

Trend Study 22-11-08

Study site name: 'B' Hill.

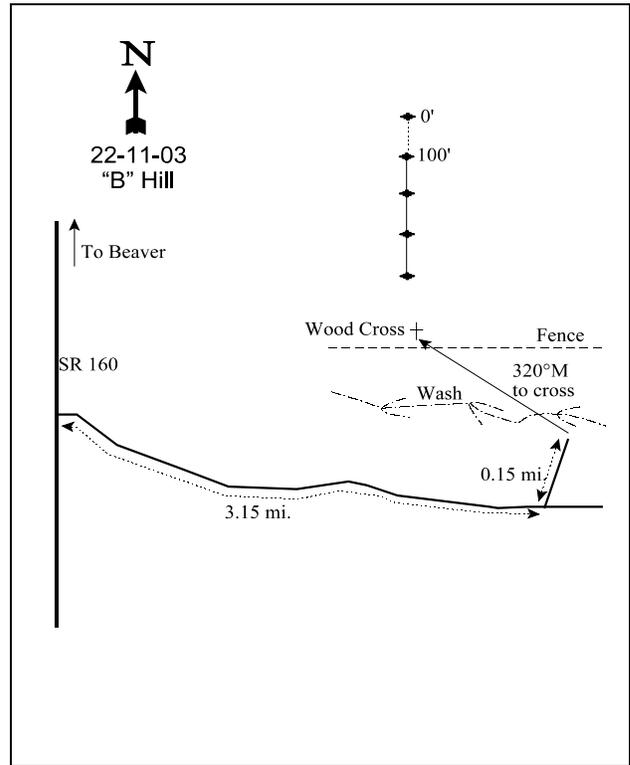
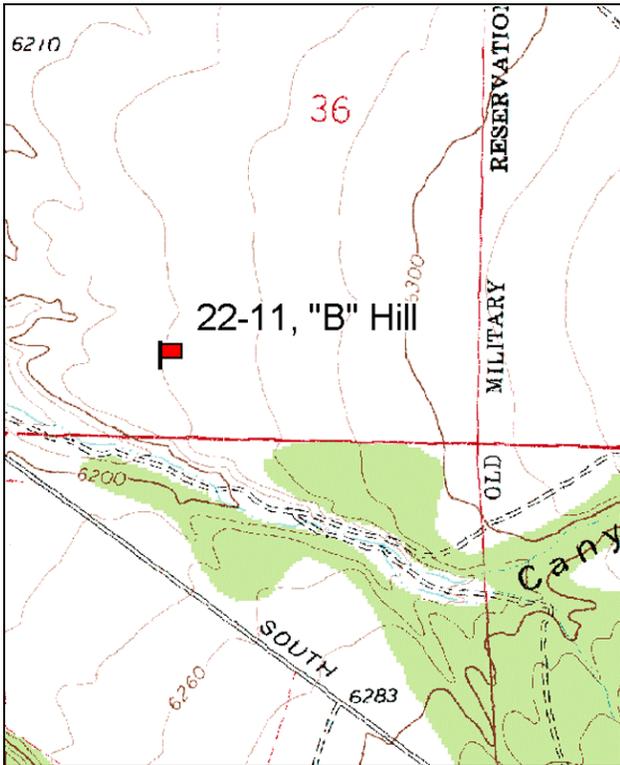
Vegetation type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees magnetic.

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

LOCATION DESCRIPTION

Starting from Beaver High School on Main Street, go south 1.6 miles. On the east side of the road there is a rock monument commemorating the "Lee's Ranch Indian Raid". Turn east at the monument onto South Creek Road. Go 3.15 miles up South Creek Road staying on the main road. Turn left and go down to the bottom of the wash where it meets another road. From this intersection, walk up the hill to the north at 320 degrees magnetic to the wooden cross braces. From the left wood post, go 100 feet at 15 degrees magnetic to the 400-foot stake. The study is marked by 2 ½ foot rebar that are 100 feet apart. The 0-foot baseline stake is marked by a short rebar tagged #7059.



