

Trend Study 23-2-08

Study site name: Saul Meadow .

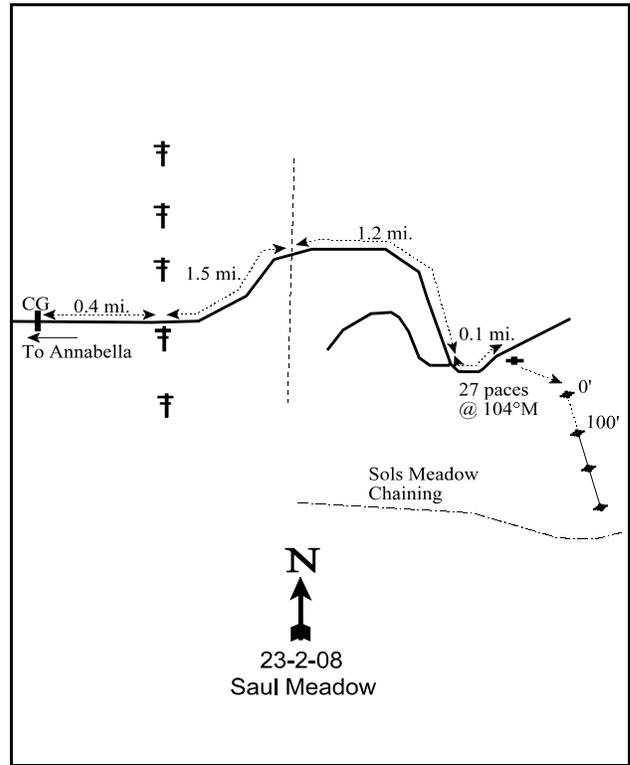
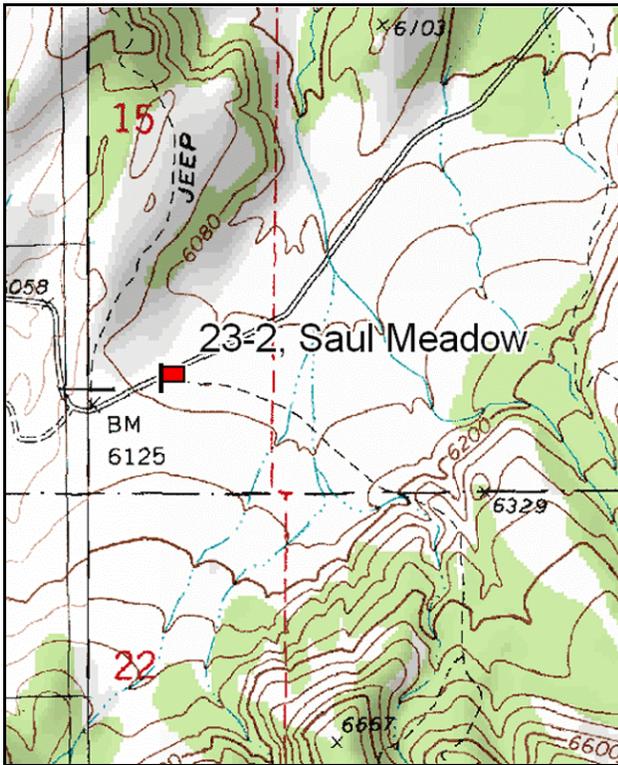
Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 167 degrees magnetic.

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

LOCATION DESCRIPTION

Starting from the Annabella cemetery go northeast 0.1 miles to a cattleguard. Bear left and go 0.4 miles crossing under a powerline. Continue 1.5 miles to the BLM boundary sign, then 1.2 miles more to a fork in the road. Continue straight 0.1 miles on the main road to a green and yellow fencepost on the right. The rebar marking the 0-foot end of the frequency baseline is 27 paces at 104 degrees magnetic from the green and yellow fencepost (which marks the start of a pellet transect).



