

Trend Study 2-35-06

Study site name: Higgins Hollow .

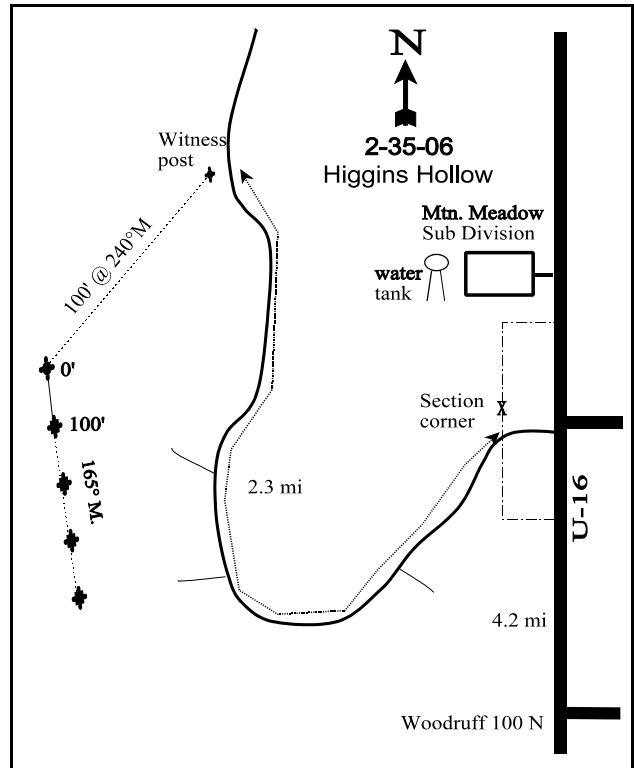
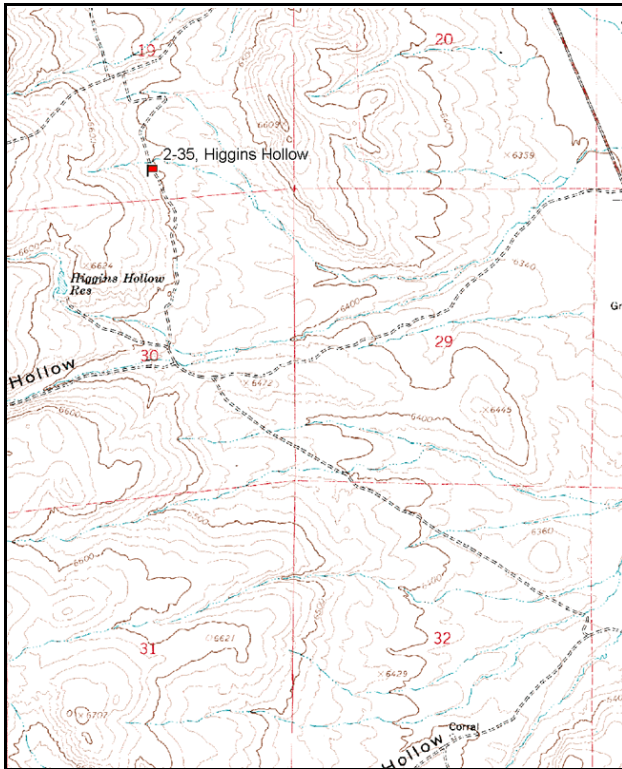
Vegetation type: Big Sagebrush .

Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

From 1st North in Woodruff proceed north on U-16 for 4.2 miles, and turn west to a dirt road. Proceed through pasture passing section marker at west gate. Travel a total of 2.3 miles (staying right) to a witness post on west side of road. From the witness post walk 100 feet at 240 degrees magnetic to the 0-foot stake of the baseline.



Map Name: Woodruff

Diagrammatic Sketch

Township 10N, Range 7E, Section 19

UTM NAD 27, UTM 12T 4603446 N, 483519 E

DISCUSSION

Higgins Hollow - Trend Study No. 2-35

Study Information

This study is located north of Woodruff on the west side of SR 16 on land administered by the BLM (elevation: 6,500 feet, slope: 15-20%, aspect: east). The area is similar physically and edaphically to the Otter Creek study (2-34). The principal difference between these two areas is management practices of the past. This study samples a relatively undisturbed Wyoming big sagebrush type. Thus, it provides a good comparison to the Otter Creek study (2-34), an area that was mechanically treated and seeded. Wildlife use of the Higgin's Hollow study area appears light to moderate. Pellet group transect data collected in 2001 estimated 7 deer/pronghorn and 12 cow days use/acre (17 days use/ha and 29 cdu/ha). Deer and pronghorn pellet groups were combined due to their similarity in appearance. Pellet group data from 2006 was estimated at 11 deer/pronghorn and 4 cow days use/acre (26 ddu/ha and 11 cdu/ha).

