

CRANDALL CANYON - TREND STUDY NO. 6-7-11

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Mountain Loam \(Mountain Big Sagebrush\), R047XA461UT](#)

Land Ownership: Private

Elevation: 6,600 ft (2,012 m)

Aspect: South

Slope: 31%

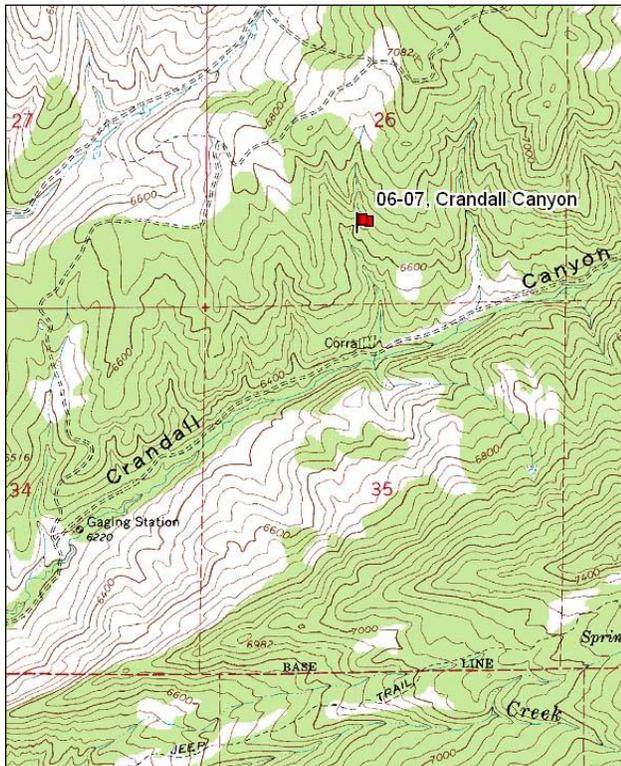
Transect bearing: 165° magnetic

Belt placement: line 1 (11, 31, & 71ft), line 2 (59 & 95ft)

Directions:

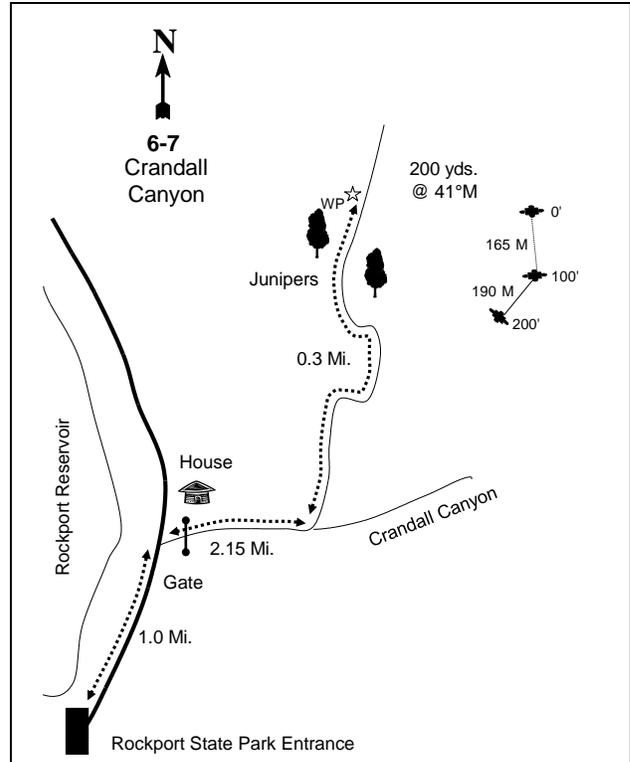
From the guard house at Rockport State Park, proceed north and east on the paved road for 1.0 mile. Turn right, proceed up through the gate and up Crandall Canyon (dirt road) for 2.15 miles, and turn left at the fork. Travel 0.3 miles north on this road to a pair of junipers on either side of the road. Just past the junipers on the left hand side of the road is a witness post. From the witness post walk approximately 200 yards at 41 degrees magnetic to the 0-foot stake of the baseline. The 0-foot stake is marked by browse tag #7956. The 200-foot baseline doglegs and runs 190 degrees magnetic.

Map Name: Crandall Canyon



Township: 1N Range: 5E Section: 26

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 470437. E 4515135 N

## CRANDALL CANYON - TREND STUDY NO. 6-7

### Site Information

Site Description: The study is located on crucial deer and elk winter range east of Rockport Reservoir. The plant community is comprised of mixed mountain brush with patches of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and Gambel oak (*Quercus gambelii*). The result is a mosaic vegetation pattern that provides excellent big game habitat. Crandall Canyon is privately owned and is grazed by sheep and cattle. Big game presence is heavy and animals are usually seen here at all times of the year. Deer pellet groups were sampled in high abundance in 2001, but abundance has been low since 2006. Two deer carcasses were on the site in 2011. Elk pellet groups have been sampled in low abundance since 2001 (Table - Pellet Group Data).

