

BARNARD CREEK - TREND STUDY NO. 5-8-11

Vegetation Type: Bitterbrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: [Upland Gravelly Loam \(Bonneville Big Sagebrush\), R028AY306UT](#)

Land Ownership: USFS

Elevation: 4,972 ft (1,516 m)

Aspect: West

Slope: 52%

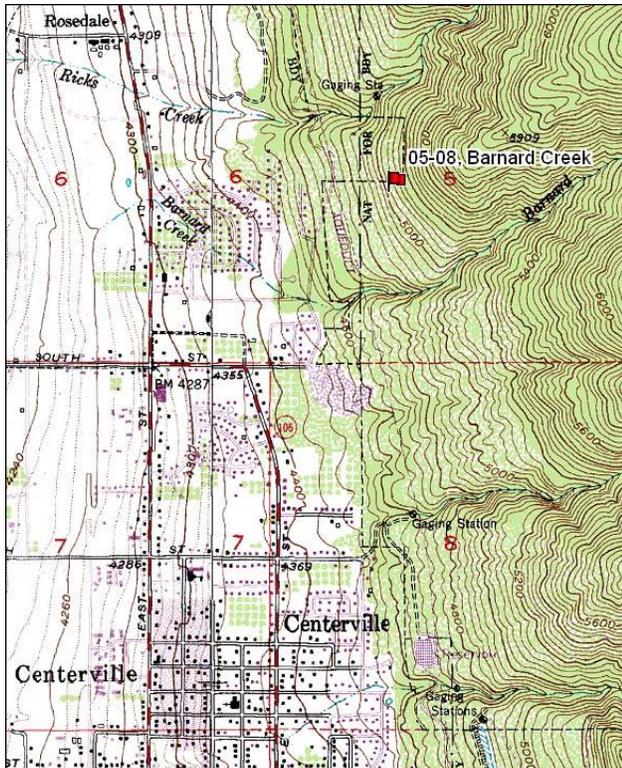
Transect bearing: 166° magnetic

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

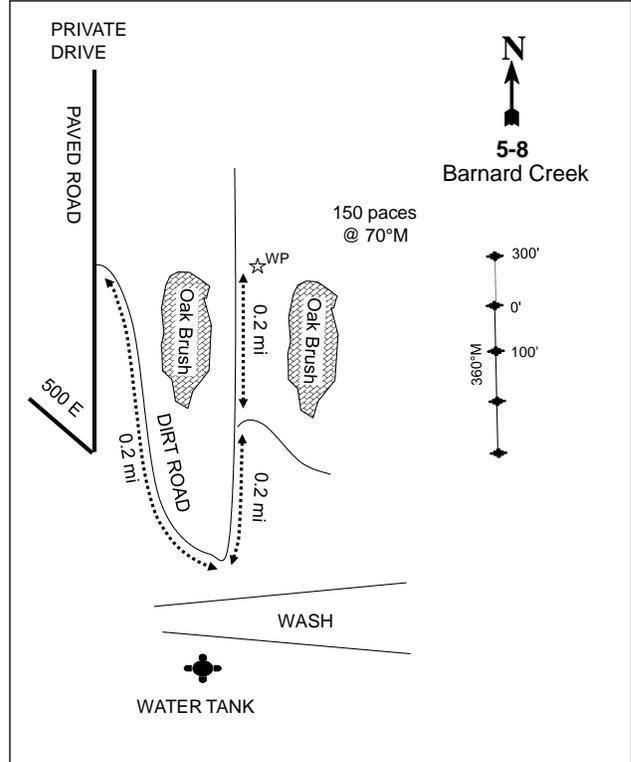
Directions:

From U-106 in Centerville (Main St.) take Barnard Street (1200 North) east to Oak Ridge Drive. Turn left on Oak Ridge to 500 East and stop. Take a bearing of 53 degrees magnetic from the northwest corner of this intersection to locate the transect up the first hill below a band of oak and boulders. Continue along Oak Ridge Drive for 0.2 miles, take a hairpin turn to the right and go 0.2 miles along the Weber Basin Pipeline to a fork in the road. Take the left fork and go 0.2 miles around a bend to a fork. Continue left on a two track 0.2 miles to a witness post on the right just after a patch of oak. The transect is 150 paces up the slope at a bearing of 70 degrees magnetic. The 0-foot baseline has browse tag #58 attached. The baseline runs 166 degrees magnetic. The 300 foot line runs off the 0-foot baseline stake at a bearing of 360 degrees magnetic.

