

'B' CANYON - TREND STUDY NO. 11B-5-10

Vegetation Type: Chained, Seeded Pinyon-Juniper

Range Type: Crucial Deer Winter, Crucial Elk Year-Long

NRCS Ecological Site Description: Upland Stony Loam (Pinyon-Utah Juniper), R034XY330UT

Land Ownership: BLM

Elevation: 6700 ft. (2043 m)

Aspect: South-Southwest

Slope: 5%

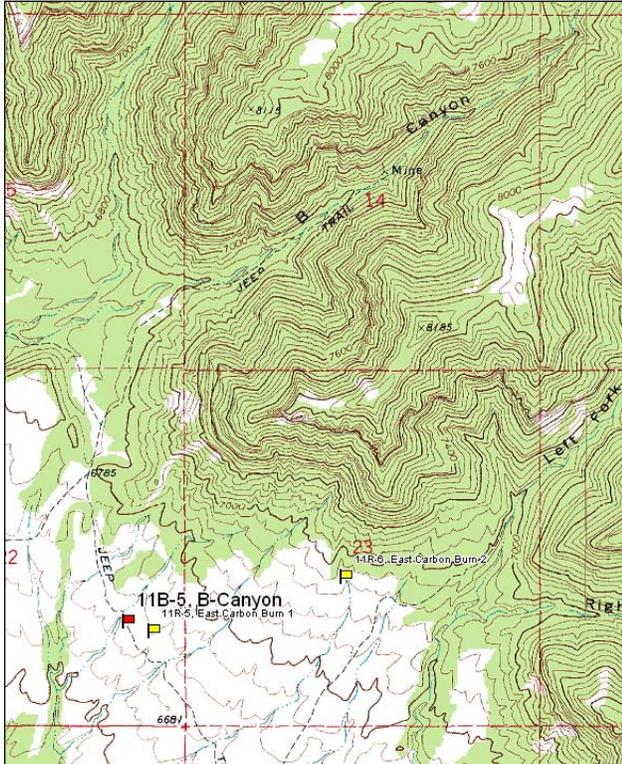
Transect bearing: 165° magnetic

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

Directions:

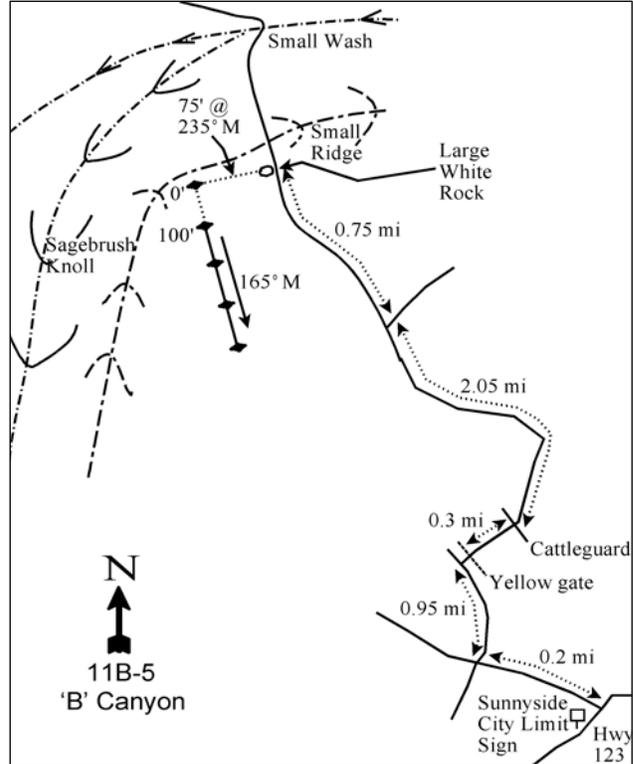
From the Sunnyside city limit sign on Highway 123 at the west end of town, turn north and go 0.2 miles, passing the East Carbon High School football field. Turn right and go 0.95 miles. Turn right and pass through a yellow metal gate, continuing 0.3 miles to a cattle guard. Stay on the main road and go north 2.05 miles to an intersection. Keep left at the intersection (right turn goes to A Canyon transect) and go 0.75 miles more to the top of the ridge. On the left side of the road you should find a rock. The 0-foot stake, marked by a red painted rebar (tag #7894), is 75 feet away at a bearing of 235°M.