Browse: The majority of the vegetation is composed of a diverse mixture of mountain brush species. Over the duration of the study, twelve species have been sampled. The abundant species are true mountain mahogany (*Cercocarpus montanus*), mountain snowberry (*Symphoricarpos oreophilus*), Gambel oak, Saskatoon serviceberry (*Amelanchier alnifolia*), and mountain big sagebrush. Many of the browse species form tight associations with one another, with three or four species commonly growing within one "bush". This growth pattern provides some protection from heavy browsing. The dominant preferred browse species is true mountain mahogany. The mahogany is a moderately dense population of heavily used plants. Consistent heavy browsing on mahogany has resulted in a population of short statured plants. The serviceberry and sagebrush populations have lower densities, but show moderate to heavy use. Other common browse species including Gambel oak and snowberry display lighter use (Table - Browse Characteristics). Pocket gopher and badger diggings around plants have been noted in the past. A moderate rust infestation on serviceberry plants has also been sampled in past readings, which does not usually kill plants, but can affect vigor. Utah juniper (*Juniperus osteosperma*) has been invading the study area. Juniper canopy cover has increased since 2001 (Table - Canopy Cover), and density has increased slightly since 2006 (Table - Point-Quarter Tree Data).

Herbaceous Understory: Grasses provide the majority of the herbaceous cover on the site. Thickspike wheatgrass (*Agropyron dasystachyum*), bluebunch wheatgrass (*A. spicatum*), and Indian ricegrass (*Oryzopsis hymenoides*) are the most abundant perennial grasses. Two annuals, cheatgrass (*Bromus tectorum*) and Japanese chess (*B. japonicus*), are present, but are not overly abundant. Forbs are not very abundant on the site, but are quite diverse (Table - Herbaceous Trends).

Soil: The soil is in the Yeates Hollow-Henefer complex, which occurs on mountain slopes. Parent material consists of colluviums derived from conglomerate, sandstone, quartzite, and shale (Soil Survey Staff 2011). The soil texture is classified as a sandy clay loam, and the soil reaction is moderately alkaline (pH 8.0). Phosphorus may have limited availability for plant growth and development at 5.1 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is moderately high. Vegetation cover has increased since 1996, but litter cover has decreased. Rock and pavement cover is moderate (Table - Basic Cover). Gullies are evident, but many of them show signs of healing. Sheet and gully erosion have been high in the past, but appear to have been stabilizing in recent years. Some erosion is apparent with pedestalling around some of the plants. The soil erosion condition was classified as slight in 2001, moderate in 2006, but stable in 2011.

### Trend Assessments

#### Browse:

- **1984 to 1990 - slightly down (-1):** True mountain mahogany decreased 20% in density from 1,331 plants/acre to 1,065 plants/acre, but the densities of both sagebrush and serviceberry increased. Decadence and poor vigor increased, and is considered high, in all three species.
- **1990 to 1996 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence of true mountain

mahogany decreased from 88% to 4%, and poor vigor decreased from 31% to 2%. Decadence and poor vigor of sagebrush and serviceberry also decreased at similar rates.

- **1996 to 2001 - stable (0):** The density and cover of serviceberry, sagebrush, and mahogany plants remained similar. Decadence increased to moderate levels in the sagebrush and mahogany populations. Recruitment of young sagebrush and mahogany plants decreased, and was considered to be poor.
- **2001 to 2006 - slightly down (-1):** True mountain mahogany density decreased 12% from 1,200 plants/acre to 1,060 plants/acre, and cover decreased from 5% to 3%. Serviceberry density decreased 50% from 640 plants/acre to 320 plants/acre, but cover increased slightly from 1% to 3%. Sagebrush density decreased 29% from 280 plants/acre to 200 plants/acre, but cover remained similar. Decadence remained moderate in all three species.
- **2006 to 2011 - stable (0):** There was a slight decrease in the density of mahogany, serviceberry, and sagebrush plants, but decadence of all three species decreased substantially.

Grass:

- **1984 to 1990 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1990 to 1996 - stable (0):** The sum of nested frequency of perennial grasses remained similar.
- **1996 to 2001 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 16%, though cover remained similar.
- **2001 to 2006 - stable (0):** The sum of nested frequency remained similar, but cover increased from 11% to 17%.
- **2006 to 2011 - slightly down (-1):** Despite an increase in perennial grass cover to 19%, the sum of nested frequency of perennial grasses decreased 11%. The annual species Japanese chess increased significantly in nested frequency, and cover increased from near 0% to 3%.