Map Name: Bountiful Peak



Diagrammatic Sketch:



Township: 2N Range: 1E Section: 5

GPS: NAD 83, UTM 12S 427058 E 4532009 N

## BARNARD CREEK - TREND STUDY NO. 5-8

### Site Information

Site Description: This study is located within an isolated antelope bitterbrush (*Purshia tridentata*) population on crucial deer winter range on the Wasatch Face above Centerville. The study transect is about 1,000 feet from the nearest residence. The study transect is located on private land near the National Forest Service boundary. Deer presence is heavy and the range has shown some signs of intense utilization during past readings. Some elk also appear to winter on this slope. Deer pellet groups were sampled in high abundance in 2001 and 2011, but moderate abundance in 2006. Elk pellet groups were sampled in low abundance in 2001, but more moderate abundance in 2006. No elk pellet groups were observed in 2011 (Table - Pellet Group Data).

Browse: Antelope bitterbrush and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) are the key browse species. Bitterbrush is the dominant browse species, and has provided the majority of browse cover since 1996. The bitterbrush population is moderately dense, and has been centered within the mature demographic throughout the duration of the study. Decadence and poor vigor within the bitterbrush population are low. Utilization of antelope bitterbrush has been generally moderate over the sample years. The bitterbrush plants are large and vigorous with an average height of nearly 4 feet and a crown of about 6 feet. The recruitment of young bitterbrush plants has been poor over the course of the study (Table - Browse Characteristics).

Mountain big sagebrush provides less browse cover than bitterbrush, but has a population concentrated toward the south end of the study. Sagebrush density has increased slightly since 1996. The sagebrush population has been centered within the mature demographic. Decadence has fluctuated from low to high rates within the population, but poor vigor has been mostly low. Utilization of mountain big sagebrush has been light to moderate over the sample years. The recruitment of young sagebrush plants to the population has been poor over the sample years (Table - Browse Characteristics).

Herbaceous Understory: The study area is dominated by cheatgrass (*Bromus tectorum*). The perennial grass species are rare on the site, but include bluebunch wheatgrass (*Agropyron spicatum*), purple three-awn (*Aristida purpurea*), Sandberg bluegrass (*Poa secunda*), and sand dropseed (*Sporobolus cryptandrus*). A variety of forb species have been sampled on the study, but are not found in abundance. Common species include pale alyssum (*Alyssum Alyssoides*), storksbill (*Erodium cicutarium*), hairy goldaster (*Heterotheca villosa*), Douglas knotweed (*Polygonum douglasii*), and Louisiana sagebrush (*Artemisia ludoviciana*). The state listed noxious weeds Dyer's woad (*Isatis tinctoria*) and Dalmation toadflax (*Linaria dalmatica*) were first sampled in 1996 and have been sampled every year since. Dyer's woad has increased slightly in nested frequency every sampled year (Table - Herbaceous Trends).

Soil: The study is part of the Kilburn-Francis association, and is likely part of the Kilburn component. These soils occur on alluvial fans. The parent material consists of lacustrine deposits (Soil Survey Staff 2011). The soil texture is a sandy clay loam with neutral soil reaction (pH 7.0) (Table - Soil Analysis Data). Phosphorus may have limited availability for plant growth and development at 5.7 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover has been modest to near absent for the duration of the study, and protective ground cover is provided by ample vegetation and litter cover (Table - Basic cover). A deep layer of litter and organic matter has built up under the shrubs. There is easy access for off road vehicles and their frequent use has led to increased erosion potential. The soil erosion condition has been classified as stable since 2001.