Map Name: Sunny Side



Township: 14S Range: 13E Section: 22

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 547929 E 4382377 N

'B' CANYON - TREND STUDY NO. 11B-5

Site Information

Site Description: This study is located near the mouth of 'B' Canyon at the base of the West Tavaputs Plateau, about four miles northwest of Sunnyside. In 1966, the area was two-way chained to remove pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*), and was seeded to crested wheatgrass (*Agropyron cristatum*), fourwing saltbush (*Atriplex canescens*) and nomad alfalfa (*Medicago sativa*). After 20 years, the site was again dominated by the release of the young trees left after the original chaining. In 1996, the area was part of the East Carbon wildfire that burned 1,094 acres. After the fire, the site was chained and apparently seeded with a dribbler. The wildfire eliminated all of the trees and nearly all of the shrubs. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Mud Springs allotment. Pellet group transect data has estimated light use by deer and elk since 2000, and light use by cattle in 2000 and 2010 with heavy use in 2005 (Table - Pellet Group Data).

Browse: The only shrubs sampled following the wildfire are a few surviving true mountain mahogany (*Cercocarpus montanus*), antelope bitterbrush (*Purshia tridentata*), fourwing saltbush, broom snakeweed (*Gutierrezia sarothrae*) and resprouting green ephedra (*Ephedra viridis*). The most numerous shrub species prior to the 1996 fire was black sagebrush (*Artemisia nova*). Bitterbrush was seeded after the fire and was sampled at low density in 2000 and 2005, but was not sampled in 2010. Fourwing, mountain mahogany and green ephedra have shown heavy use over the course of the study (Table - Browse Characteristics).

Herbaceous Understory: Before and after the fire, crested wheatgrass was the dominant herbaceous plant and has increased in cover since 1994. Plants are tall, vigorous and were lightly grazed until 2005, when grazing was heavy. Comparing photos from 2000 and 2005 clearly shows heavy cattle grazing. A few other valuable perennial grass species include Indian ricegrass (*Oryzopsis hymenoides*), smooth brome (*Bromus inermis*), bluebunch wheatgrass (*Agropyron spicatum*) and mutton bluegrass (*Poa fendleriana*) have been sampled, but provide only limited forage. Abundance of forbs is low and has produced less than 1% cover every year. Only four herbaceous species established from the post-fire seeding treatment: intermediate wheatgrass (*Agropyron intermedium*), orchardgrass (*Dactylis glomerata*), alfalfa and small burnet (*Sanguisorba minor*), but orchardgrass, alfalfa and small burnet have not been sampled since 2000. The seeded species, Russian wildrye (*Elymus junceus*), was sampled for the first time in 2010 (Table - Herbaceous Trends).

Soil: The soil has a sandy clay loam texture with a soil reaction that is neutral (pH 7.3). Phosphorus may have limited availability for plant growth and development at 5.2 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). There are patches of exposed soil, but overall ground cover is good and erosion minimal. Rocks and pavement are found in the bare areas and large rocks and boulders are common on the surface (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1986 to 1994 - stable (0):** Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. The primary browse species, black sagebrush, had a slight decrease in decadence, but the population remained similar.
- **1994 to 2000 - down (-2):** A wildfire removed nearly all of the browse from the site.
- **2000 to 2005 - stable (0):** The density and cover of preferred browse remained low.
- **2005 to 2010 - stable (0):** There was a slight increase in the cover and density of true mountain mahogany and green ephedra, but a slight decrease in the density and cover of fourwing saltbush and bitterbrush.

Grass:

- **1986 to 1994 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.

