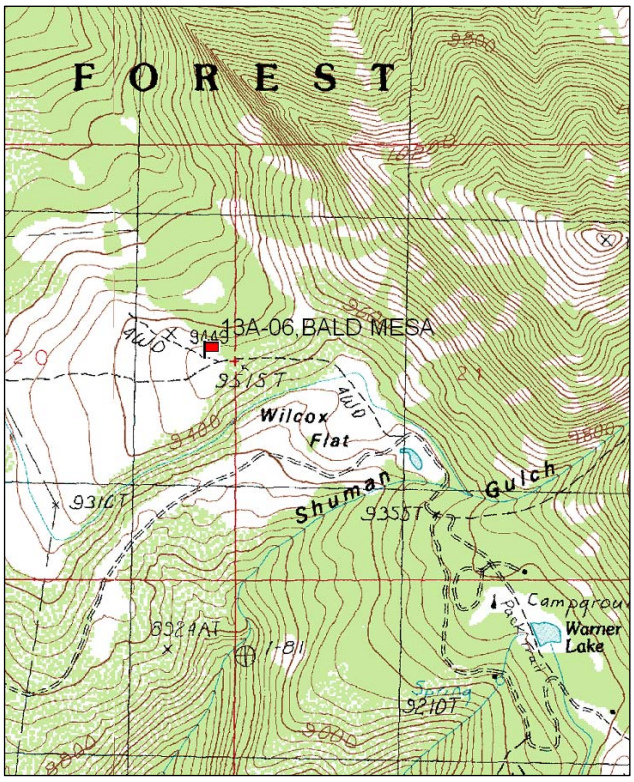
BALD MESA - TREND STUDY NO. 13A-6-09

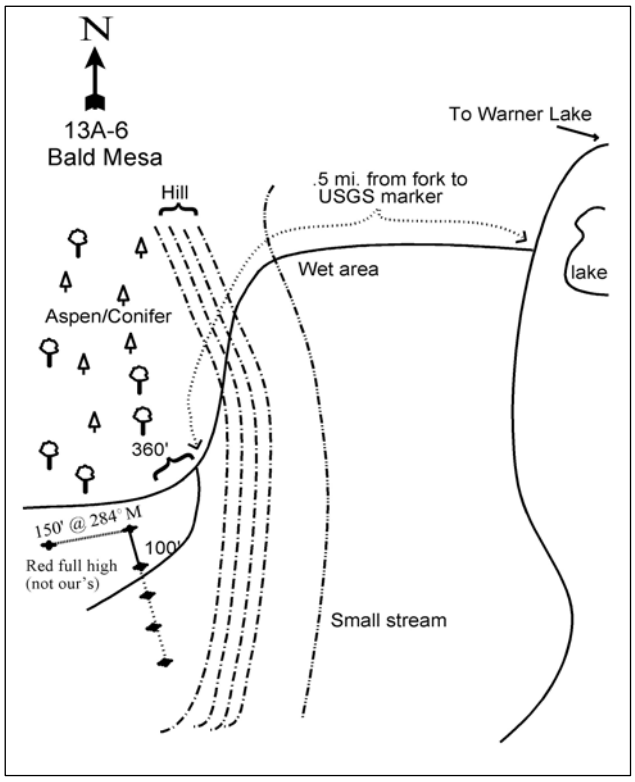
Vegetation Type: Mixed Mountain Brush
Range Type: Crucial Deer Summer, Crucial Elk Summer
NRCS Ecological Site Description: High Mountain Clay, R048AY503UT
Land Ownership: US Forest Service
Elevation: 9,500 ft (2,896 m)
Aspect: Southwest
Slope: 5%
Transect bearing: 185 degrees magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:
From the La Sal Mountain Loop Road, take the Warner Lake Campground road 4.8 miles. Turn left onto a minor road which crosses Wilcox Flat, then turns into a rough, rutted road going up the side of the hill to Bald Mesa. Walk or drive 0.5 miles up this road, continuing past the aspen-conifer edge to a fork in the meadow. Follow the right fork 200 feet to the first baseline stake, located 10 feet off the road to the left. The transect is marked by 12" fence posts.

Map Name: Warner Lake



Diagrammatic Sketch:



Township: 26S, Range: 24E, Section: 20

GPS: NAD 83, UTM 12S 649195 E 4265676 N

BALD MESA - TREND STUDY NO. 13A-6

Site Information

Site Description: This study is just west of the high La Sal peaks and samples a typical high elevation mesa that supports a mountain brush-forb-grass vegetation type. This type occupies only a small percentage of the high country. Here it is bounded to the north and east by aspen (*Populus tremuloides*) and conifer forests. This area is part of the Bald Mesa grazing allotment and is used mostly as summer range for cattle with some big game use. Pellet group data estimated light use by deer and elk, with very heavy use by cattle since 1999 (Table - Pellet Group Data).