## Trend Assessments

### Browse:

- **1985 to 1990 - stable (0):** The density for antelope bitterbrush increased six-fold from 66 plants/acre to 399 plants/acre. Decadence and poor vigor was not observed within the bitterbrush population. Recruitment of young bitterbrush increased to 17% of the overall population. The density for mountain big sagebrush decreased 35% from 1,331 plants/acre to 865 plants/acre. Decadence within the sagebrush population increased from 15% to 31%. The sagebrush population decreased in poor vigor from 10% to 0%. Recruitment of young sagebrush increased from 5% to 54% of the overall population.
- **1990 to 1996 - stable (0):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence within the antelope bitterbrush population increased slightly to 3%. Poor vigor was not observed within the bitterbrush population. Decadence within the mountain big sagebrush population decreased to 18%; however, poor vigor increased slightly to 3%. Recruitment of young sagebrush decreased to 3% of the overall population.
- **1996 to 2001 - up (+2):** The density for antelope bitterbrush increased two-fold from 600 plants/acre to 1,220 plants/acre. Decadence and poor vigor within the bitterbrush population was maintained at 3% and 0%, respectively. The density for mountain big sagebrush increased 15% from 680 plants/acre to 780 plants/acre. Decadence within the sagebrush population increased to 23%. The sagebrush population maintained poor vigor at 3%. Recruitment of young sagebrush was maintained at 3% of the overall population.
- **2001 to 2006 - slightly down (-1):** The density for antelope bitterbrush decreased 25% to 920 plants/acre. Decadence and poor vigor within the bitterbrush population increased to 7%. The density for mountain big sagebrush remained at 780 plants/acre. Decadence within the sagebrush population decreased to 3%. The sagebrush population decreased in poor vigor to 0%. Recruitment of young sagebrush was not observed.
- **2006 to 2011 - up (+2):** The density for antelope bitterbrush increased 25% to 1,160 plants/acre. Decadence within the bitterbrush population remained at 7%. The bitterbrush population decreased in poor vigor to 3%. The density for mountain big sagebrush increased 8% to 840 plants/acre. Decadence within the sagebrush population increased to 10%. The sagebrush population increased in poor vigor to 14%. Recruitment of young sagebrush increased to 5% of the overall population.

### Grass:

- **1985 to 1990 - stable (0):** The sum of nested frequency for perennial grasses increased 57%. Perennial grasses are scarce and the increase is likely not due to any one specific species, and is likely due to small, accumulative increases in nested frequency across the perennial grass community.
- **1990 to 1996 - stable (0):** The sum of nested frequency for perennial grass species increased 64%. However, because perennial grasses are so rare that small incremental increases in nested frequency will be amplified as a change within the grass community. Annual grasses were included in the sample for the first time in 1996, and cheatgrass was measured as the most dominant grass species.
- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial grass species increased over two-fold. Sandberg bluegrass had a significant increase in nested frequency, and increased in cover from less than 1% to 1%. The weedy annual species cheatgrass had significant decrease in nested frequency, and decreased in cover from 37% to 31%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial grass species remained similar. The annual species winter rye (*Secale cereale*) was sampled for the first time, and had a cover of 1%.
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial grass species remained similar. The annual species winter rye had a significant increase in nested frequency, and maintained cover near 1%.

Forb:

- **1985 to 1990 - down (-2):** The sum of nested frequency for perennial forbs decreased 59%. The perennial species Louisiana sagebrush and Pacific aster (*Aster chilensis*) decreased significantly in nested frequency.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 13%. The increase is likely not due to any one specific perennial species, and is likely due to small, accumulative increases in nested frequency across the perennial forb community. However, the noxious weeds dyer's woad and dalmation toadflax were observed for the first time. Dyer's woad and dalmation toadflax were not common and had a combined cover of less than 1%. Hairy goldaster was the most commonly occurring perennial forb, and had a cover of 3%.
- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial forbs increased 94%. The perennial species wild onion (*Allium sp.*) and Pacific aster increased significantly in nested frequency, but had covers that were less than 1%. The noxious weed dyer's woad had a significant increase in nested frequency, and increased in cover to 1%. Hairy goldaster maintained cover near 3%
- **2001 to 2006 - down (-2):** The sum of nested frequency for perennial forbs decreased 31%. The perennial species wild onion and Pacific aster decreased significantly in nested frequency. Covers for these species were maintained at less than 1%.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial forbs increased 91%. The perennial species bedstraw (*Galium sp.*) was observed for the first time, and had a cover of 3%. Wild onion had a significant decrease in nested frequency.