Soil

The soil is classified in the Pancheri series, which includes deep, well drained soils that formed in loess covered lava plains, which are fertile soils with agricultural potential (Campbell and Lacey 1982; USDA-NRCS 2006). Soil is mostly rock free and has a clay loam texture with a neutral soil reaction (pH of 7.1). There is a considerable amount of roots in the top 6 inches of the soil, due mostly to Sandberg bluegrass. The ratio of protective cover (vegetation, litter, and cryptogams) to bare ground was good at 3.4:1 in 2006. Some erosion is apparent but not serious. An erosion condition class conducted in 2001 classified erosion as stable, but in 2006 it was classified as slight. Pedstalling is apparent around the shrubs and a few active gullies have formed on the steeper slopes.

Browse

The key browse species is Wyoming big sagebrush. It is by far the most abundant and palatable shrub on the study area. Wyoming big sagebrush density was relatively stable from 1984-1996 at around 6,800 plants/acre and 16-33% of the population was classified as young over this same period. The number of young plants in the population declined to only 1-2% of the population in 2001 and 2006. However, sagebrush density increased in 2001 as some of the young plants reached maturity. The population declined from 8,080 plants/acre in 2001 to 6,040 plants/acre in 2006. Some plants were dropping leaves in 2001 due to several consecutive years of relatively dry conditions. Precipitation in both 2001 and 2002 were 25% below normal and drought is most likely the cause of the die-off. Cover remained high at 21-27% since 1996. Decadence has been high at over 35% in all sampling years, except in 1996, when decadence was estimated at 19%. In 2006, 25% of the population was classified as dying, which may further reduce the population, since young recruitment has been very low. Overall use has been at a moderate level, with heavier use occurring in 1984 and 1990. In 2001 and 2006, sagebrush leader growth averaged less than 1 inch.

Stickyleaf low rabbitbrush occurs in fairly high numbers, although it is much smaller and seldom utilized.

Herbaceous Understory

The herbaceous component is dominated by Sandberg bluegrass, a low-growing species. This species has averaged 14-16% cover since 1996 and provides more than 90% of the grass cover. Several other perennials are present but in limited numbers. These species include: western wheatgrass, bluebunch wheatgrass, mutton bluegrass, and bottlebrush squirreltail. Forbs occur only rarely and are primarily low growing species with little forage value. Hood's phlox and longleaf phlox are the most common species.

1990 TREND ASSESSMENT

The Higgins Hollow winter range continues to support a dense stand of Wyoming big sagebrush. At about 20% canopy cover, the sagebrush community appears about at its maxim. There is a high percentage of seedling and young plants. The sagebrush tends to be moderately hedged, as opposed to the more heavily

hedged classification of mature plants in 1984. Trend for grasses is slightly down. The frequency of bluebunch wheatgrass has declined dramatically, even if the increase in western wheatgrass is interpreted as a misidentification. Squirreltail nested frequency also decreased significantly. However, the most abundant grass, Sandberg bluegrass, increased significantly. Trend for forbs is slightly up due to a significant increase in longleaf phlox nested frequency. Forbs are rare and low growing.

browse - stable (0) grasses - slightly down (-1) forbs - slightly up (+1)

1996 TREND ASSESSMENT

The browse trend is stable. Sagebrush density remained similar to 1990 and both heavy use and percent decadence decreased (45% to 19%). Trend for grasses is down. Perennial grass sum of nested frequency decreased by 26%, mainly due to a significant decrease in bluebunch wheatgrass/western wheatgrass. Trend for forbs is slightly down due to a significant decrease in longleaf phlox. Forbs continue to be rare and low growing. The Desirable Components Index rated this study as excellent due to high browse cover, moderate decadence, and good perennial grass cover.

winter range condition (DC Index) - excellent (82) Low Potential scale
browse - stable (0) grasses - down (-2) forbs - slightly down (-1)

2001 TREND ASSESSMENT

Trend for browse is slightly up. Wyoming big sagebrush density increased from 6,760 plants/acre in 1996 to 8,080 plants/acre in 2001. Young plants are few and percent decadence increased from 19% to 48%. Utilization is light to moderate, and vigor is normal on most plants. Trend for grasses is slightly up. Sum of nested frequency for perennial grasses increased by 17% due to a significant increase in western wheatgrass. Trend for forbs is stable. Forbs continue to be rare and low growing. The Desirable Components Index rated this study as good-excellent due to good browse cover, high decadence, and high perennial grass cover.