Browse: Snowberry (*Symphoricarpos oreophilus*) forms the dominant shrub cover on this site. Preferred browse species found on the site consist of a small number of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and two currant species (*Ribes cereum* ssp. *cereum* and *R. montigenum*). Mountain big sagebrush has been increasing in density on the site over the sample period (Table - Browse Characteristics), likely due to heavy cattle grazing. Because of the moderately high elevation, this site would not normally be used as a winter range; consequently, browse is not a critical component for this site. The browse component provides approximately 30% of the total vegetation cover on average.

Herbaceous Understory: Herbaceous vegetation forms a diverse and dense understory. Perennial forbs are abundant providing an average of 47% of the vegetation cover. These species provide valuable summer forage. More than 30 perennial forb species have been sampled on the site since the outset of the study. Some of the most common species include ballhead sandwort (*Arenaria congesta*), pacific aster (*Aster chilensis*), *Astragulus spp.*, silky lupine (*Lupinus sericeus*), and silverweed cinquefoil (*Potentilla anersina*). There has been a steady decrease in the sum of nested frequency of perennial forbs over the sample years, though cover has remained similar (Table - Herbaceous Trends).

Grasses are also quite dense providing an average of 24% of the vegetation cover over the sample years. Kentucky bluegrass (*Poa pratensis*) is the dominant grass on the site. Other common grass species include Letterman needlegrass (*Stipa lettermani*), needle-and-thread grass (*S. comata*), and bottlebrush squirreltail (*Sitanion hystrix*).

Soil: The clay loam soil is slightly acidic (6.2 pH) and gravelly with scattered rock on the surface. Effective rooting depth is 15 inches. Phosphorus has a low availability for plant growth and development at 6.1 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). The erosion condition classification rated soil as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1987 to 1994 - stable (0):** Differences in browse density may be related to the larger sample area used in 1994; therefore, other parameters were used to determine the trend. Since this site is not considered to be winter range, browse is not a crucial element of the site. There was little change in the major browse species.
- **1994 to 1999 - stable (0):** Density of serviceberry decreased 33%, but cover increased slightly.
- **1999 to 2004 - up (+2):** Density of mountain big sagebrush increased more than two-fold, mostly due to a high proportion of young plants. Decadence of sagebrush declined, and vigor remained good. An increase in shrubs may not be desired on this site since it is not winter range.
- **2004 to 2009 - up (+2):** Density of mountain big sagebrush increased by 22%, though cover has not reflected the change in density. That is because much of the increase is due to the recruitment of young plants that do not provide much cover. Decadence and vigor remain very good in the population.

Grass:

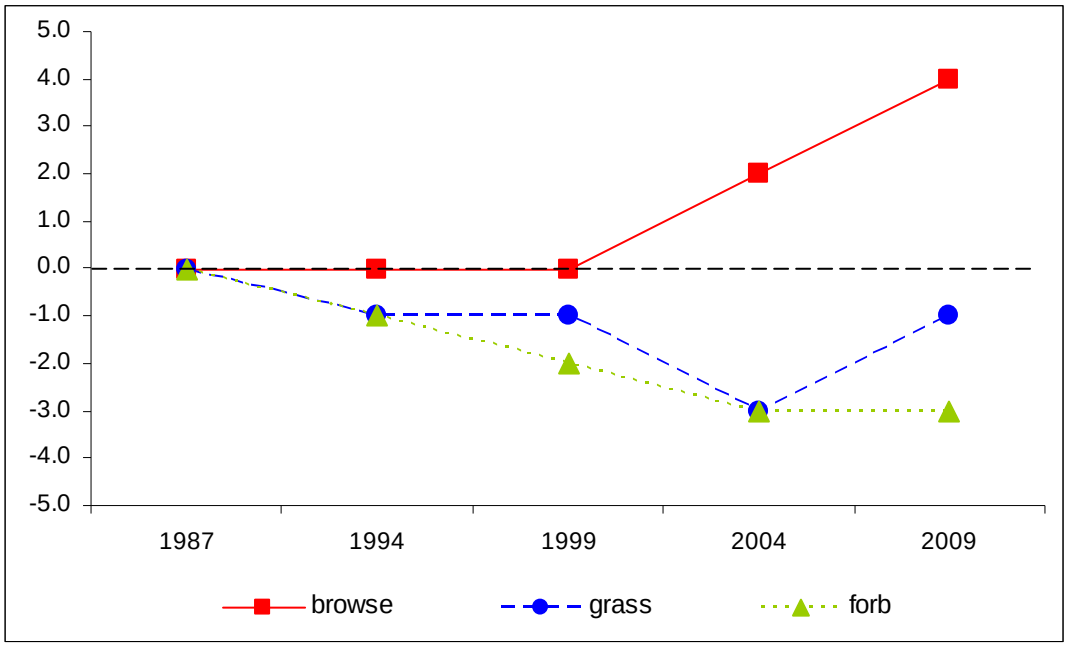
- **1987 to 1994 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 14%. There was a significant decrease in the nested frequency of the *Agropyron sp.*, plains bluegrass (*Poa arida*), and needle-and-thread grass. There was a significant increase in the nested frequency of prairie junegrass (*Koleria cristata*), Kentucky bluegrass, and Letterman needlegrass.
- **1994 to 1999 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased markedly from 16% to 27%.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial grasses decreased by 25%, and cover decreased to 11%. There was a significant decrease in the nested frequency of Kentucky bluegrass.
- **2004 to 2009 - up (+2):** The sum of nested frequency of perennial grasses increased 20% and cover increased to 17%. There was a significant increase in the nested frequency of Kentucky bluegrass and Letterman needlegrass.