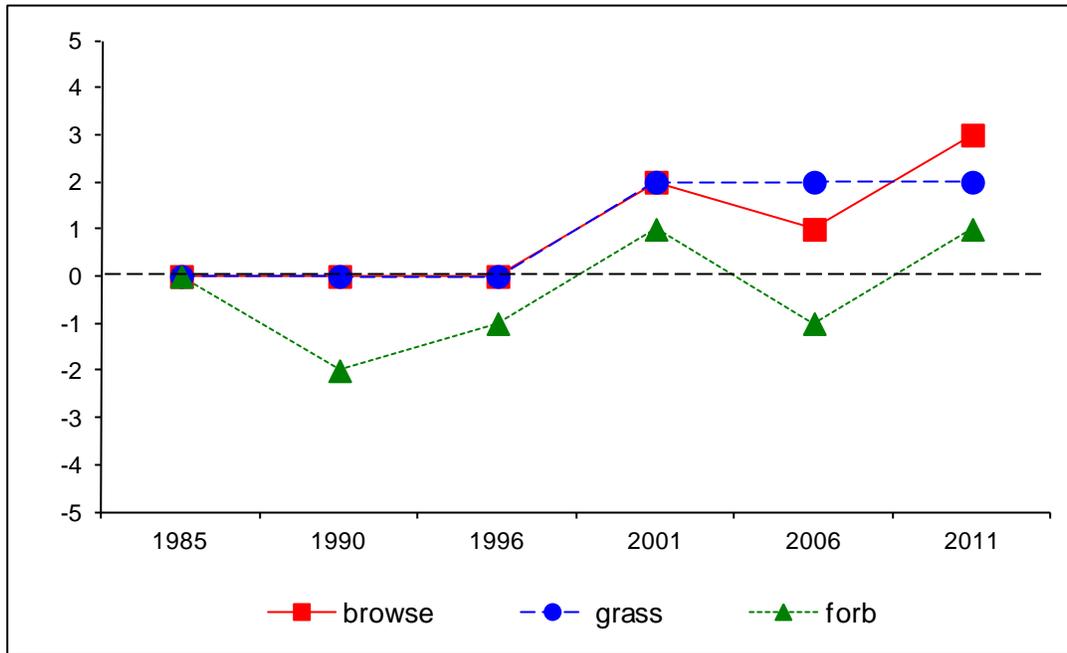
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --  
Management unit 5, study no: 8

| Year | Preferred Browse Cover | Preferred Browse Decadence | Preferred Browse Young | Perennial Grass Cover (-POBU) | Annual Grass Cover | Perennial Forb Cover | Noxious Weeds | Total Score | Ranking        |
|------|------------------------|----------------------------|------------------------|-------------------------------|--------------------|----------------------|---------------|-------------|----------------|
| 96   | 24.5                   | 13.4                       | 0.2                    | 3.4                           | -20.0              | 8.7                  | -4.0          | <b>26.3</b> | Very Poor      |
| 01   | 30.0                   | 12.7                       | 0.4                    | 4.4                           | -20.0              | 10.0                 | -4.0          | <b>33.4</b> | Very Poor-Poor |
| 06   | 30.0                   | 13.3                       | 0.0                    | 4.9                           | -20.0              | 5.5                  | -4.0          | <b>29.7</b> | Very Poor      |
| 11   | 30.0                   | 12.6                       | 0.9                    | 3.4                           | -20.0              | 10.0                 | -4.0          | <b>32.9</b> | Very Poor      |