Map Name: Kane Canyon

Diagrammatic Sketch

Township 29S, Range 7W, Section 36

GPS: NAD 83, UTM 12S 360146 E, 4233276 N

DISCUSSION

'B' Hill - Trend Study No. 22-11

Study Information

This study is located on a section of DWR land commonly known as the B-Hill WMA [elevation: 6,200 feet (1,890m), slope: 1%, aspect: west] which is part of the crucial and limited deer winter range south of Beaver and east of I-15. Historically, deer concentrate here in the South Creek area during the winter with the accompanying problems of spring crop depredation and overuse on the range. A pinyon (*Pinus edulis*) – juniper (*Juniperus osteosperma*) eradication project and aerial seeding was done in 1959. Some locations were harrowed and drilled. The wash just to the south of the study area contains an open stand of Utah juniper and provides the only cover near the flat. The site is nearly level with only a slight slope. The DWR "B" Hill pellet group transect, which samples a slightly higher elevation area near the study site, averaged 53 deer days use/acre (131 ddu/ha) from 1980-1985 (Jense et al. 1985), and 55 deer days use/acre (136 ddu/ha) from 1986-1990 (Jense et al. 1991). From 1993-1997, deer use averaged 17 days use/acre (42 ddu/ha) (Evans et al. 1997). A pellet group transect read on the trend study site estimated 5 deer days use/acre and 13 cow days use/acre (12 ddu/ha and 32 cdu/ha) in 1998, 14 deer and 4 cow days use/acre (35 ddu/ha and 9 cdu/ha) in 2003, and 13 deer days use/acre (33 ddu/ha) in 2008.

Soil

The site is within the Murdock series (USDA-NRCS 2007) and consists of moderately deep, well drained soils that formed in alluvial soil material. These soils are on dissected terraces. Due to the levelness of the terrain, runoff and the hazard of erosion is low. Soils were given a stable rating from an erosion condition class assessment completed in 2003 and 2008. The soil surface and profile are very rocky and there are signs from the past of pedestalling around some of the plants. Soil analysis indicates a sandy clay loam texture with a neutral pH (7.1). Average effective rooting depth was estimated at just over 13 inches. Phosphorous levels in the soil profile are low at 4.6 ppm, which may inhibit plant growth and development (Tiedemann and Lopez 2004). There appears to be a hardpan about one foot below the surface.

Browse

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is the key browse species on the site and the density is considered moderately low for this type of site. Sagebrush density was estimated at 1,200 plants/acre in 1998, 1,040 plants/acre in 2003 and only 860 plants/acre in 2008. Decadence was fairly low in 1991 and 1998 at just over 20%, increased to 40% in 2003, and decreased slightly to 30% in 2008. No decadent plants were sampled during the initial reading in 1985. The proportion of young plants (recruitment) in the population was fairly high from 1985-1998 to replace the decadent, dying individuals. Since 2003, the overall average for recruitment has only been 3%. Since 1998, sagebrush density has decreased by 17%, from 1,200 plants/acre to 860 plants/acre in 2008. Other shrubs are rare.

Herbaceous Understory

The most common grasses are crested wheatgrass (*Agropyron cristatum*) and Russian wildrye (*Elymus junceus*). Crested wheatgrass has maintained a stable nested frequency value over all readings. Russian wildrye declined in 1998, but increased significantly between 2003 and 2008. Western wheatgrass (*Agropyron smithii*), intermediate wheatgrass (*Agropyron intermedium*), and Indian ricegrass (*Oryzopsis hymenoides*) are also important species present on the site, but are less abundant. Sum of nested frequency for all perennial grasses remained similar between 1998 and 2008. Forbs are sparse and add very little in terms of forage production and ground cover on this site. Scarlet globemallow (*Sphaeralcea coccinea*) and heath aster (*Leucelene ericoides*) had fair abundance in 1991, but both species have steadily declined since.