Forb:

- **1987 to 1994 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 14%. There was a shift in composition as many forbs decreased significantly in nested frequency and others increased.
- **1994 to 1999 - slightly down (-1):** The sum of nested frequency of perennial forbs continued to decrease by another 19%. Ballhead sandwort and pacific aster decreased significantly in nested frequency.
- **1999 to 2004 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by another 13%. There was a significant decrease in nested frequency of dandelion (*Taraxacum officinale*) and thistle (*Cirsium calcareum*). There was a significant increase in the nested frequency of ballhead sandwort and Oregon fleabane (*Erigeron speciosus*).
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though cover decreased markedly.

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 13A, Study no: 6



HERBACEOUS TRENDS--
Management unit 13A, Study no: 6

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron sp.	b128	a-	a1	a-	a-	-	.01	-	-
G	Bromus anomalus	1	5	-	-	-	.04	-	-	-
G	Carex sp.	4	-	5	8	-	-	.03	.53	-
G	Dactylis glomerata	-	-	5	5	-	-	.04	.03	-
G	Koeleria cristata	a-	b35	b27	b25	b33	.36	.21	.25	.19
G	Phleum pratense	-	-	5	-	-	-	.15	-	-
G	Poa arida	b136	ab28	a17	a3	a-	.54	1.07	.03	-
G	Poa fendleriana	-	-	3	-	-	-	.03	-	-
G	Poa pratensis	b257	c332	c346	a237	b274	12.42	22.36	8.07	13.42
G	Sitanion hystrix	a34	b57	ab45	ab40	ab36	.80	.72	.74	.40
G	Stipa comata	b99	a49	a32	a28	a39	1.14	.68	.33	.44
G	Stipa lettermani	a-	b59	b48	b54	c99	1.08	1.42	.90	2.66
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		659	565	534	400	481	16.42	26.75	10.90	17.14
Total for Grasses		659	565	534	400	481	16.42	26.75	10.90	17.14
F	Achillea millefolium	b102	b125	b110	a42	a44	2.53	2.02	.49	.74
F	Agoseris glauca	-	14	19	7	6	.08	.12	.07	.15
F	Androsace septentrionalis (a)	b16	a-	a-	a-	a-	-	-	-	-
F	Arabis drummondi	b38	a-	a-	a-	a-	-	-	-	-
F	Arenaria congesta	a181	bc240	a195	c255	ab204	8.03	5.33	13.60	7.45
F	Aster chilensis	a-	b50	a-	a12	c103	.89	-	.24	4.43
F	Aster sp.	a-	a-	a-	b13	c29	-	-	.15	.77
F	Astragalus miser	d226	c191	b72	a-	a1	7.73	3.42	-	.03
F	Astragalus sp.	a-	a-	b179	b183	a-	-	7.96	7.79	-
F	Calochortus nuttallii	a-	ab3	b13	a5	ab5	.01	.08	.01	.01
F	Carduus nutans (a)	-	-	-	-	-	-	-	.00	-
F	Castilleja linariaefolia	a-	c19	bc15	ab3	a1	.26	.30	.01	.00
F	Chenopodium album (a)	-	-	1	-	-	-	.00	-	-
F	Cirsium calcareum	b51	c108	b52	a4	a2	1.19	1.97	.19	.03
F	Clematis hirsutissima	b13	a-	a-	a-	a-	-	-	-	-
F	Collinsia parviflora (a)	-	-	1	1	-	-	.00	.00	-
F	Collomia linearis (a)	-	-	-	-	5	-	-	-	.01
F	Comandra pallida	b28	b21	b31	b14	a-	.33	.78	.10	-
F	Crepis acuminata	15	18	18	2	7	.16	.45	.06	.24
F	Delphinium nuttallianum	b75	a8	a-	a6	a-	.08	-	.02	-
F	Erigeron flagellaris	88	52	29	55	25	.33	.21	1.31	.67
F	Erigeron sp.	a-	a-	a-	a-	b7	-	-	-	.10
F	Erigeron speciosus	ab39	bc65	a15	c80	a-	1.98	.27	3.97	-
F	Eriogonum racemosum	61	65	56	56	62	1.35	.84	.89	1.30
F	Eriogonum umbellatum	12	6	2	-	-	.01	.15	-	-
F	Galium boreale	-	5	4	4	-	.53	.41	.18	-
F	Holosteum umbellatum (a)	-	-	5	-	-	-	.01	-	-
F	Ipomopsis aggregata	2	3	3	-	-	.00	.00	-	-