- **1994 to 2000 - up (+2):** The sum of nested frequency of perennial grasses increased by 20% and cover increased from 10% to 21%. There was a significant increase in the nested frequency of the seeded species intermediate wheatgrass.
- **2000 to 2005 - stable (0):** The perennial grass sum of nested frequency decreased by 7%, but cover decreased to 17%. There was a significant decrease in the nested frequency of intermediate wheatgrass.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased to 28% due to a large increase in the cover of crested wheatgrass. Russian wildrye was sampled for the first time at moderate frequency and cover.

Forb:

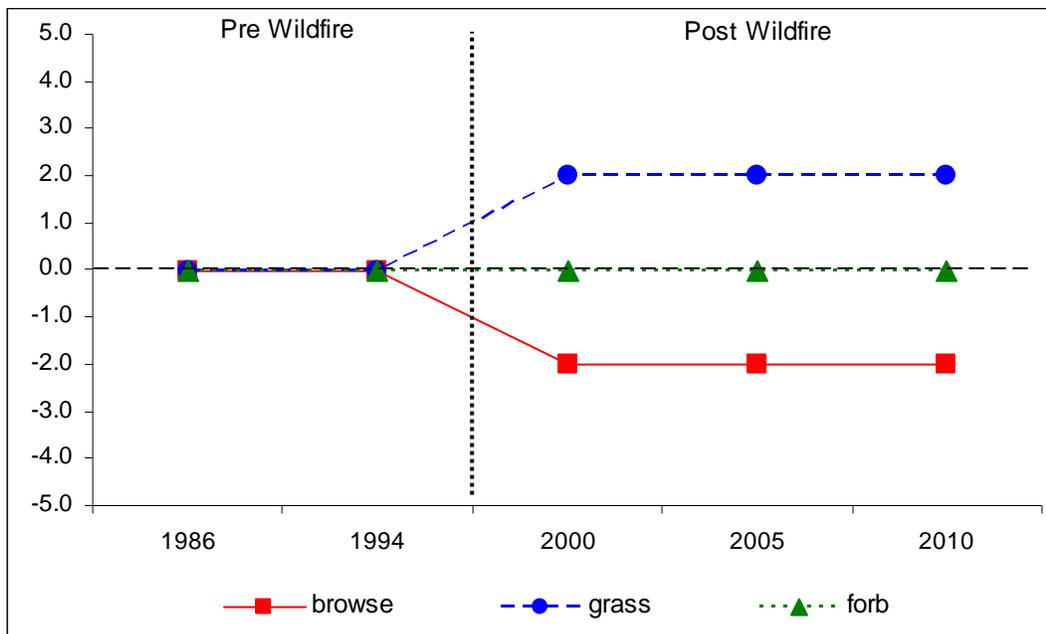
- **1986 to 1994 - stable (0):** Forbs are rare on the site.
- **1994 to 2000 - stable (0):** Forbs are rare on the site.
- **2000 to 2005 - stable (0):** Forbs are rare on the site.
- **2005 to 2010 - stable (0):** Forbs are rare on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 11B, study no: 5