Forb:

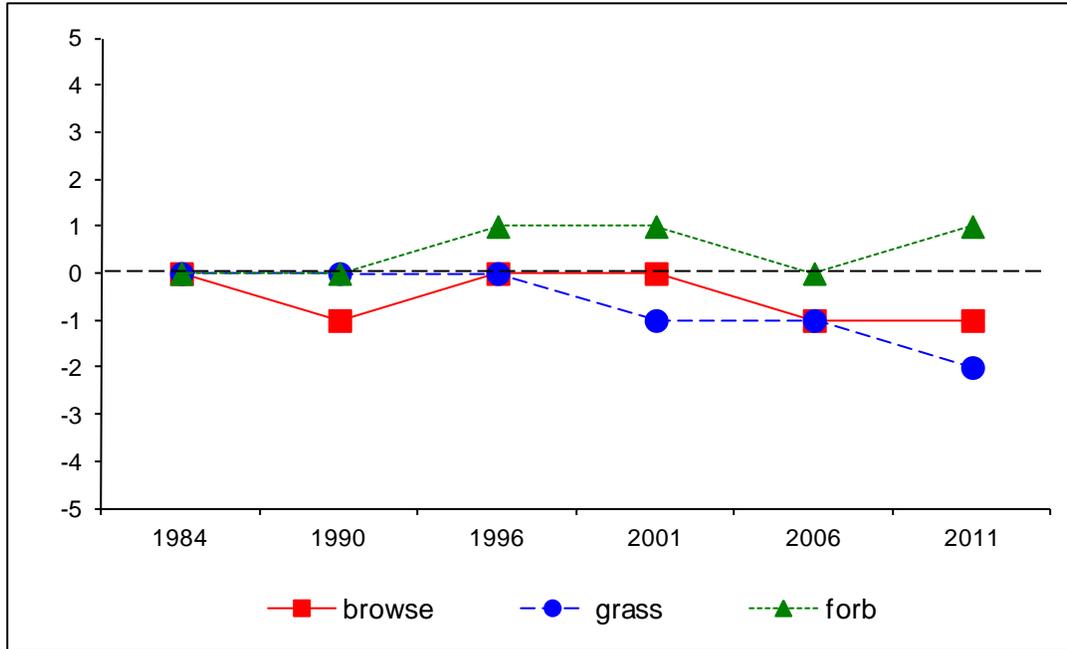
- **1984 to 1990 - stable (0):** The sum of nested frequency of perennial forbs decreased; however, perennial forbs are rare on the site.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency of perennial forbs increased nearly two-fold. Some of this increase may be related to the larger sample area used in 1996.
- **1996 to 2001 - stable (0):** There was little change in the sum of nested frequency or cover of perennial forbs.
- **2001 to 2006 - slightly down (-1):** The perennial forb sum of nested frequency decreased 44%, returning to 1990 levels.
- **2006 to 2011 - slightly up (+1):** There was a 56% increase in the sum of nested frequency of perennial forbs, and cover increased from 2% to 4%. However, there was also a substantial increase in the cover of annual forbs due to a significant increase in the nested frequency of pale alyssum (*Alyssum alyssoides*).

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 6, study no: 7

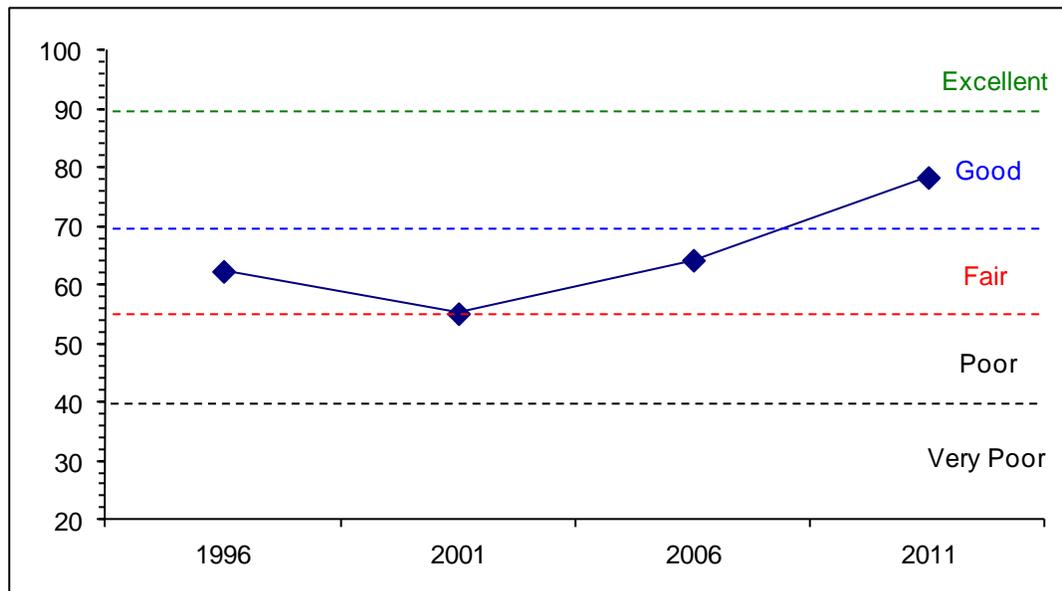
| Year | Preferred Browse Cover | Preferred Browse Decadence | Preferred Browse Young | Perennial Grass Cover | Annual Grass Cover | Perennial Forb Cover | Noxious Weeds | Total Score | Ranking   |
|------|------------------------|----------------------------|------------------------|-----------------------|--------------------|----------------------|---------------|-------------|-----------|
| 96   | 15.0                   | 13.0                       | 9.2                    | 21.0                  | -0.2               | 4.4                  | 0.0           | <b>62.3</b> | Fair      |
| 01   | 11.7                   | 10.9                       | 5.4                    | 21.9                  | -0.2               | 5.4                  | 0.0           | <b>55.1</b> | Poor-Fair |
| 06   | 11.7                   | 11.3                       | 8.1                    | 30.0                  | -0.1               | 3.2                  | 0.0           | <b>64.2</b> | Fair      |
| 11   | 17.4                   | 14.8                       | 9.8                    | 30.0                  | -2.1               | 8.4                  | 0.0           | <b>78.3</b> | Good      |