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
F	Lathyrus brachycalyx	a-	a-	a-	a-	b168	-	.53	-	7.02
F	Ligusticum sp.	-	-	-	-	9	-	-	-	.15
F	Lomatium dissectum	-	3	1	7	2	.00	.38	.53	.00
F	Lupinus argenteus	-	8	-	-	-	.33	-	-	-
F	Lupinus sericeus	b117	a49	a41	a40	a32	2.83	2.66	2.12	1.45
F	Lychnis drummondii	-	-	2	-	-	-	.01	-	-
F	Mertensia brevistyla	8	3	-	-	-	.00	-	-	-
F	Penstemon crandallii	a-	a2	a6	ab10	b18	.03	.06	.45	.38
F	Penstemon humilis	-	-	-	-	1	-	-	-	.03
F	Penstemon palmeri	b49	a4	a4	a-	a-	.15	.03	-	-
F	Penstemon strictus	a-	c32	bc31	ab9	a2	.52	.61	.09	.06
F	Petradoria pumila	a-	b26	bc31	bc29	c47	.92	.51	1.46	1.42
F	Phlox sp.	-	3	3	-	-	.15	.03	-	-
F	Polygonum douglasii (a)	-	a1	ab15	b22	a4	.00	.03	.05	.03
F	Potentilla anersina	64	95	78	84	85	2.24	1.72	2.71	2.51
F	Sedum lanceolatum	b22	a1	a-	a2	a-	.00	-	.03	-
F	Senecio integerrimus	c197	b84	a29	a25	a42	1.18	.29	.26	.64
F	Taraxacum officinale	c172	b66	b65	a20	a10	.39	1.35	.35	.10
F	Thalictrum fendleri	-	-	3	-	-	-	.30	-	-
F	Trifolium sp.	1	-	3	-	-	-	.00	-	-
F	Unknown forb-perennial	b34	a-	a-	a-	a-	-	-	-	-
F	Zigadenus paniculatus	2	-	-	-	-	-	-	-	-
Total for Annual Forbs		16	1	22	23	9	0.00	0.05	0.06	0.05
Total for Perennial Forbs		1597	1369	1110	967	912	34.35	32.89	37.12	29.75
Total for Forbs		1613	1370	1132	990	921	34.36	32.94	37.18	29.80

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

BROWSE TRENDS--
Management unit 13A, Study no: 6

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Artemisia tridentata vaseyana	19	22	23	24	1.96	1.57	1.22	1.41
B	Chrysothamnus viscidiflorus lanceolatus	41	34	37	36	1.79	2.50	2.75	2.63
B	Clematis sp.	0	0	0	0	-	.15	-	-
B	Ribes cereum cereum	0	3	3	3	-	1.33	1.53	2.49
B	Ribes montigenum	0	3	2	1	-	1.26	1.99	.85
B	Ribes sp.	4	0	0	0	2.62	-	-	-
B	Rosa woodsii	1	1	1	0	.15	.00	.00	-
B	Sambucus racemosa	1	3	2	3	.03	.00	.00	.00
B	Symphoricarpos oreophilus	46	49	47	46	13.17	14.17	15.92	12.69
Total for Browse		112	115	115	113	19.72	21.01	23.43	20.07