## Trend Summary

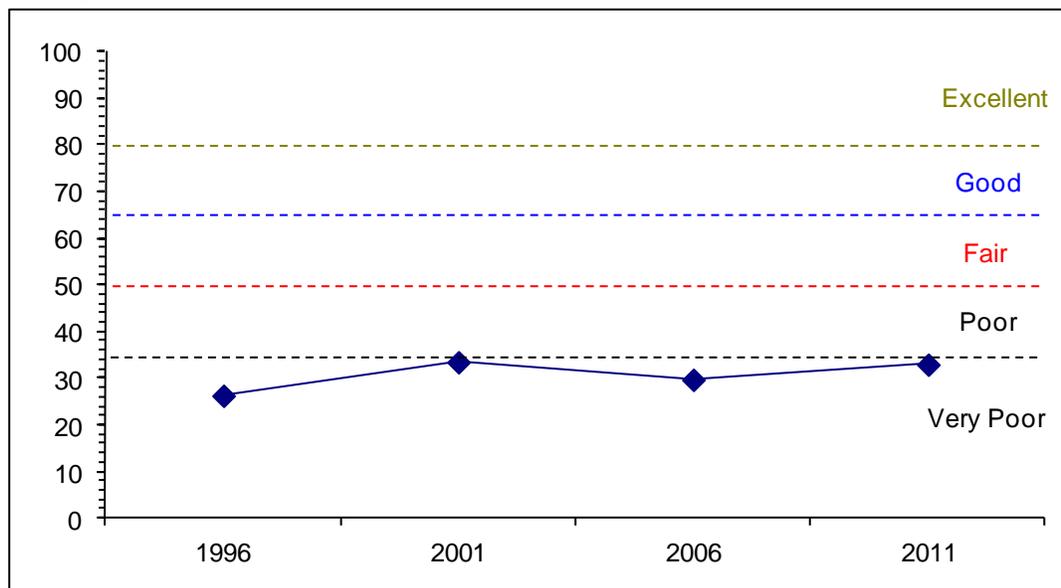
### CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 5 Study no: 8



### DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--

Management unit 5, Study no: 8



HERBACEOUS TRENDS--  
Management unit 05, Study no: 8

| Type                        | Species                    | Nested Frequency |     |      |      |      |      | Average Cover % |       |       |       |
|-----------------------------|----------------------------|------------------|-----|------|------|------|------|-----------------|-------|-------|-------|
|                             |                            | '85              | '90 | '96  | '01  | '06  | '11  | '96             | '01   | '06   | '11   |
| G                           | Agropyron spicatum         | ab8              | a3  | ab15 | ab14 | b23  | ab22 | .67             | .90   | 1.18  | 1.37  |
| G                           | Aristida purpurea          | -                | 2   | 5    | 9    | 2    | 3    | .09             | .36   | .30   | .00   |
| G                           | Bromus tectorum (a)        | -                | -   | b392 | a378 | a373 | a362 | 36.54           | 30.96 | 34.23 | 40.65 |
| G                           | Festuca myuros (a)         | -                | -   | a-   | a5   | a5   | b62  | -               | .03   | .31   | 2.50  |
| G                           | Poa bulbosa                | a3               | a-  | a-   | a18  | a16  | b54  | -               | .20   | .43   | .76   |
| G                           | Poa fendleriana            | 3                | 3   | -    | -    | 3    | -    | -               | -     | .00   | -     |
| G                           | Poa secunda                | a-               | a-  | ab12 | bc32 | c30  | a10  | .10             | .66   | .51   | .34   |
| G                           | Secale cereale (a)         | -                | -   | a-   | a-   | b17  | c80  | -               | -     | .54   | 1.38  |
| G                           | Sporobolus cryptandrus     | -                | 12  | 4    | 8    | 13   | -    | .30             | .27   | .42   | -     |
| G                           | Stipa comata               | -                | 2   | -    | -    | -    | -    | -               | -     | -     | -     |
| Total for Annual Grasses    |                            | 0                | 0   | 392  | 383  | 395  | 504  | 36.54           | 30.99 | 35.09 | 44.55 |
| Total for Perennial Grasses |                            | 14               | 22  | 36   | 81   | 87   | 89   | 1.16            | 2.40  | 2.86  | 2.48  |
| Total for Grasses           |                            | 14               | 22  | 428  | 464  | 482  | 593  | 37.70           | 33.39 | 37.95 | 47.04 |
| F                           | Agoseris glauca            | -                | -   | -    | 1    | -    | 1    | -               | .03   | -     | .03   |
| F                           | Allium sp.                 | a11              | a-  | a2   | b52  | a18  | b57  | .00             | .38   | .07   | .27   |
| F                           | Alyssum alyssoides (a)     | -                | -   | b29  | a8   | a3   | a5   | .10             | .06   | .03   | .04   |
| F                           | Ambrosia psilostachya      | -                | -   | 9    | 1    | -    | -    | .27             | .00   | -     | -     |
| F                           | Artemisia ludoviciana      | b49              | a21 | a11  | a11  | a14  | a8   | .36             | .33   | .50   | .04   |
| F                           | Aster chilensis            | c63              | a-  | a-   | b8   | a-   | a-   | -               | .03   | -     | -     |
| F                           | Chenopodium album (a)      | -                | 6   | -    | -    | -    | -    | -               | -     | -     | -     |
| F                           | Comandra pallida           | -                | -   | -    | -    | 2    | 3    | -               | -     | .00   | .03   |
| F                           | Cynoglossum officinale     | -                | -   | 3    | -    | 3    | -    | .00             | -     | .01   | -     |
| F                           | Descurainia pinnata (a)    | -                | -   | a-   | a2   | a1   | b18  | -               | .01   | .00   | .51   |
| F                           | Draba sp. (a)              | -                | -   | a-   | c59  | b25  | bc37 | -               | .26   | .13   | .39   |
| F                           | Epilobium brachycarpum (a) | b24              | a-  | a4   | a11  | a5   | a9   | .01             | .12   | .01   | .02   |
| F                           | Erigeron sp.               | 5                | 3   | -    | -    | -    | 1    | -               | -     | .00   | .00   |
| F                           | Eriogonum umbellatum       | -                | -   | -    | -    | 1    | 1    | -               | -     | .03   | .15   |
| F                           | Erodium cicutarium (a)     | b18              | a-  | a-   | c79  | a-   | b12  | -               | 1.77  | -     | .34   |
| F                           | Euphorbia sp.              | -                | -   | 3    | 1    | -    | -    | .00             | .00   | -     | -     |
| F                           | Galium sp.                 | a-               | a-  | a-   | a-   | a-   | b45  | -               | -     | -     | 2.76  |
| F                           | Gilia sp. (a)              | -                | -   | -    | 5    | -    | -    | -               | .03   | -     | -     |
| F                           | Helianthus annuus (a)      | -                | 6   | -    | 7    | -    | 3    | -               | .02   | -     | .00   |
| F                           | Heterotheca villosa        | 40               | 46  | 38   | 38   | 21   | 22   | 3.22            | 3.36  | 1.21  | .63   |
| F                           | Holosteum umbellatum (a)   | -                | -   | a-   | b18  | b24  | b25  | -               | .41   | .06   | .12   |
| F                           | Isatis tinctoria           | a-               | a-  | b9   | bc31 | c41  | c53  | .31             | 1.13  | .78   | 1.06  |
| F                           | Lactuca serriola (a)       | a-               | b28 | a2   | a-   | a3   | b26  | .00             | -     | .00   | .30   |
| F                           | Linaria dalmanica          | -                | -   | 1    | 6    | 3    | 4    | .15             | .36   | .13   | .03   |
| F                           | Lupinus argenteus          | -                | -   | -    | -    | -    | 5    | -               | -     | -     | .03   |
| F                           | Machaeranthera canescens   | -                | -   | 1    | -    | 2    | -    | .00             | -     | .00   | -     |
| F                           | Phlox longifolia           | -                | -   | -    | 4    | -    | -    | -               | .01   | -     | -     |
| F                           | Polygonum douglasii (a)    | -                | -   | b28  | a-   | a-   | b17  | .14             | -     | -     | .03   |
| F                           | Portulaca oleracea (a)     | -                | 3   | -    | -    | -    | -    | -               | -     | -     | -     |
| F                           | Salsola iberica (a)        | -                | 8   | -    | 2    | -    | 3    | -               | .03   | -     | .00   |

| Type                      | Species                | Nested Frequency |     |     |     |     |     | Average Cover % |      |      |      |
|---------------------------|------------------------|------------------|-----|-----|-----|-----|-----|-----------------|------|------|------|
|                           |                        | '85              | '90 | '96 | '01 | '06 | '11 | '96             | '01  | '06  | '11  |
| F                         | Tragopogon dubius (a)  | a-               | a1  | b17 | a2  | a-  | a5  | .17             | .06  | -    | .01  |
| F                         | Unknown forb-perennial | 3                | -   | -   | -   | -   | -   | -               | -    | -    | -    |
| F                         | Verbascum blattaria    | -                | -   | 2   | -   | -   | -   | .00             | -    | -    | -    |
| Total for Annual Forbs    |                        | 42               | 52  | 80  | 193 | 61  | 160 | 0.43            | 2.79 | 0.24 | 1.79 |
| Total for Perennial Forbs |                        | 171              | 70  | 79  | 153 | 105 | 200 | 4.35            | 5.66 | 2.75 | 5.06 |
| Total for Forbs           |                        | 213              | 122 | 159 | 346 | 166 | 360 | 4.79            | 8.46 | 3.00 | 6.86 |