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
 Management unit 6 Study no: 7



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--  
 Management unit 6, Study no: 7



HERBACEOUS TRENDS--  
Management unit 06, Study no: 7

| Type                        | Species                          | Nested Frequency |      |       |       |       |      | Average Cover % |       |       |       |
|-----------------------------|----------------------------------|------------------|------|-------|-------|-------|------|-----------------|-------|-------|-------|
|                             |                                  | '84              | '90  | '96   | '01   | '06   | '11  | '96             | '01   | '06   | '11   |
| G                           | Agropyron dasystachyum           | a26              | c268 | b126  | b100  | c219  | b114 | 3.48            | 2.92  | 9.85  | 5.42  |
| G                           | Agropyron spicatum               | c244             | a21  | bc147 | bc133 | a44   | b110 | 4.57            | 5.35  | 2.71  | 9.70  |
| G                           | Bromus japonicus (a)             | -                | -    | a-    | a10   | a19   | b87  | -               | .04   | .09   | 2.62  |
| G                           | Bromus tectorum (a)              | -                | -    | b57   | b40   | a20   | a16  | .22             | .15   | .05   | .14   |
| G                           | Carex sp.                        | 19               | 12   | 8     | 6     | 1     | 3    | .16             | .08   | .03   | .03   |
| G                           | Elymus cinereus                  | -                | -    | -     | 1     | -     | -    | -               | .03   | -     | -     |
| G                           | Oryzopsis hymenoides             | 53               | 53   | 72    | 49    | 55    | 51   | 1.62            | 1.81  | 3.05  | 1.84  |
| G                           | Poa pratensis                    | -                | -    | 1     | 5     | 3     | 7    | .00             | .06   | .03   | .09   |
| G                           | Poa secunda                      | 4                | 6    | 20    | 13    | 17    | 13   | .18             | .03   | .09   | .54   |
| G                           | Sitanion hystrix                 | -                | 3    | 4     | 3     | -     | -    | .00             | .03   | -     | -     |
| G                           | Stipa comata                     | a1               | ab10 | ab8   | b15   | ab12  | b16  | .45             | .64   | 1.08  | .92   |
| Total for Annual Grasses    |                                  | 0                | 0    | 57    | 50    | 39    | 103  | 0.21            | 0.20  | 0.14  | 2.76  |
| Total for Perennial Grasses |                                  | 347              | 373  | 386   | 325   | 351   | 314  | 10.48           | 10.97 | 16.87 | 18.56 |
| Total for Grasses           |                                  | 347              | 373  | 443   | 375   | 390   | 417  | 10.70           | 11.17 | 17.01 | 21.33 |
| F                           | Achillea millefolium             | -                | -    | 4     | 1     | -     | 4    | .03             | .03   | -     | .15   |
| F                           | Agoseris glauca                  | -                | -    | -     | -     | 3     | -    | -               | -     | .00   | -     |
| F                           | Alyssum alyssoides (a)           | -                | -    | bc215 | ab182 | a177  | c231 | 1.00            | .84   | .43   | 7.03  |
| F                           | Arabis sp.                       | -                | -    | -     | 1     | -     | -    | -               | .00   | -     | -     |
| F                           | Aster chilensis                  | a-               | a-   | b32   | b36   | b14   | b22  | .52             | .48   | .11   | .80   |
| F                           | Astragalus convallarius          | -                | -    | -     | -     | 1     | -    | -               | -     | .03   | -     |
| F                           | Astragalus sp.                   | -                | 3    | -     | -     | -     | -    | -               | -     | -     | -     |
| F                           | Balsamorhiza sagittata           | 3                | 3    | 5     | 2     | -     | 2    | .06             | .03   | .03   | .15   |
| F                           | Calochortus nuttallii            | -                | -    | -     | 5     | -     | 5    | -               | .18   | -     | .04   |
| F                           | Camelina microcarpa (a)          | -                | -    | a-    | a1    | b29   | ab13 | -               | .00   | .06   | .25   |
| F                           | Chaenactis douglasii             | 4                | 11   | 13    | 5     | 1     | 5    | .08             | .04   | .00   | .04   |
| F                           | Cirsium sp.                      | -                | -    | -     | -     | 1     | -    | -               | -     | .03   | -     |
| F                           | Cirsium undulatum                | ab9              | a5   | abc22 | c27   | abc16 | bc31 | .63             | .90   | .61   | 1.57  |
| F                           | Collomia linearis (a)            | -                | -    | -     | 3     | -     | -    | -               | .00   | -     | -     |
| F                           | Comandra pallida                 | 28               | 12   | 28    | 25    | 23    | 34   | .19             | .22   | .14   | .30   |
| F                           | Cryptantha sp.                   | a19              | b34  | a22   | ab30  | a12   | a4   | .27             | .50   | .37   | .22   |
| F                           | Descurainia pinnata (a)          | -                | -    | 1     | -     | 1     | 1    | .00             | -     | .00   | .03   |
| F                           | Epilobium brachycarpum (a)       | -                | -    | 1     | -     | 1     | -    | .00             | -     | .00   | -     |
| F                           | Eriogonum umbellatum             | -                | 3    | -     | -     | 3     | 3    | -               | -     | .03   | .01   |
| F                           | Euphorbia brachycera             | -                | -    | -     | -     | -     | 3    | -               | -     | -     | .03   |
| F                           | Hackelia patens                  | c32              | ab10 | bc21  | ab8   | a4    | a-   | .20             | .04   | .18   | -     |
| F                           | Lactuca serriola (a)             | -                | -    | 1     | -     | -     | -    | .00             | -     | -     | -     |
| F                           | Oenothera caespitosa             | -                | -    | -     | 1     | -     | -    | -               | .03   | -     | -     |
| F                           | Penstemon humilis                | 11               | 6    | 9     | 15    | 10    | 20   | .09             | .18   | .07   | .82   |
| F                           | Phlox longifolia                 | -                | -    | -     | -     | 1     | -    | -               | -     | .00   | -     |
| F                           | Ranunculus testiculatus (a)      | -                | -    | -     | 14    | -     | 1    | -               | .02   | -     | .00   |
| F                           | Senecio integerrimus             | -                | -    | -     | -     | -     | 3    | -               | -     | -     | .03   |
| F                           | Smilacina racemosa amplexicaulis | -                | -    | 6     | 3     | -     | 3    | .07             | .03   | -     | .03   |