Map Name: Water Creek Canyon

Diagrammatic Sketch

Township 24S, Range 2W, Section 15

GPS: NAD 83, UTM 12S 413150 E, 4284872 N

DISCUSSION

Saul Meadow - Trend Study No. 23-2

Study Information

This study is located on BLM land on the northwest side of the Monroe Mountains [elevation: 6,130 feet (1,868 m), slope: 3%-6%, aspect: north]. The area was chained and aerially seeded with crested wheatgrass (*Agropyron cristatum*) in 1965. This area was treated by lop and scatter between 1998 and 2003 to remove Utah juniper (*Juniperus osteosperma*) trees. Data collected on the DWR Maple Creek pellet group transect indicated that deer use has generally been moderate in the area. A pellet group transect sampled along the study baseline estimated deer use at 94 days use/acre (232 ddu/ha) in 1998, 59 days use/acre (145 ddu/ha) in 2003, and 85 days use/acre (210 ddu/ha) in 2008. Elk use was estimated at 18 days use/acre (44 edu/ha) in 1998, 10 days use/acre (25 edu/ha) in 2003, and 15 days use/acre (38 edu/ha) in 2008. Currently, the seeding has permits for 22 AUMs for cattle in May, June, and October. Cattle use was low at 4 days use/acre (10 cdu/ha) in 1998 and 1 day use/acre (4 cdu/ha) in 2003, and no cattle pats were sampled in 2008. Sheep do not use this portion of the allotment.

Soil

The soil is a sandy loam with a neutral reaction (pH 6.6). Organic matter content is low at 1.2%, and soil phosphorus is marginal for plant growth and development at 8.6 ppm (Tiedemann and Lopez 2004). Relative combined vegetation and litter cover has been 56%-68% since 1998, and relative combined rock and pavement cover has been 11%-13%. Relative bare ground cover has been 19%-30% since 1998. The soil erosion condition was classified as stable in 2003 and 2008.

Browse

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) comprises most of the browse on the study, although shadscale (*Atriplex confertifolia*) is present in low densities. Sagebrush provided 13% quadrat cover in 1998, 15% in 2003, and 8% in 2008. Density has ranged from 2,740 plants/acre to 3,060 plants/acre since 1998. Decadence was relatively low in 1985 at 12% of the population, but has been high at 28%-52% since 1991. Young recruitment was high in 1985 at 42% of the population, and has varied between 8% and 31% since 1991. The density of dead plants has ranged from 1,500 plants/acre to 1,760 plants/acre since 1998. Plants showing poor vigor have ranged from 5%-26% over the sample years. Browse use varied from light to heavy in 1985 and 2008, and was light-moderate in 1991, 1998, and 2003. Average annual leader growth was 1.4 inches (3.5 cm) in 2003 and 0.8 inches (2.0 cm) in 2008.

Point-centered quarter data estimated juniper density at 19 trees/acre in 1998, with an average trunk diameter of 5.4 inches (13.7 cm). Juniper trees were not sampled in 2003 following the lop and scatter treatment, but density was estimated at 21 trees/acre in 2008, with an average trunk diameter of 2.2 inches (5.6 cm). The trees sampled in 2008 were 1-4 feet (0.3-1.2 m) in height.

Herbaceous Understory

The herbaceous component is low in cover and diversity. Three grass species, including crested wheatgrass, bottlebrush squirreltail (*Sitanion hystrix*), and cheatgrass (*Bromus tectorum*), have been sampled consistently. Crested wheatgrass cover has remained stable at approximately 7% since 1998, and bottlebrush squirreltail has provided less than 1% cover. Cheatgrass cover decreased from 12% in 1998 to 6% in 2003 and 2008.

Forbs are rare and provide little cover. Annual species such as pale alyssum (*Alyssum alyssoides*), tumbled mustard (*Sisymbrium altissimum*), and bur buttercup (*Ranunculus testiculatus*) dominate the forb component.