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

#### BROWSE TRENDS--

Management unit 05, Study no: 8

| Type             | Species                       | Strip Frequency |     |     |     | Average Cover % |       |       |       |
|------------------|-------------------------------|-----------------|-----|-----|-----|-----------------|-------|-------|-------|
|                  |                               | '96             | '01 | '06 | '11 | '96             | '01   | '06   | '11   |
| B                | Artemisia tridentata vaseyana | 25              | 27  | 28  | 29  | 2.73            | 5.09  | 9.18  | 9.31  |
| B                | Gutierrezia sarothrae         | 8               | 2   | 2   | 0   | .06             | -     | .38   | -     |
| B                | Opuntia sp.                   | 2               | 2   | 1   | 0   | -               | -     | -     | -     |
| B                | Purshia tridentata            | 27              | 36  | 30  | 39  | 14.06           | 16.55 | 17.37 | 16.32 |
| Total for Browse |                               | 62              | 67  | 61  | 68  | 16.86           | 21.65 | 26.93 | 25.64 |

#### CANOPY COVER, LINE INTERCEPT--

Management unit 05, Study no: 8

| Species                       | Percent Cover |       |
|-------------------------------|---------------|-------|
|                               | '06           | '11   |
| Artemisia tridentata vaseyana | 11.68         | 10.88 |
| Purshia tridentata            | 27.93         | 18.39 |

#### KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 05, Study no: 8

| Species                       | Average leader growth (in) |     |     |
|-------------------------------|----------------------------|-----|-----|
|                               | '01                        | '06 | '11 |
| Artemisia tridentata vaseyana | 2.8                        | 2.3 | 2.8 |
| Purshia tridentata            | 4.4                        | 4.6 | 1.6 |

#### BASIC COVER--

Management unit 05, Study no: 8

| Cover Type  | Average Cover % |       |       |       |       |       |
|-------------|-----------------|-------|-------|-------|-------|-------|
|             | '85             | '90   | '96   | '01   | '06   | '11   |
| Vegetation  | 7.25            | 4.75  | 55.25 | 60.27 | 65.84 | 69.59 |
| Rock        | 5.00            | 6.50  | 5.85  | 5.56  | 4.69  | 5.93  |
| Pavement    | 12.50           | 13.25 | 3.92  | 4.43  | 3.58  | 5.11  |
| Litter      | 38.00           | 61.25 | 55.74 | 48.18 | 53.77 | 38.87 |
| Cryptogams  | 0               | 0     | .12   | .06   | .04   | .40   |
| Bare Ground | 37.25           | 14.25 | .56   | 6.14  | 1.91  | 4.29  |

SOIL ANALYSIS DATA --

Management unit 05, Study no: 8, Study Name: Barnard Creek

| Effective rooting depth (in) | pH  | Sandy-Clay-Loam |       |       | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----|-----------------|-------|-------|-----|-------|-------|------|
|                              |     | %sand           | %silt | %clay |     |       |       |      |
| 33.5                         | 7.0 | 60.9            | 19.1  | 20.0  | 1.1 | 5.7   | 118.4 | 0.3  |

PELLET GROUP DATA--

Management unit 05, Study no: 8

| Type   | Quadrat Frequency |     |     |     | Days use per acre (ha) |         |          |
|--------|-------------------|-----|-----|-----|------------------------|---------|----------|
|        | '96               | '01 | '06 | '11 | '01                    | '06     | '11      |
| Rabbit | -                 | -   | 1   | -   | -                      | -       | -        |
| Elk    |                   |     |     |     | 5 (12)                 | -       | -        |
| Deer   | 20                | 19  | 14  | 15  | 46 (114)               | 27 (68) | 74 (182) |