CANOPY COVER, LINE INTERCEPT--
Management unit 13A, Study no: 6

Species	Percent Cover	
	'04	'09
Artemisia tridentata vaseyana	.90	1.54
Chrysothamnus viscidiflorus lanceolatus	2.76	4.58
Ribes cereum cereum	2.95	3.09
Ribes montigenum	.15	.98
Sambucus racemosa	-	.46
Symphoricarpos oreophilus	18.35	19.73

BASIC COVER--
Management unit 13A, Study no: 6

Cover Type	Average Cover %				
	'87	'94	'99	'04	'09
Vegetation	26.00	66.22	70.77	67.34	67.25
Rock	2.75	1.59	1.36	1.61	2.87
Pavement	0	.20	1.12	1.39	.77
Litter	64.00	39.64	54.87	30.88	48.26
Cryptogams	.50	.12	.06	0	0
Bare Ground	6.75	6.11	5.03	12.82	8.04

SOIL ANALYSIS DATA --
Management unit 13A, Study no: 6, Study Name: Bald Mesa

Effective rooting depth (in)	pH	clay loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15	6.2	40.2	32.6	27.3	5	6.1	2620.4	0.4

PELLET GROUP DATA--
Management unit 13A, Study no: 6

Type	Quadrat Frequency			
	'94	'99	'04	'09
Elk	4	3	1	1
Deer	-	1	1	-
Cattle	4	17	22	28

Days use per acre (ha)		
'99	'04	'09
9 (22)	5 (13)	3 (7)
-	1 (3)	3 (7)
84 (207)	112 (276)	33 (82)

BROWSE CHARACTERISTICS--
Management unit 13A, Study no: 6

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia tridentata vaseyana									
87	**932**	0	43	57	-	36	29	29	15/25
94	**620**	10	58	32	80	10	0	10	16/20
99	**620**	26	48	26	180	58	0	0	14/21
04	**1540**	44	49	6	-	1	0	4	13/17
09	**1880**	20	79	1	160	45	6	2	12/18

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Chrysothamnus viscidiflorus lanceolatus									
87	**2998**	44	40	16	133	44	9	0	13/21
94	**1340**	9	91	0	-	0	0	0	14/18
99	**1060**	6	94	0	-	4	0	0	14/18
04	**1320**	2	98	0	-	8	0	0	13/18
09	**1300**	3	97	0	-	0	0	6	14/19
Clematis sp.									
87	**0**	0	0	-	-	0	0	0	-/-
94	**0**	0	0	-	-	0	0	0	-/-
99	**0**	0	0	-	-	0	0	0	-/-
04	**0**	0	0	-	-	0	0	0	-/-
09	**0**	0	0	-	-	0	0	0	22/16
Ribes cereum cereum									
87	**0**	0	0	-	-	0	0	0	-/-
94	**0**	0	0	-	-	0	0	0	-/-
99	**60**	0	100	-	-	0	0	0	65/90
04	**60**	0	100	-	-	0	0	0	56/62
09	**60**	0	100	-	-	0	0	0	75/118
Ribes montigenum									
87	**0**	0	0	-	-	0	0	0	-/-
94	**0**	0	0	-	-	0	0	0	-/-
99	**60**	0	100	-	-	0	0	0	34/37
04	**40**	0	100	-	-	0	0	0	26/24
09	**40**	0	100	-	-	0	0	0	66/77
Ribes sp.									
87	**0**	0	0	-	-	0	0	0	-/-
94	**180**	0	100	-	-	0	0	0	49/93
99	**0**	0	0	-	-	0	0	0	-/-
04	**0**	0	0	-	-	0	0	0	-/-
09	**0**	0	0	-	-	0	0	0	-/-
Rosa woodsii									
87	**0**	0	0	-	-	0	0	0	-/-
94	**20**	0	100	-	-	0	0	0	12/19
99	**20**	100	0	-	-	0	0	0	-/-
04	**20**	0	100	-	-	0	0	0	27/14
09	**0**	0	0	-	-	0	0	0	-/-
Sambucus racemosa									
87	**0**	0	0	-	-	0	0	0	-/-
94	**60**	0	100	-	-	0	0	0	29/40
99	**60**	33	67	-	-	0	0	0	35/39
04	**40**	0	100	-	-	0	0	0	27/22
09	**100**	20	80	-	-	0	0	0	27/31

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Symphoricarpos oreophilus									
87	**4798**	72	22	6	1866	31	1	0	25/23
94	**2100**	9	91	0	-	0	0	0	22/50
99	**1400**	7	81	11	80	13	1	0	25/42
04	**1360**	3	94	3	-	0	0	1	21/48
09	**1680**	6	90	4	-	6	18	17	24/46