1991 TREND ASSESSMENT

The trend for browse is stable. Sagebrush density increased from 5,398 plants/acre to 6,399 plants/acre, but decadence increased from 12% of the population to 52%. Young recruitment decreased from 42% of the population to 18%, and plants exhibiting poor vigor increased from 5% of the population to 24%. The trend for grass is up. The sum of nested frequency for perennial grasses increased 39%, and bottlebrush squirreltail increased significantly in nested frequency. The trend for forbs is stable. Few forbs were sampled.

browse - stable (0)

grass - up (+2)

forb - stable (0)

1998 TREND ASSESSMENT

The browse trend is stable. Density changes of browse species may have been related to the larger sample area in 1998, therefore, the trend for browse was determined using other parameters. Sagebrush decadence remained high at 44% of the population, and young recruitment continued to decline from 18% of the population to 8%. Plants displaying poor vigor decreased from 24% of the population to 14%. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little. The trend for forbs is stable. Few forbs were sampled. The winter range condition, determined by the Desirable Components Index (DCI), was rated as fair due to moderate preferred browse and perennial grass cover.

winter range condition (DCI) - fair (28) Low potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

2003 TREND ASSESSMENT

The browse trend is slightly up. Sagebrush density increased 8%, and decadence decreased from 44% of the population to 28%. Young recruitment increased from 8% to 31%, and plants displaying poor vigor stayed constant at approximately 13% of the population. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little, but cheatgrass decreased significantly in nested frequency. The trend for forbs is stable. Few forbs were sampled. The DCI rating improved to good due to increases in preferred browse cover and young recruitment, and a decrease in browse decadence.

winter range condition (DCI) - good (50) Low potential scale

browse - slightly up (+1)

grass - stable (0)

forb - stable (0)

2008 TREND ASSESSMENT

The browse trend is slightly down. Sagebrush density decreased 11%, and decadence increased from 28% of the population to 36%. Young recruitment decreased from 31% of the population to 9%. Plants displaying poor vigor increased from 13% of the population to 26%. The density of dead plants sampled increased from 1,500 plants/acre to 1,760 plants/acre. The trend for grass is stable. There was little change in sum of nested frequency for perennial grasses, but cover of perennial grasses increased to 36% of the total vegetative cover. Cheatgrass increased significantly in nested frequency, but cover remained similar. The trend for forbs is stable. Few forbs were sampled and no perennial forbs were sampled. The DCI rating declined to fair due to decreases in preferred browse cover and young recruitment, and an increase in browse decadence.

winter range condition (DCI) - fair (31) Low potential scale

browse - slightly down (-1)

grass - stable (0)

forb - stable (0)

HERBACEOUS TRENDS --

Management unit 23 , Study no: 2

| T y p e | Species | Nested Frequency | | | | | Average Cover % | | |
|-----------------------------|------------------------------------|------------------|-----------------|------------------|------------------|------------------|-----------------|-------|-------|
| | | '85 | '91 | '98 | '03 | '08 | '98 | '03 | '08 |
| G | <i>Agropyron cristatum</i> | 97 | 114 | 132 | 135 | 125 | 7.03 | 6.89 | 7.53 |
| G | <i>Bromus tectorum</i> (a) | - | - | _b 252 | _a 228 | _c 289 | 11.73 | 5.92 | 5.63 |
| G | <i>Sitanion hystrix</i> | _a 4 | _b 26 | _{ab} 10 | _{ab} 11 | _{ab} 12 | .45 | .31 | .51 |
| G | <i>Vulpia octoflora</i> (a) | - | - | - | 7 | - | - | .01 | - |
| Total for Annual Grasses | | 0 | 0 | 252 | 235 | 289 | 11.73 | 5.94 | 5.63 |
| Total for Perennial Grasses | | 101 | 140 | 142 | 146 | 137 | 7.49 | 7.20 | 8.04 |
| Total for Grasses | | 101 | 140 | 394 | 381 | 426 | 19.22 | 13.14 | 13.67 |
| F | <i>Alyssum alyssoides</i> (a) | - | - | _a 2 | _a 4 | _b 66 | .00 | .01 | .16 |
| F | <i>Eriogonum cernuum</i> (a) | 6 | 5 | - | - | - | - | - | - |
| F | <i>Euphorbia</i> sp. | - | - | 2 | - | - | .00 | - | - |
| F | <i>Gayophytum ramosissimum</i> (a) | - | - | 3 | 3 | 2 | .00 | .00 | .00 |
| F | <i>Ranunculus testiculatus</i> (a) | - | - | _a - | _b 13 | _{ab} 7 | - | .06 | .01 |
| F | <i>Sisymbrium altissimum</i> (a) | - | 19 | _a - | _b 19 | _a 2 | - | .65 | .03 |
| F | <i>Stephanomeria pauciflora</i> | 3 | - | - | - | - | - | - | - |
| Total for Annual Forbs | | 6 | 24 | 5 | 39 | 77 | 0.00 | 0.72 | 0.21 |
| Total for Perennial Forbs | | 3 | 0 | 2 | 0 | 0 | 0.00 | 0 | 0 |
| Total for Forbs | | 9 | 24 | 7 | 39 | 77 | 0.01 | 0.72 | 0.21 |