BROWSE CHARACTERISTICS--

Management unit 05, Study no: 8

| Year                                 | Plants per Acre (excluding seedlings) | Age class distribution |          |            | Seedling (plants/acre) | Utilization |         |              | Average Height Crown (in) |
|--------------------------------------|---------------------------------------|------------------------|----------|------------|------------------------|-------------|---------|--------------|---------------------------|
|                                      |                                       | % Young                | % Mature | % Decadent |                        | % moderate  | % heavy | % poor vigor |                           |
| <i>Artemisia tridentata vaseyana</i> |                                       |                        |          |            |                        |             |         |              |                           |
| 85                                   | <b>1331</b>                           | 5                      | 80       | 15         | 199                    | 65          | 10      | 10           | 26/40                     |
| 90                                   | <b>865</b>                            | 54                     | 15       | 31         | -                      | 23          | 0       | 0            | 13/22                     |
| 96                                   | <b>680</b>                            | 3                      | 79       | 18         | -                      | 18          | 0       | 3            | 19/35                     |
| 01                                   | <b>780</b>                            | 3                      | 74       | 23         | -                      | 0           | 0       | 3            | 27/40                     |
| 06                                   | <b>780</b>                            | 0                      | 97       | 3          | -                      | 21          | 0       | 0            | 28/49                     |
| 11                                   | <b>840</b>                            | 5                      | 86       | 10         | 20                     | 21          | 0       | 14           | 27/43                     |
| <i>Chrysothamnus nauseosus</i>       |                                       |                        |          |            |                        |             |         |              |                           |
| 85                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 90                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 96                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 01                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 06                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 11                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | 26/32                     |
| <i>Gutierrezia sarothrae</i>         |                                       |                        |          |            |                        |             |         |              |                           |
| 85                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 90                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 96                                   | <b>200</b>                            | 30                     | 70       | -          | -                      | 0           | 0       | 0            | 13/19                     |
| 01                                   | <b>80</b>                             | 0                      | 100      | -          | -                      | 0           | 0       | 0            | 11/14                     |
| 06                                   | <b>40</b>                             | 0                      | 100      | -          | -                      | 0           | 0       | 0            | 12/19                     |
| 11                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | 9/15                      |
| <i>Opuntia sp.</i>                   |                                       |                        |          |            |                        |             |         |              |                           |
| 85                                   | <b>66</b>                             | 0                      | 100      | -          | -                      | 0           | 0       | 0            | 7/17                      |
| 90                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | -/-                       |
| 96                                   | <b>40</b>                             | 0                      | 100      | -          | -                      | 0           | 0       | 0            | 6/12                      |
| 01                                   | <b>40</b>                             | 0                      | 100      | -          | -                      | 0           | 0       | 0            | 10/17                     |
| 06                                   | <b>20</b>                             | 0                      | 100      | -          | -                      | 0           | 0       | 0            | 9/23                      |
| 11                                   | <b>0</b>                              | 0                      | 0        | -          | -                      | 0           | 0       | 0            | 6/6                       |

|                    |  | Age class distribution |          |            |                           |            | Utilization |              |                              |  |
|--------------------|--|------------------------|----------|------------|---------------------------|------------|-------------|--------------|------------------------------|--|
| Year               | Plants per Acre<br>(excluding seedlings) | % Young                | % Mature | % Decadent | Seedling<br>(plants/acre) | % moderate | % heavy     | % poor vigor | Average Height<br>Crown (in) |  |
| Purshia tridentata |  |                        |          |            |                           |            |             |              |                              |  |
| 85                 | <b>66</b>                                | 0                      | 100      | 0          | -                         | 0          | 100         | 0            | 36/51                        |  |
| 90                 | <b>399</b>                               | 17                     | 83       | 0          | -                         | 50         | 0           | 0            | 50/66                        |  |
| 96                 | <b>600</b>                               | 0                      | 97       | 3          | -                         | 70         | 0           | 0            | 43/73                        |  |
| 01                 | <b>1220</b>                              | 0                      | 97       | 3          | -                         | 56         | 21          | 0            | 40/67                        |  |
| 06                 | <b>920</b>                               | 0                      | 93       | 7          | -                         | 37         | 26          | 7            | 41/72                        |  |
| 11                 | <b>1160</b>                              | 0                      | 93       | 7          | -                         | 19         | 48          | 3            | 31/45                        |  |