winter range condition (DC Index) - good-excellent (66) Low Potential scale
browse - slightly up (+1) grasses - slightly up (+1) forbs - stable (0)

2006 TREND ASSESSMENT

Trend for key browse, Wyoming big sagebrush, is down. Density decreased by 25%, from 8,080 plants/acre in 2001 to 6,040 plants/acre in 2006. Sagebrush decadence decreased from 48% to 36% and 25% of the population was classified as dying. Young recruitment was minimal at only 1% of the population. Trend for grasses is slightly up. Perennial grass sum of nested frequency increased by 12% due to an increase in bluebunch wheatgrass. Trend for forbs is slightly up due to significant increase in low fleabane and milkvetch. The Desirable Components Index rated this study as excellent due to good browse cover, moderate decadence, and good perennial grass cover.

winter range condition (DC Index) - excellent (72) Low Potential scale
browse - down (-2) grasses - slightly up (+1) forbs - slightly up (+1)

HERBACEOUS TRENDS --
Management unit 02 , Study no: 35

| T y p e | Species | Nested Frequency | | | | | Average Cover % | | |
|-----------------------------|--------------------------|------------------|-------|------|-------|-------|-----------------|-------|-------|
| | | '84 | '90 | '96 | '01 | '06 | '96 | '01 | '06 |
| G | Agropyron smithii | a- | c105 | b14 | c84 | c111 | .07 | .62 | 1.06 |
| G | Agropyron spicatum | c217 | a14 | a9 | a24 | b53 | .04 | .29 | 1.72 |
| G | Bromus tectorum (a) | - | - | 2 | - | - | .00 | - | - |
| G | Carex sp. | b29 | c55 | a4 | a2 | ab10 | .02 | .03 | .02 |
| G | Oryzopsis hymenoides | - | - | 1 | - | 2 | .00 | - | .00 |
| G | Poa bulbosa | - | - | 4 | - | - | .15 | - | - |
| G | Poa fendleriana | - | - | 4 | 8 | 10 | .04 | .06 | .44 |
| G | Poa pratensis | a- | a- | a- | ab2 | b10 | - | .03 | .12 |
| G | Poa secunda | a263 | bc304 | d339 | cd318 | ab281 | 15.75 | 14.18 | 14.19 |
| G | Sitanion hystrix | c91 | b69 | a30 | a34 | ab53 | .25 | .50 | .79 |
| G | Stipa comata | - | - | - | 2 | - | - | .03 | - |
| Total for Annual Grasses | | 0 | 0 | 2 | 0 | 0 | 0.00 | 0 | 0 |
| Total for Perennial Grasses | | 600 | 547 | 405 | 474 | 530 | 16.32 | 15.75 | 18.37 |
| Total for Grasses | | 600 | 547 | 407 | 474 | 530 | 16.33 | 15.75 | 18.37 |
| F | Agoseris glauca | 4 | - | - | 4 | 3 | - | .03 | .03 |
| F | Antennaria rosea | - | 8 | 4 | 2 | 3 | .06 | .03 | .06 |
| F | Arabis sp. | a2 | b13 | ab3 | ab6 | a- | .00 | .02 | - |
| F | Astragalus convallarius | 2 | 2 | 3 | 4 | 7 | .03 | .01 | .04 |
| F | Astragalus sp. | a- | a- | a- | a- | b20 | - | - | .36 |
| F | Calochortus nuttallii | 3 | 4 | - | 3 | 1 | - | .00 | .00 |
| F | Collinsia parviflora (a) | - | - | - | 1 | 3 | - | .00 | .00 |
| F | Cordylanthus ramosus (a) | - | - | a8 | b23 | b40 | .04 | .14 | .20 |
| F | Crepis acuminata | - | - | - | - | 1 | - | - | .03 |
| F | Cryptantha sp. | 13 | - | - | - | - | - | - | - |
| F | Descurainia pinnata (a) | - | - | 5 | 10 | 5 | .01 | .02 | .01 |
| F | Erigeron divergens | 14 | 14 | 19 | 18 | 12 | .28 | .14 | .15 |
| F | Erigeron pumilus | a12 | a- | a3 | a8 | b42 | .03 | .02 | .69 |
| F | Haplopappus acaulis | - | - | - | - | - | - | - | .00 |
| F | Lomatium triternatum | - | 9 | - | 5 | 5 | - | .18 | .01 |
| F | Microsteris gracilis (a) | - | - | a- | b16 | a- | - | .03 | - |
| F | Penstemon humilis | 5 | 1 | 1 | - | 5 | .00 | - | .06 |
| F | Phlox hoodii | a5 | a7 | b53 | b60 | b54 | 1.12 | 1.24 | 1.28 |
| F | Phlox longifolia | a57 | c160 | b113 | ab89 | ab101 | .55 | .40 | .57 |
| F | Salsola iberica (a) | - | - | - | 3 | - | - | .00 | - |
| F | Schoenocrambe linifolia | - | - | - | 1 | 5 | - | .00 | .01 |