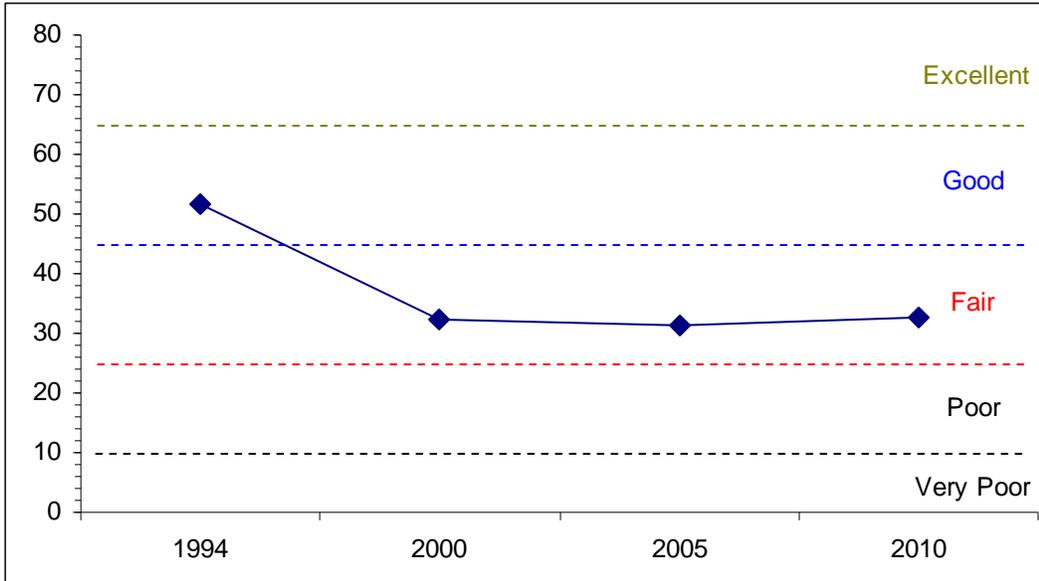
| Year | Preferred Browse Cover | Preferred Browse Decadence | Preferred Browse Young | Perennial Grass Cover | Annual Grass Cover | Perennial Forb Cover | Noxious Weeds | Total Score | Ranking |
|------|------------------------|----------------------------|------------------------|-----------------------|--------------------|----------------------|---------------|-------------|---------|
| 94 | 14.1 | 11.4 | 4.0 | 20.7 | 0.0 | 1.5 | 0.0 | 51.7 | Good |
| 00 | 0.5 | 0.0 | 0.0 | 30.0 | 0.0 | 1.9 | 0.0 | 32.3 | Fair |
| 05 | 0.5 | 0.0 | 0.0 | 30.0 | 0.0 | 0.8 | 0.0 | 31.2 | Fair |
| 10 | 1.1 | 0.0 | 0.0 | 30.0 | 0.0 | 1.7 | 0.0 | 32.8 | Fair |

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 11B, Study no: 5



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 11B, Study no: 5



HERBACEOUS TRENDS--
 Management unit 11B, Study no: 5

| Type | Species | Nested Frequency | | | | | Average Cover % | | | |
|-----------------------------|----------------------------------|------------------|-----|------|-----|------|-----------------|-------|-------|-------|
| | | '86 | '94 | '00 | '05 | '10 | '94 | '00 | '05 | '10 |
| G | <i>Agropyron cristatum</i> | 269 | 263 | 274 | 289 | 297 | 9.44 | 17.78 | 16.36 | 26.35 |
| G | <i>Agropyron intermedium</i> | ab4 | a- | c43 | ab1 | b10 | - | 1.74 | .00 | .28 |
| G | <i>Agropyron spicatum</i> | - | 6 | - | - | - | .33 | - | - | - |
| G | <i>Bouteloua gracilis</i> | a- | b12 | a3 | a1 | a- | .10 | .03 | .03 | - |
| G | <i>Bromus inermis</i> | ab12 | ab6 | a4 | b21 | a3 | .21 | .38 | .47 | .38 |
| G | <i>Dactylis glomerata</i> | - | - | 9 | - | - | - | .04 | - | - |
| G | <i>Elymus junceus</i> | a- | a- | a- | a- | b32 | - | - | - | 1.17 |
| G | <i>Festuca ovina</i> | a- | a- | b15 | a1 | a1 | - | .09 | .00 | .15 |
| G | <i>Oryzopsis hymenoides</i> | b10 | ab4 | ab8 | b19 | a- | .06 | .99 | .24 | - |
| G | <i>Poa fendleriana</i> | - | 7 | - | - | - | .21 | - | - | - |
| G | <i>Sitanion hystrix</i> | 1 | - | - | - | - | - | - | - | - |
| Total for Annual Grasses | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total for Perennial Grasses | | 296 | 298 | 356 | 332 | 343 | 10.36 | 21.06 | 17.11 | 28.33 |
| Total for Grasses | | 296 | 298 | 356 | 332 | 343 | 10.36 | 21.06 | 17.11 | 28.33 |
| F | <i>Arabis selbyi</i> | ab2 | b11 | a- | a- | a- | .02 | - | - | - |
| F | <i>Astragalus convallarius</i> | a13 | a9 | ab21 | b33 | ab14 | .20 | .55 | .13 | .36 |
| F | <i>Astragalus wingatanus</i> | c21 | b15 | a- | ab2 | ab4 | .46 | .06 | .15 | .15 |
| F | <i>Chenopodium fremontii</i> (a) | - | - | 6 | 5 | - | - | .01 | .02 | - |
| F | <i>Descurainia pinnata</i> (a) | - | - | - | 3 | - | - | - | .00 | - |
| F | <i>Gilia</i> sp. (a) | - | - | - | 1 | - | - | - | .00 | - |
| F | <i>Hedysarum boreale</i> | 2 | - | 3 | 3 | - | - | .15 | .03 | - |
| F | <i>Lappula occidentalis</i> (a) | - | - | - | - | 1 | - | - | - | .00 |
| F | <i>Lesquerella ludoviciana</i> | 3 | 7 | 5 | - | - | .01 | .01 | - | - |
| F | <i>Linum lewisii</i> | - | - | 8 | - | - | - | .02 | - | - |