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

BROWSE TRENDS --

Management unit 23 , Study no: 2

| T y p e | Species | Strip Frequency | | | Average Cover % | | |
|------------------|--|-----------------|-----|-----|-----------------|-------|------|
| | | '98 | '03 | '08 | '98 | '03 | '08 |
| B | <i>Artemisia tridentata wyomingensis</i> | 78 | 75 | 73 | 12.83 | 14.86 | 8.49 |
| B | <i>Atriplex canescens</i> | 0 | 1 | 0 | - | .00 | - |
| B | <i>Atriplex confertifolia</i> | 0 | 0 | 0 | - | - | .15 |
| B | <i>Gutierrezia sarothrae</i> | 2 | 0 | 0 | .00 | - | - |
| B | <i>Juniperus osteosperma</i> | 3 | 0 | 0 | 2.00 | - | - |
| B | <i>Opuntia</i> sp. | 4 | 2 | 3 | .00 | .00 | .00 |
| Total for Browse | | 87 | 78 | 76 | 14.83 | 14.86 | 8.65 |

CANOPY COVER, LINE INTERCEPT --

Management unit 23 , Study no: 2

| Species | Percent Cover | | |
|-----------------------------------|---------------|-------|-------|
| | '98 | '03 | '08 |
| Artemisia tridentata wyomingensis | - | 12.03 | 11.94 |
| Juniperus osteosperma | 1.39 | - | - |
| Opuntia sp. | - | .08 | .11 |

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 23 , Study no: 2

| Species | Average leader growth (in) | |
|-----------------------------------|----------------------------|-----|
| | '03 | '08 |
| Artemisia tridentata wyomingensis | 1.4 | 0.8 |

POINT-QUARTER TREE DATA --

Management unit 23 , Study no: 2

| Species | Trees per Acre | | |
|-----------------------|----------------|-----|-----|
| | '98 | '03 | '08 |
| Juniperus osteosperma | 19 | - | 21 |

| Average diameter (in) | | |
|-----------------------|-----|-----|
| '98 | '03 | '08 |
| 5.4 | - | 2.2 |

BASIC COVER --

Management unit 23 , Study no: 2

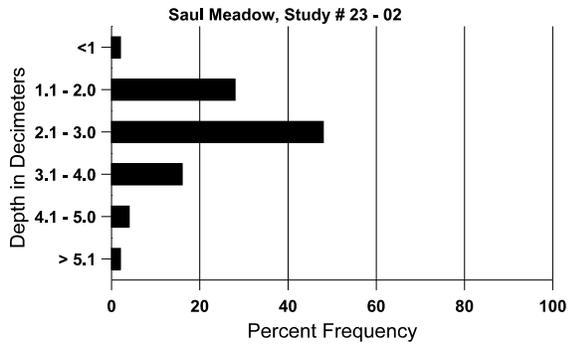
| Cover Type | Average Cover % | | | | |
|-------------|-----------------|-------|-------|-------|-------|
| | '85 | '91 | '98 | '03 | '08 |
| Vegetation | 5.00 | 3.75 | 31.53 | 27.32 | 22.91 |
| Rock | 5.00 | 2.00 | 4.00 | 4.58 | 3.13 |
| Pavement | 25.00 | 16.00 | 7.97 | 8.46 | 12.23 |
| Litter | 44.25 | 46.00 | 45.56 | 36.73 | 56.79 |
| Cryptogams | 0 | 1.50 | 1.85 | 1.64 | .52 |
| Bare Ground | 20.75 | 30.75 | 21.92 | 34.51 | 21.77 |