| Type                      | Species                | Nested Frequency |     |     |     |     |     | Average Cover % |      |      |       |
|---------------------------|------------------------|------------------|-----|-----|-----|-----|-----|-----------------|------|------|-------|
|                           |                        | '84              | '90 | '96 | '01 | '06 | '11 | '96             | '01  | '06  | '11   |
| F                         | Tragopogon dubius (a)  | 2                | -   | 4   | -   | 6   | 5   | .06             | -    | .06  | .07   |
| F                         | Unknown forb-perennial | 3                | -   | -   | -   | -   | -   | -               | -    | -    | -     |
| Total for Annual Forbs    |                        | 2                | 0   | 222 | 200 | 214 | 251 | 1.08            | 0.88 | 0.56 | 7.39  |
| Total for Perennial Forbs |                        | 109              | 87  | 162 | 159 | 89  | 139 | 2.17            | 2.71 | 1.62 | 4.20  |
| Total for Forbs           |                        | 111              | 87  | 384 | 359 | 303 | 390 | 3.25            | 3.59 | 2.19 | 11.60 |

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

#### BROWSE TRENDS--

Management unit 06, Study no: 7

| Type             | Species                                   | Strip Frequency |     |     |     | Average Cover % |       |       |       |
|------------------|---|-----------------|-----|-----|-----|-----------------|-------|-------|-------|
|                  |   | '96             | '01 | '06 | '11 | '96             | '01   | '06   | '11   |
| B                | Amelanchier alnifolia                     | 22              | 25  | 16  | 11  | 1.68            | 1.17  | 2.56  | 1.52  |
| B                | Artemisia tridentata vaseyana             | 13              | 11  | 8   | 8   | .94             | .56   | .63   | 1.18  |
| B                | Cercocarpus montanus                      | 38              | 38  | 40  | 39  | 5.02            | 4.66  | 2.92  | 5.41  |
| B                | Chrysothamnus viscidiflorus viscidiflorus | 20              | 23  | 19  | 21  | .74             | 1.50  | 1.55  | 1.33  |
| B                | Gutierrezia sarothrae                     | 82              | 77  | 36  | 31  | 4.02            | 3.67  | .44   | 1.24  |
| B                | Juniperus osteosperma                     | 2               | 6   | 7   | 2   | 2.39            | 3.37  | 5.87  | 4.38  |
| B                | Opuntia sp.                               | 10              | 7   | 11  | 2   | .51             | .45   | .18   | .03   |
| B                | Purshia tridentata                        | 1               | 1   | 1   | 2   | .63             | .38   | .38   | .41   |
| B                | Quercus gambelii                          | 6               | 8   | 9   | 8   | 2.65            | 1.66  | 2.16  | 4.88  |
| B                | Rosa woodsii                              | 0               | 1   | 0   | 0   | .15             | -     | -     | .03   |
| B                | Symphoricarpos oreophilus                 | 19              | 19  | 21  | 21  | 2.75            | 3.59  | 1.97  | 1.92  |
| B                | Tetradymia canescens                      | 4               | 3   | 0   | 0   | .18             | .38   | -     | -     |
| Total for Browse |   | 217             | 219 | 168 | 145 | 21.69           | 21.43 | 18.69 | 22.37 |