| Type | Species | Nested Frequency | | | | | Average Cover % | | | |
|---------------------------|-------------------------------------|------------------|-----------------|------------------|-----------------|-----------------|-----------------|------|------|------|
| | | '86 | '94 | '00 | '05 | '10 | '94 | '00 | '05 | '10 |
| F | <i>Machaeranthera grindelioides</i> | 3 | 1 | - | - | - | .03 | - | - | - |
| F | <i>Medicago sativa</i> | 5 | - | 5 | - | - | - | .01 | - | - |
| F | <i>Penstemon cyanocaulis</i> | _b 17 | _a 5 | _a 4 | _a - | _a - | .01 | .03 | - | - |
| F | <i>Salsola iberica</i> (a) | - | _a - | _{ab} 12 | _b 13 | _a - | - | .04 | .03 | - |
| F | <i>Sanguisorba minor</i> | - | - | 1 | - | - | - | .03 | - | - |
| F | <i>Schoenrambe linifolia</i> | _a - | _{ab} 3 | _{bc} 16 | _a 1 | _c 32 | .01 | .06 | .01 | .29 |
| F | <i>Sphaeralcea coccinea</i> | 3 | - | 6 | 5 | 6 | - | .01 | .06 | .04 |
| F | <i>Townsendia incana</i> | - | - | - | 1 | - | - | - | .00 | - |
| F | <i>Trifolium</i> sp. | - | - | - | 2 | 3 | - | - | .00 | .00 |
| Total for Annual Forbs | | 0 | 0 | 18 | 22 | 1 | 0 | 0.05 | 0.06 | 0.00 |
| Total for Perennial Forbs | | 69 | 51 | 69 | 47 | 59 | 0.76 | 0.94 | 0.38 | 0.86 |
| Total for Forbs | | 69 | 51 | 87 | 69 | 60 | 0.76 | 1.00 | 0.45 | 0.86 |

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

BROWSE TRENDS--

Management unit 11B, Study no: 5

| Type | Species | Strip Frequency | | | | Average Cover % | | | |
|------------------|--------------------------------------|-----------------|-----|-----|-----|-----------------|------|------|------|
| | | '94 | '00 | '05 | '10 | '94 | '00 | '05 | '10 |
| B | <i>Artemisia nova</i> | 78 | 0 | 0 | 0 | 8.85 | - | - | - |
| B | <i>Artemisia tridentata vaseyana</i> | 3 | 0 | 0 | 0 | .81 | - | - | - |
| B | <i>Atriplex canescens</i> | 0 | 2 | 2 | 1 | - | - | - | - |
| B | <i>Cercocarpus montanus</i> | 3 | 1 | 1 | 1 | 1.00 | .03 | .03 | .15 |
| B | <i>Ephedra viridis</i> | 2 | 2 | 3 | 4 | .41 | .15 | .15 | .66 |
| B | <i>Gutierrezia sarothrae</i> | 8 | 1 | 1 | 4 | .21 | - | - | .03 |
| B | <i>Juniperus osteosperma</i> | 0 | 0 | 0 | 0 | 3.00 | - | - | - |
| B | <i>Opuntia</i> sp. | 1 | 0 | 1 | 1 | - | - | - | - |
| B | <i>Pinus edulis</i> | 0 | 0 | 0 | 0 | 1.63 | - | - | - |
| B | <i>Purshia tridentata</i> | 0 | 1 | 1 | 0 | - | .15 | .15 | - |
| Total for Browse | | 95 | 7 | 9 | 11 | 15.93 | 0.33 | 0.33 | 0.83 |