SOIL ANALYSIS DATA --

Management unit 23, Study no: 2, Study Name: Saul Meadow

| Effective rooting depth (in) | Temp °F (depth) | pH | sandy loam | | | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----------------|-----|------------|-------|-------|-----|-------|-------|------|
| | | | %sand | %silt | %clay | | | | |
| 16.9 | 79.0 (12.1) | 6.6 | 62.0 | 19.4 | 18.6 | 1.2 | 8.6 | 115.2 | 0.5 |

Stoniness Index



PELLET GROUP DATA --

Management unit 23, Study no: 2

| Type | Quadrat Frequency | | |
|--------|-------------------|-----|-----|
| | '98 | '03 | '08 |
| Rabbit | 57 | 68 | 80 |
| Elk | 11 | 3 | 11 |
| Deer | 52 | 36 | 47 |
| Cattle | 1 | 2 | 1 |

| Days use per acre (ha) | | |
|------------------------|----------|----------|
| '98 | '03 | '08 |
| - | - | - |
| 18 (44) | 10 (25) | 15 (38) |
| 94 (232) | 59 (145) | 85 (210) |
| 4 (10) | 1 (4) | - |

BROWSE CHARACTERISTICS --
Management unit 23 , 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>Artemisia tridentata wyomingensis</i> | | | | | | | | | | | | |
| 85 | 5398 | 599 | 2266 | 2466 | 666 | - | 36 | 22 | 12 | - | 5 | 18/23 |
| 91 | 6399 | 199 | 1133 | 1933 | 3333 | - | 25 | 1 | 52 | 7 | 24 | 26/30 |
| 98 | 2840 | 40 | 240 | 1340 | 1260 | 1520 | 45 | 4 | 44 | 14 | 14 | 24/31 |
| 03 | 3060 | 40 | 940 | 1260 | 860 | 1500 | 12 | 1 | 28 | 12 | 13 | 24/32 |
| 08 | 2740 | - | 260 | 1480 | 1000 | 1760 | 19 | 46 | 36 | 23 | 26 | 23/32 |
| <i>Atriplex canescens</i> | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 03 | 40 | - | - | 40 | - | - | 0 | 0 | - | - | 0 | -/- |
| 08 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| <i>Gutierrezia sarothrae</i> | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 40 | - | - | 40 | - | - | 0 | 0 | - | - | 0 | 6/8 |
| 03 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 08 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | 18/26 |
| <i>Juniperus osteosperma</i> | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 60 | - | - | 60 | - | - | 0 | 0 | - | - | 0 | -/- |
| 03 | 0 | - | - | - | - | 20 | 0 | 0 | - | - | 0 | -/- |
| 08 | 0 | - | - | - | - | 20 | 0 | 0 | - | - | 0 | -/- |
| <i>Opuntia sp.</i> | | | | | | | | | | | | |
| 85 | 1598 | - | 333 | 999 | 266 | - | 0 | 0 | 17 | - | 8 | 4/9 |
| 91 | 1331 | 66 | 399 | 866 | 66 | - | 15 | 0 | 5 | - | 0 | 5/6 |
| 98 | 80 | - | - | 60 | 20 | 20 | 0 | 0 | 25 | 25 | 25 | 4/6 |
| 03 | 40 | - | - | 40 | - | - | 0 | 0 | 0 | - | 0 | 6/16 |
| 08 | 60 | - | - | 40 | 20 | - | 0 | 0 | 33 | 33 | 33 | 5/20 |