#### CANOPY COVER, LINE INTERCEPT--

Management unit 06, Study no: 7

| Species                                   | Percent Cover |       |      |
|---|---------------|-------|------|
|   | '01           | '06   | '11  |
| Amelanchier alnifolia                     | -             | 3.48  | 4.13 |
| Artemisia tridentata vaseyana             | -             | .30   | 1.01 |
| Cercocarpus montanus                      | -             | 2.59  | 5.84 |
| Chrysothamnus viscidiflorus viscidiflorus | -             | 1.01  | 1.38 |
| Gutierrezia sarothrae                     | -             | .98   | 1.88 |
| Juniperus osteosperma                     | 6.80          | 13.14 | 9.16 |
| Opuntia sp.                               | -             | .08   | -    |
| Pinus edulis                              | -             | -     | 4.43 |
| Purshia tridentata                        | -             | 1.01  | 1.14 |
| Quercus gambelii                          | 3.40          | 4.31  | 5.18 |
| Rosa woodsii                              | -             | -     | -    |
| Symphoricarpos oreophilus                 | -             | 3.45  | 3.88 |

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 06, Study no: 7

| Species                       | Average leader growth (in) |     |     |
|-------------------------------|----------------------------|-----|-----|
|                               | '01                        | '06 | '11 |
| Amelanchier alnifolia         | -                          | 2.7 | 3.2 |
| Artemisia tridentata vaseyana | -                          | 2.2 | 2.6 |
| Cercocarpus montanus          | 1.9                        | 2.3 | 5.1 |

POINT-QUARTER TREE DATA--

Management unit 06, Study no: 7

| Species               | Trees per Acre |     |     | Average diameter (in) |     |     |
|-----------------------|----------------|-----|-----|-----------------------|-----|-----|
|                       | '01            | '06 | '11 | '01                   | '06 | '11 |
| Juniperus osteosperma | -              | 40  | 55  | -                     | 8.5 | 7.4 |

BASIC COVER--

Management unit 06, Study no: 7

| Cover Type  | Average Cover % |       |       |       |       |       |
|-------------|-----------------|-------|-------|-------|-------|-------|
|             | '84             | '90   | '96   | '01   | '06   | '11   |
| Vegetation  | 4.50            | 9.50  | 34.75 | 37.41 | 38.00 | 52.36 |
| Rock        | 2.75            | 4.75  | 3.69  | 3.95  | 4.17  | 3.68  |
| Pavement    | 11.25           | 7.25  | 5.34  | 4.38  | 4.35  | 6.00  |
| Litter      | 46.50           | 37.00 | 38.81 | 26.92 | 26.64 | 18.88 |
| Cryptogams  | .25             | 0     | .03   | 0     | 0     | .15   |
| Bare Ground | 34.75           | 41.50 | 31.27 | 41.62 | 45.29 | 30.20 |

SOIL ANALYSIS DATA --

Management unit 06, Study no: 7, Study Name: Crandall Canyon

| Effective rooting depth (in) | pH  | Sandy-Clay-Loam |        |        | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----|-----------------|--------|--------|-----|-------|-------|------|
|                              |     | % sand          | % silt | % clay |     |       |       |      |
| 15.8                         | 8.0 | 58.7            | 12.0   | 29.3   | 1.7 | 5.1   | 32.0  | 0.5  |

PELLET GROUP DATA--

Management unit 06, Study no: 7

| Type   | Quadrat Frequency |     |     |     | Days use per acre (ha) |         |        |
|--------|-------------------|-----|-----|-----|------------------------|---------|--------|
|        | '96               | '01 | '06 | '11 | '01                    | '06     | '11    |
| Rabbit | -                 | 11  | 3   | 1   | -                      | -       | -      |
| Elk    | 5                 | 2   | 2   | 1   | 2 (5)                  | 1 (3)   | 5 (12) |
| Deer   | 15                | 22  | 7   | 6   | 50 (122)               | 15 (36) | 9 (23) |
| Cattle | -                 | 1   | -   | -   | 7 (16)                 | -       | 5 (13) |