CANOPY COVER, LINE INTERCEPT--

Management unit 11B, Study no: 5

| Species | Percent Cover | |
|-----------------------------|---------------|-----|
| | '05 | '10 |
| <i>Atriplex canescens</i> | .13 | - |
| <i>Cercocarpus montanus</i> | - | .15 |
| <i>Ephedra viridis</i> | .55 | .55 |

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 11B, Study no: 5

| Species | Average leader growth (in) '10 |
|----------------------|-----------------------------------|
| Atriplex canescens | 1.0 |
| Cercocarpus montanus | 5.1 |
| Ephedra viridis | 2.7 |
| Purshia tridentata | 4.6 |

BASIC COVER--
Management unit 11B, Study no: 5

| Cover Type | Average Cover % | | | | |
|-------------|-----------------|-------|-------|-------|-------|
| | '86 | '94 | '00 | '05 | '10 |
| Vegetation | 11.50 | 28.43 | 24.17 | 17.87 | 32.15 |
| Rock | 7.00 | 10.55 | 13.60 | 13.45 | 14.89 |
| Pavement | 3.75 | 1.52 | 6.80 | 2.12 | 8.76 |
| Litter | 60.50 | 45.45 | 30.78 | 17.16 | 29.53 |
| Cryptogams | .75 | 2.80 | .63 | .04 | .06 |
| Bare Ground | 16.50 | 15.73 | 38.27 | 55.37 | 23.05 |

SOIL ANALYSIS DATA --
Management unit 11B, Study no: 5, Study Name: B Canyon

| Effective rooting depth (in) | pH | sandy clay loam | | | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----|-----------------|-------|-------|-----|-------|-------|------|
| | | %sand | %silt | %clay | | | | |
| 13.7 | 7.3 | 51.0 | 26.4 | 22.6 | 2.2 | 5.2 | 124.8 | 0.7 |

PELLET GROUP DATA--
Management unit 11B, Study no: 5

| Type | Quadrat Frequency | | | | Days use per acre (ha) | | |
|--------|-------------------|-----|-----|-----|------------------------|----------|---------|
| | '94 | '00 | '05 | '10 | '00 | '05 | '10 |
| Rabbit | 20 | 66 | 27 | 16 | - | - | - |
| Elk | 1 | - | 10 | 2 | - | 7 (17) | 1 (3) |
| Deer | 35 | 20 | 11 | 4 | 9 (22) | 6 (15) | 5 (13) |
| Cattle | - | 1 | 12 | 6 | 5 (11) | 42 (104) | 13 (32) |