1991 TREND ASSESSMENT

Wyoming big sagebrush has demonstrated declining numbers, including fewer young (poor recruitment), and increased decadence. Trend for browse is slightly down. The trend for perennial grasses is slightly up with an increase in nested frequency. Trend for perennial forbs is also slightly up with an increase in nested frequency, however, perennial forbs have little forage value as the combined cover for forbs is very low.

browse - slightly down (-1) grass - slightly up (+1) forb - slightly up (+1)

1998 TREND ASSESSMENT

The browse trend is stable. Wyoming big sagebrush density has increased slightly since 1991, but still remains relatively low. The difference in density may be due to the larger sample size that is now being used to get a better sample of the browse population. Sagebrush cover is low at only 3% cover. Decadence has remained the same while the percentage of plants reported to have poor vigor has increased to 13%. The perennial grass trend is down. The only species that had a significant decrease in nested frequency was Russian wildrye. The trend for perennial forbs was slightly down and it should be noted that it contributes to less than 1% cover and is not a significant source of forage.

Winter Range Condition (DCI) - fair (35) low-level potential scale
browse - stable (0) grass - down (-1) forb - slightly down (-1)

2003 TREND ASSESSMENT

Trend for browse is slightly down. Wyoming big sagebrush declined in total density and recruitment of young is very low at 4%. Decadence increased to 40%, and it is likely that the sagebrush population will continue to decline in the future because there are more decadent and dying plants in the population than young to replace them. Trend for the perennial grasses is stable with little change in sum of nested frequency. The sum of nested frequency of perennial forbs is slightly lower than in 1998.

Winter Range Condition (DCI) - fair (35) low-level potential scale
browse - slightly down (-1) grass - stable (0) forb - slightly down (-1)

2008 TREND ASSESSMENT

Trend for browse continues to be slightly down. Wyoming big sagebrush declined in total density and recruitment, as the proportion of young is very low at only 2%. Decadence is still high at 30%. The sagebrush population will continue to decline in the future because there are more decadent and dying plants in the population than young (recruitment) to replace them. Trend for the perennial grasses is moderately stable with a slight increase in sum of nested frequency, although none of the major species increases were significant. Sum of nested frequency for perennial forbs is stable.

Winter Range Condition (DCI) - fair (35) low-level potential scale
browse - slightly down (-1) grass - stable (0) forb - stable (0)