| Type | Species | Nested Frequency | | | | | Average Cover % | | |
|---------------------------|-----------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|------|------|
| | | '84 | '90 | '96 | '01 | '06 | '96 | '01 | '06 |
| F | Trifolium sp. | _b 25 | _b 12 | _a - | _b 24 | _b 15 | - | .08 | .04 |
| F | Zigadenus paniculatus | _a - | _{bc} 11 | _{ab} 2 | _a 1 | _c 11 | .03 | .03 | .13 |
| Total for Annual Forbs | | 0 | 0 | 13 | 53 | 48 | 0.06 | 0.21 | 0.21 |
| Total for Perennial Forbs | | 142 | 241 | 201 | 225 | 285 | 2.11 | 2.21 | 3.51 |
| Total for Forbs | | 142 | 241 | 214 | 278 | 333 | 2.17 | 2.43 | 3.74 |

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

BROWSE TRENDS --

Management unit 02 , Study no: 35

| Type | Species | Strip Frequency | | | Average Cover % | | |
|------------------|--|-----------------|-----|-----|-----------------|-------|-------|
| | | '96 | '01 | '06 | '96 | '01 | '06 |
| B | Amelanchier alnifolia | 0 | 0 | 1 | - | - | - |
| B | Artemisia tridentata wyomingensis | 96 | 97 | 92 | 20.53 | 26.73 | 22.64 |
| B | Chrysothamnus viscidiflorus stenophyllus | 39 | 46 | 45 | 1.36 | 1.90 | 2.61 |
| B | Eriogonum microthecum | 8 | 4 | 6 | .01 | .00 | .09 |
| B | Opuntia sp. | 3 | 6 | 5 | .00 | - | - |
| B | Tetradymia canescens | 3 | 7 | 6 | - | .06 | .21 |
| Total for Browse | | 149 | 160 | 155 | 21.92 | 28.70 | 25.56 |

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 35

| Species | Percent Cover |
|--|---------------|
| | '06 |
| Artemisia tridentata wyomingensis | 30.46 |
| Chrysothamnus viscidiflorus stenophyllus | 3.38 |
| Eriogonum microthecum | .10 |
| Opuntia sp. | .08 |

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 35

| Species | Average leader growth (in) | |
|--------------------------------------|----------------------------|-----|
| | '01 | '06 |
| Artemisia tridentata wyomingensis | 0.7 | 0.8 |

BASIC COVER --

Management unit 02 , Study no: 35

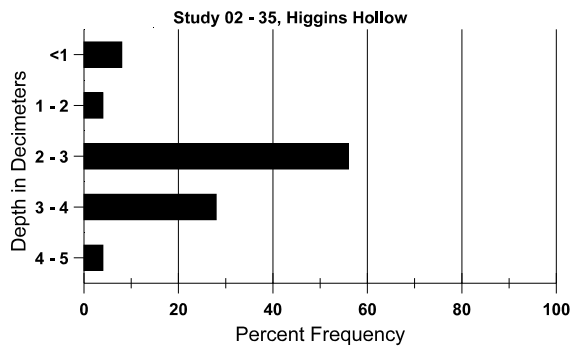
| Cover Type | Average Cover % | | | | |
|-------------|-----------------|-------|-------|-------|-------|
| | '84 | '90 | '96 | '01 | '06 |
| Vegetation | 7.75 | 7.75 | 39.28 | 49.63 | 45.86 |
| Rock | 0 | 0 | .10 | .09 | .11 |
| Pavement | .75 | .25 | .36 | .46 | 1.01 |
| Litter | 76.00 | 54.25 | 38.15 | 44.29 | 43.97 |
| Cryptogams | 2.75 | 14.25 | 10.31 | 13.38 | 6.60 |
| Bare Ground | 12.75 | 23.50 | 23.33 | 17.78 | 21.75 |

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 35, Higgins Hollow

| Effective rooting depth (in) | Temp °F (depth) | PH | Loam | | | %OM | PPM P | PPM K | dS/m |
|------------------------------|-----------------|-----|-------|-------|-------|-----|-------|-------|------|
| | | | %sand | %silt | %clay | | | | |
| 12.9 | 59.0 (13.1) | 7.1 | 42.9 | 31.1 | 26.0 | 1.9 | 11.8 | 137.6 | 0.6 |