BROWSE CHARACTERISTICS--

Management unit 06, Study no: 7

|  |                                       | Age class distribution |          |            |                        |            | Utilization |              |                           |  |
|--|---------------------------------------|------------------------|----------|------------|------------------------|------------|-------------|--------------|---------------------------|--|
| Year   | Plants per Acre (excluding seedlings) | % Young                | % Mature | % Decadent | Seedling (plants/acre) | % moderate | % heavy     | % poor vigor | Average Height Crown (in) |  |
| <i>Amelanchier alnifolia</i>                     |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84   | 0                                     | 0                      | 0        | 0          | -                      | 0          | 0           | 0            | -/-                       |  |
| 90   | 1132                                  | 47                     | 0        | 53         | -                      | 24         | 18          | 29           | -/-                       |  |
| 96   | 580                                   | 21                     | 69       | 10         | 20                     | 21         | 21          | 14           | 21/22                     |  |
| 01   | 640                                   | 25                     | 63       | 13         | -                      | 28         | 34          | 9            | 22/27                     |  |
| 06   | 320                                   | 25                     | 63       | 13         | -                      | 19         | 44          | 19           | 25/30                     |  |
| 11   | 220                                   | 9                      | 91       | 0          | -                      | 18         | 18          | 0            | 22/26                     |  |
| <i>Artemisia tridentata vaseyana</i>             |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84   | 864                                   | 8                      | 46       | 46         | -                      | 62         | 31          | 0            | 20/23                     |  |
| 90   | 1132                                  | 0                      | 29       | 71         | 66                     | 12         | 59          | 41           | 19/23                     |  |
| 96   | 340                                   | 24                     | 71       | 6          | -                      | 24         | 41          | 0            | 14/25                     |  |
| 01   | 280                                   | 7                      | 64       | 29         | -                      | 36         | 43          | 0            | 16/26                     |  |
| 06   | 200                                   | 0                      | 80       | 20         | 60                     | 50         | 20          | 20           | 23/31                     |  |
| 11   | 160                                   | 0                      | 100      | 0          | 20                     | 50         | 0           | 13           | 21/35                     |  |
| <i>Cercocarpus montanus</i>                      |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84   | 1331                                  | 10                     | 45       | 45         | -                      | 15         | 85          | 0            | 17/18                     |  |
| 90   | 1065                                  | 6                      | 6        | 88         | -                      | 13         | 81          | 31           | 6/10                      |  |
| 96   | 1120                                  | 20                     | 77       | 4          | 20                     | 27         | 43          | 2            | 21/29                     |  |
| 01   | 1200                                  | 3                      | 78       | 18         | -                      | 7          | 80          | 13           | 26/35                     |  |
| 06   | 1060                                  | 9                      | 70       | 21         | -                      | 9          | 66          | 6            | 20/34                     |  |
| 11   | 1020                                  | 12                     | 86       | 2          | 20                     | 29         | 31          | 6            | 19/28                     |  |
| <i>Chrysothamnus viscidiflorus viscidiflorus</i> |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84   | 0                                     | 0                      | 0        | 0          | -                      | 0          | 0           | 0            | -/-                       |  |
| 90   | 6265                                  | 22                     | 50       | 28         | -                      | 16         | 0           | 43           | 9/7                       |  |
| 96   | 1020                                  | 2                      | 94       | 4          | -                      | 2          | 2           | 0            | 10/12                     |  |
| 01   | 1640                                  | 4                      | 96       | 0          | -                      | 0          | 0           | 0            | 8/11                      |  |
| 06   | 1120                                  | 9                      | 89       | 2          | -                      | 5          | 0           | 0            | 9/16                      |  |
| 11   | 960                                   | 21                     | 79       | 0          | 20                     | 0          | 0           | 2            | 9/16                      |  |
| <i>Gutierrezia sarothrae</i>                     |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84   | 4599                                  | 0                      | 97       | 3          | -                      | 1          | 0           | 0            | 11/13                     |  |
| 90   | 7998                                  | 36                     | 54       | 10         | 2333                   | 0          | 0           | 3            | 8/7                       |  |
| 96   | 7640                                  | 11                     | 89       | 0          | 620                    | 0          | 0           | 0            | 9/11                      |  |
| 01   | 10680                                 | 2                      | 91       | 7          | 20                     | 0          | 0           | 4            | 6/8                       |  |
| 06   | 1360                                  | 16                     | 82       | 1          | 40                     | 0          | 0           | 0            | 7/10                      |  |
| 11   | 940                                   | 23                     | 77       | 0          | 20                     | 0          | 0           | 0            | 10/13                     |  |