HERBACEOUS TRENDS --
 Management unit 22 , Study no: 11

| T y p e | Species | Nested Frequency | | | | | Average Cover % | | |
|-----------------------------|-----------------------------|------------------|------------------|------------------|-------------------|------------------|-----------------|-------|-------|
| | | '85 | '91 | '98 | '03 | '08 | '98 | '03 | '08 |
| G | Agropyron cristatum | 205 | 198 | 211 | 209 | 200 | 18.53 | 11.03 | 11.27 |
| G | Agropyron intermedium | _{ab} 4 | _{ab} 14 | _c 37 | _a 3 | _{bc} 21 | .38 | .15 | .30 |
| G | Agropyron smithii | _b 88 | _c 140 | _a 40 | _a 36 | _a 13 | .53 | .33 | .03 |
| G | Aristida purpurea | - | 3 | - | - | - | - | - | - |
| G | Bromus tectorum (a) | - | - | _b 15 | _a 2 | _a - | .45 | .00 | - |
| G | Elymus junceus | _b 152 | _b 168 | _a 96 | _{ab} 126 | _b 149 | 3.58 | 6.71 | 8.90 |
| G | Oryzopsis hymenoides | 26 | 28 | 14 | 11 | 12 | .58 | .45 | 1.00 |
| G | Poa fendleriana | _{ab} 7 | _a - | _a 4 | _a - | _b 13 | .03 | - | .10 |
| G | Sitanion hystrix | - | - | 2 | - | 4 | .00 | - | .01 |
| G | Stipa comata | 3 | 7 | 4 | 6 | 5 | .18 | .31 | .06 |
| Total for Annual Grasses | | 0 | 0 | 15 | 2 | 0 | 0.45 | 0.00 | 0 |
| Total for Perennial Grasses | | 485 | 558 | 408 | 391 | 417 | 23.84 | 18.98 | 21.70 |
| Total for Grasses | | 485 | 558 | 423 | 393 | 417 | 24.29 | 18.98 | 21.70 |
| F | Astragalus cibaricus | _b 11 | _a 2 | _b 8 | _a - | _a - | .13 | - | - |
| F | Cryptantha sp. | 2 | 2 | - | - | - | - | - | - |
| F | Cymopterus sp. | - | - | 1 | - | - | .00 | - | - |
| F | Descurainia pinnata (a) | - | - | - | 5 | - | - | .04 | - |
| F | Gilia sp. (a) | - | - | - | 1 | - | - | .00 | - |
| F | Leucelene ericoides | _b 33 | _c 66 | _b 30 | _{ab} 13 | _a 3 | .29 | .11 | .01 |
| F | Orobancha fasciculata | - | - | 1 | - | - | .00 | - | - |
| F | Phlox longifolia | _a - | _b 12 | _a 3 | _a - | _a 10 | .01 | - | .04 |
| F | Ranunculus testiculatus (a) | - | - | _{ab} 16 | _a 2 | _b 24 | .03 | .00 | .04 |
| F | Schoenocrambe linifolia | - | - | 2 | - | 1 | .00 | - | .00 |
| F | Sisymbrium altissimum (a) | - | - | 2 | 2 | - | .03 | .00 | - |
| F | Sphaeralcea coccinea | _b 131 | _b 131 | _a 57 | _a 47 | _a 44 | .41 | .33 | .53 |
| Total for Annual Forbs | | 0 | 0 | 18 | 10 | 24 | 0.06 | 0.05 | 0.04 |
| Total for Perennial Forbs | | 177 | 213 | 102 | 60 | 58 | 0.86 | 0.44 | 0.59 |
| Total for Forbs | | 177 | 213 | 120 | 70 | 82 | 0.92 | 0.50 | 0.63 |

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

BROWSE TRENDS --

Management unit 22 , Study no: 11

| Type | Species | Strip Frequency | | | Average Cover % | | |
|------------------|-----------------------------------|-----------------|-----|-----|-----------------|------|------|
| | | '98 | '03 | '08 | '98 | '03 | '08 |
| B | Artemisia tridentata wyomingensis | 44 | 38 | 32 | 3.05 | 3.05 | 3.22 |
| B | Ephedra nevadensis | 0 | 1 | 1 | - | .03 | .15 |
| B | Gutierrezia sarothrae | 4 | 0 | 1 | .03 | - | .03 |
| B | Opuntia sp. | 0 | 1 | 3 | - | .00 | .00 |
| Total for Browse | | 48 | 40 | 37 | 3.08 | 3.08 | 3.40 |

CANOPY COVER, LINE INTERCEPT --

Management unit 22 , Study no: 11

| Species | Percent Cover | |
|-----------------------------------|---------------|------|
| | '03 | '08 |
| Artemisia tridentata wyomingensis | 2.28 | 2.36 |
| Gutierrezia sarothrae | - | .06 |
| Opuntia sp. | .01 | .03 |

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 22 , Study no: 11

| Species | Average leader growth (in) | |
|-----------------------------------|----------------------------|-----|
| | '03 | '08 |
| Artemisia tridentata wyomingensis | 1.3 | 0.8 |