BROWSE CHARACTERISTICS--
Management unit 11B, Study no: 5

| Year | Plants per Acre (excluding seedlings) | Age class distribution | | | Seedling (plants/acre) | Utilization | | % poor vigor | Average Height Crown (in) |
|--------------------------------------|--|------------------------|-------------|---------------|---------------------------|---------------|------------|--------------------|------------------------------|
| | | % Young | % Mature | % Decadent | | % moderate | % heavy | | |
| <i>Amelanchier utahensis</i> | | | | | | | | | |
| 86 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 94 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 00 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 05 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 10 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | 43/92 |
| <i>Artemisia nova</i> | | | | | | | | | |
| 86 | 6131 | 10 | 63 | 27 | 399 | 10 | 67 | 3 | 9/16 |
| 94 | 6080 | 9 | 77 | 14 | 100 | 31 | .65 | 3 | 15/21 |
| 00 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | -/- |
| 05 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | -/- |
| 10 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | -/- |
| <i>Artemisia tridentata vaseyana</i> | | | | | | | | | |
| 86 | 199 | 0 | 100 | 0 | - | 100 | 0 | 0 | 20/20 |
| 94 | 180 | 11 | 78 | 11 | - | 44 | 0 | 0 | 16/28 |
| 00 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | -/- |
| 05 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 10/15 |
| 10 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 12/17 |
| <i>Atriplex canescens</i> | | | | | | | | | |
| 86 | 66 | 0 | 0 | 100 | - | 0 | 0 | 0 | -/- |
| 94 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | -/- |
| 00 | 40 | 100 | 0 | 0 | - | 0 | 100 | 0 | -/- |
| 05 | 40 | 0 | 100 | 0 | - | 0 | 100 | 0 | 18/20 |
| 10 | 20 | 100 | 0 | 0 | - | 100 | 0 | 0 | 20/27 |
| <i>Cercocarpus montanus</i> | | | | | | | | | |
| 86 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 94 | 60 | 0 | 100 | - | - | 33 | 0 | 0 | 38/42 |
| 00 | 20 | 0 | 100 | - | - | 0 | 100 | 0 | 9/8 |
| 05 | 40 | 0 | 100 | - | - | 0 | 100 | 0 | 14/11 |
| 10 | 60 | 0 | 100 | - | - | 0 | 100 | 0 | 22/21 |
| <i>Chrysothamnus nauseosus</i> | | | | | | | | | |
| 86 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 94 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 00 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 05 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 10 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | 13/23 |

| Year | Plants per Acre (excluding seedlings) | Age class distribution | | | Seedling (plants/acre) | Utilization | | % poor vigor | Average Height Crown (in) |
|------------------------------|--|------------------------|-------------|---------------|---------------------------|---------------|------------|--------------------|------------------------------|
| | | % Young | % Mature | % Decadent | | % moderate | % heavy | | |
| <i>Ephedra viridis</i> | | | | | | | | | |
| 86 | 66 | 0 | 100 | - | - | 100 | 0 | 100 | 36/25 |
| 94 | 40 | 0 | 100 | - | - | 0 | 0 | 0 | 26/24 |
| 00 | 200 | 10 | 90 | - | - | 10 | 90 | 0 | 11/12 |
| 05 | 160 | 0 | 100 | - | - | 0 | 100 | 0 | 14/27 |
| 10 | 160 | 50 | 50 | - | - | 50 | 50 | 0 | 20/34 |
| <i>Gutierrezia sarothrae</i> | | | | | | | | | |
| 86 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 94 | 300 | 20 | 80 | - | - | 0 | 0 | 0 | 8/7 |
| 00 | 20 | 0 | 100 | - | - | 0 | 0 | 0 | -/- |
| 05 | 20 | 0 | 100 | - | - | 0 | 0 | 0 | 5/8 |
| 10 | 100 | 0 | 100 | - | - | 0 | 0 | 0 | 5/7 |
| <i>Juniperus osteosperma</i> | | | | | | | | | |
| 86 | 265 | 25 | 75 | - | - | 25 | 25 | 0 | 72/35 |
| 94 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 00 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 05 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 10 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| <i>Opuntia sp.</i> | | | | | | | | | |
| 86 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 94 | 20 | 0 | 100 | - | - | 0 | 0 | 0 | 5/13 |
| 00 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | 6/16 |
| 05 | 40 | 0 | 100 | - | - | 0 | 0 | 0 | 2/10 |
| 10 | 40 | 0 | 100 | - | - | 0 | 0 | 0 | 5/14 |
| <i>Pinus edulis</i> | | | | | | | | | |
| 86 | 132 | 50 | 50 | - | - | 0 | 0 | 0 | 108/71 |
| 94 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 00 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 05 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 10 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| <i>Purshia tridentata</i> | | | | | | | | | |
| 86 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 94 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | -/- |
| 00 | 20 | 100 | 0 | - | - | 0 | 0 | 0 | 13/24 |
| 05 | 20 | 0 | 100 | - | - | 0 | 100 | 0 | 10/18 |
| 10 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | 23/36 |