Stoniness Index



PELLET GROUP DATA --
 Management unit 02 , Study no: 35

| Type | Quadrat Frequency | | |
|--------|-------------------|-----|-----|
| | '96 | '01 | '06 |
| Rabbit | 12 | 14 | 23 |
| Elk | - | - | 1 |
| Deer | 13 | 11 | 9 |
| Cattle | 9 | 2 | 2 |

| Days use per acre (ha) | |
|------------------------|---------|
| '01 | '06 |
| - | - |
| - | - |
| 7 (17) | 11 (26) |
| 12 (29) | 4 (11) |

BROWSE CHARACTERISTICS --
 Management unit 02 , Study no: 35

| | | 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) |
| Amelanchier alnifolia | | | | | | | | | | | | |
| 84 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 90 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 96 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 01 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 06 | 160 | - | - | 160 | - | 60 | 0 | 0 | - | - | 0 | -/- |
| Artemisia tridentata wyomingensis | | | | | | | | | | | | |
| 84 | 6866 | 4266 | 1600 | 2333 | 2933 | - | 44 | 17 | 43 | .58 | 3 | 17/21 |
| 90 | 6798 | 1400 | 2266 | 1466 | 3066 | - | 34 | 10 | 45 | 2 | 8 | 23/21 |
| 96 | 6760 | 80 | 1300 | 4180 | 1280 | 1500 | 43 | 4 | 19 | 2 | 2 | 24/33 |
| 01 | 8080 | 20 | 160 | 4080 | 3840 | 1260 | 23 | 1 | 48 | 1 | 1 | 23/30 |
| 06 | 6040 | - | 40 | 3800 | 2200 | 1620 | 14 | 2 | 36 | 25 | 26 | 23/32 |
| Chrysothamnus viscidiflorus stenophyllus | | | | | | | | | | | | |
| 84 | 5532 | - | 866 | 3666 | 1000 | - | 0 | 0 | 18 | - | 0 | 9/13 |
| 90 | 4999 | 200 | 200 | 266 | 4533 | - | 4 | 0 | 91 | .40 | 52 | 8/12 |
| 96 | 1620 | - | - | 1560 | 60 | - | 0 | 0 | 4 | 2 | 9 | 10/17 |
| 01 | 2320 | - | - | 2080 | 240 | - | 0 | 0 | 10 | 5 | 5 | 10/17 |
| 06 | 2480 | 20 | - | 2260 | 220 | - | 0 | 0 | 9 | .80 | 12 | 10/17 |
| Eriogonum microthecum | | | | | | | | | | | | |
| 84 | 266 | - | - | 266 | - | - | 0 | 0 | 0 | - | 0 | 4/4 |
| 90 | 133 | - | 133 | - | - | - | 0 | 0 | 0 | - | 0 | -/- |
| 96 | 220 | - | 20 | 180 | 20 | - | 0 | 0 | 9 | 9 | 9 | 7/8 |
| 01 | 80 | - | - | 80 | - | - | 0 | 0 | 0 | - | 0 | 6/9 |
| 06 | 140 | - | - | 140 | - | - | 0 | 0 | 0 | - | 0 | 6/9 |

| | | 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) |
| Opuntia sp. | | | | | | | | | | | | |
| 84 | 400 | - | - | 400 | - | - | 0 | 0 | 0 | - | 0 | 5/7 |
| 90 | 200 | 66 | - | 200 | - | - | 0 | 0 | 0 | - | 0 | 5/1 |
| 96 | 100 | - | - | 100 | - | - | 0 | 0 | 0 | - | 0 | 4/11 |
| 01 | 180 | - | - | 160 | 20 | - | 0 | 0 | 11 | - | 0 | 3/8 |
| 06 | 140 | - | - | 140 | - | - | 0 | 0 | 0 | - | 0 | 5/13 |
| Tetradymia canescens | | | | | | | | | | | | |
| 84 | 332 | - | 66 | 266 | - | - | 80 | 0 | 0 | - | 0 | 5/4 |
| 90 | 266 | 200 | 66 | - | 200 | - | 0 | 75 | 75 | 23 | 75 | -/- |
| 96 | 60 | - | - | 40 | 20 | - | 0 | 0 | 33 | 33 | 33 | 5/10 |
| 01 | 180 | - | 20 | 120 | 40 | - | 33 | 0 | 22 | 22 | 22 | 7/12 |
| 06 | 140 | - | 20 | 100 | 20 | - | 0 | 0 | 14 | - | 0 | 6/8 |