BASIC COVER --

Management unit 22 , Study no: 11

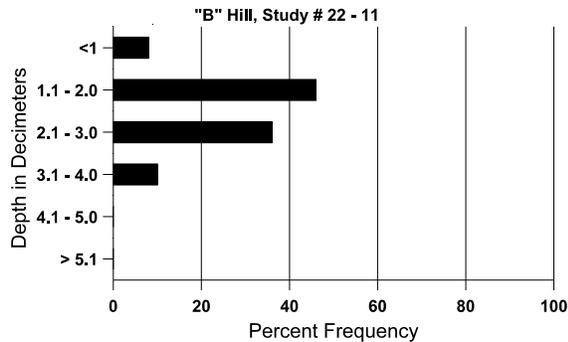
| Cover Type | Average Cover % | | | | |
|-------------|-----------------|-------|-------|-------|-------|
| | '85 | '91 | '98 | '03 | '08 |
| Vegetation | 8.25 | 14.50 | 36.55 | 23.72 | 27.71 |
| Rock | 3.50 | 2.75 | 6.62 | 5.07 | 3.90 |
| Pavement | 34.00 | 22.00 | 12.07 | 32.39 | 32.18 |
| Litter | 34.50 | 19.50 | 22.30 | 18.14 | 23.23 |
| Cryptogams | 0 | 1.50 | 7.95 | 1.96 | 2.17 |
| Bare Ground | 19.75 | 39.75 | 29.41 | 27.14 | 23.93 |

SOIL ANALYSIS DATA --

Management unit 22, Study no: 11, Study Name: "B" Hill

| Effective rooting depth (in) | Temp °F (depth) | pH | sandy clay loam | | | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----------------|-----|-----------------|-------|-------|-----|-------|-------|------|
| | | | %sand | %silt | %clay | | | | |
| 13.3 | 39.6 (14.0) | 7.1 | 52.0 | 23.4 | 24.6 | 1.9 | 4.6 | 211.2 | 0.8 |

Stoniness Index



PELLET GROUP DATA --

Management unit 22 , Study no: 11

| Type | Quadrat Frequency | | |
|--------|-------------------|-----|-----|
| | '98 | '03 | '08 |
| Rabbit | 16 | 10 | 94 |
| Deer | 15 | 8 | 11 |
| Cattle | 2 | 1 | 2 |

| Days use per acre (ha) | | |
|------------------------|---------|---------|
| '98 | '03 | '08 |
| - | - | - |
| 5 (12) | 14 (35) | 13 (33) |
| 13 (32) | 4 (9) | - |

BROWSE CHARACTERISTICS --

Management unit 22 , Study no: 11

| | | Age class distribution (plants per acre) | | | | | Utilization | | | | | |
|-----------------------------------|---------------------------------------|--|-------|--------|----------|------|-------------|---------|------------|---------|--------------|---------------------------|
| Y | Plants per Acre (excluding seedlings) | Seedling | Young | Mature | Decadent | Dead | % moderate | % heavy | % decadent | % dying | % poor vigor | Average Height Crown (in) |
| Artemisia tridentata wyomingensis | | | | | | | | | | | | |
| 85 | 932 | - | 133 | 799 | - | - | 71 | 7 | 0 | - | 0 | 20/22 |
| 91 | 864 | - | 66 | 599 | 199 | - | 69 | 8 | 23 | - | 0 | 24/27 |
| 98 | 1200 | 20 | 240 | 700 | 260 | 40 | 13 | 18 | 22 | 13 | 13 | 18/31 |
| 03 | 1040 | - | 40 | 580 | 420 | 80 | 31 | 35 | 40 | 12 | 15 | 21/29 |
| 08 | 860 | 100 | 20 | 580 | 260 | 180 | 40 | 9 | 30 | 12 | 12 | 22/31 |

| | | 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>Ephedra nevadensis</i> | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 03 | 20 | - | - | 20 | - | - | 0 | 0 | - | - | 0 | 11/8 |
| 08 | 20 | - | - | 20 | - | - | 100 | 0 | - | - | 0 | 13/8 |
| <i>Gutierrezia sarothrae</i> | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 120 | - | 20 | 100 | - | - | 0 | 0 | - | - | 0 | 8/9 |
| 03 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 08 | 20 | 20 | - | 20 | - | - | 0 | 0 | - | - | 0 | 5/6 |
| <i>Opuntia sp.</i> | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 03 | 20 | - | - | 20 | - | - | 0 | 0 | - | - | 0 | 3/2 |
| 08 | 60 | 20 | 20 | 40 | - | - | 0 | 0 | - | - | 0 | 4/6 |
| <i>Purshia tridentata</i> | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 03 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | 28/57 |
| 08 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | 23/50 |