|                                  |                                       | Age class distribution |          |            |                        |            | Utilization |              |                           |  |
|----------------------------------|---------------------------------------|------------------------|----------|------------|------------------------|------------|-------------|--------------|---------------------------|--|
| Year                             | Plants per Acre (excluding seedlings) | % Young                | % Mature | % Decadent | Seedling (plants/acre) | % moderate | % heavy     | % poor vigor | Average Height Crown (in) |  |
| <b>Juniperus osteosperma</b>     |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84                               | 0                                     | 0                      | 0        | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| 90                               | 0                                     | 0                      | 0        | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| 96                               | 40                                    | 100                    | 0        | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| 01                               | 120                                   | 0                      | 100      | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| 06                               | 140                                   | 14                     | 86       | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| 11                               | 60                                    | 33                     | 67       | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| <b>Opuntia sp.</b>               |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84                               | 398                                   | 33                     | 50       | 17         | -                      | 0          | 0           | 0            | 10/7                      |  |
| 90                               | 199                                   | 33                     | 67       | 0          | -                      | 0          | 0           | 0            | 6/6                       |  |
| 96                               | 380                                   | 16                     | 84       | 0          | -                      | 0          | 0           | 0            | 5/15                      |  |
| 01                               | 300                                   | 0                      | 60       | 40         | 20                     | 0          | 0           | 27           | 4/9                       |  |
| 06                               | 440                                   | 14                     | 86       | 0          | -                      | 0          | 0           | 0            | 4/13                      |  |
| 11                               | 40                                    | 0                      | 100      | 0          | 20                     | 0          | 0           | 0            | 4/12                      |  |
| <b>Purshia tridentata</b>        |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84                               | 0                                     | 0                      | 0        | 0          | -                      | 0          | 0           | 0            | -/-                       |  |
| 90                               | 0                                     | 0                      | 0        | 0          | -                      | 0          | 0           | 0            | -/-                       |  |
| 96                               | 40                                    | 0                      | 50       | 50         | -                      | 50         | 0           | 0            | -/-                       |  |
| 01                               | 60                                    | 0                      | 100      | 0          | -                      | 0          | 0           | 0            | 14/51                     |  |
| 06                               | 20                                    | 0                      | 100      | 0          | -                      | 100        | 0           | 0            | 12/54                     |  |
| 11                               | 60                                    | 0                      | 100      | 0          | -                      | 0          | 100         | 0            | 11/47                     |  |
| <b>Quercus gambelii</b>          |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84                               | 1999                                  | 37                     | 63       | 0          | -                      | 27         | 47          | 0            | 30/19                     |  |
| 90                               | 4398                                  | 73                     | 0        | 27         | 666                    | 26         | 6           | 18           | -/-                       |  |
| 96                               | 720                                   | 17                     | 83       | 0          | 60                     | 0          | 0           | 0            | 28/18                     |  |
| 01                               | 1320                                  | 26                     | 74       | 0          | -                      | 0          | 0           | 0            | 47/24                     |  |
| 06                               | 1460                                  | 23                     | 77       | 0          | -                      | 0          | 0           | 0            | 40/19                     |  |
| 11                               | 520                                   | 38                     | 62       | 0          | -                      | 15         | 0           | 0            | -/-                       |  |
| <b>Rosa woodsii</b>              |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84                               | 0                                     | 0                      | 0        | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| 90                               | 0                                     | 0                      | 0        | -          | -                      | 0          | 0           | 0            | -/-                       |  |
| 96                               | 0                                     | 0                      | 0        | -          | -                      | 0          | 0           | 0            | 16/10                     |  |
| 01                               | 40                                    | 0                      | 100      | -          | -                      | 0          | 0           | 0            | 9/6                       |  |
| 06                               | 0                                     | 0                      | 0        | -          | -                      | 0          | 0           | 0            | 19/12                     |  |
| 11                               | 0                                     | 0                      | 0        | -          | -                      | 0          | 0           | 0            | 12/12                     |  |
| <b>Symphoricarpos oreophilus</b> |                                       |                        |          |            |                        |            |             |              |                           |  |
| 84                               | 0                                     | 0                      | 0        | 0          | -                      | 0          | 0           | 0            | -/-                       |  |
| 90                               | 866                                   | 15                     | 0        | 85         | -                      | 54         | 8           | 62           | -/-                       |  |
| 96                               | 940                                   | 36                     | 55       | 9          | 20                     | 32         | 2           | 2            | 16/26                     |  |
| 01                               | 560                                   | 21                     | 79       | 0          | -                      | 0          | 0           | 0            | 18/29                     |  |
| 06                               | 1000                                  | 8                      | 64       | 28         | -                      | 0          | 4           | 16           | 16/22                     |  |
| 11                               | 900                                   | 16                     | 84       | 0          | 20                     | 4          | 0           | 0            | 16/24                     |  |

|                      |  | 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) |  |
| Tetradymia canescens |  |                        |          |            |                           |            |             |              |                              |  |
| 84                   | <b>0</b>                                 | 0                      | 0        | -          | -                         | 0          | 0           | 0            | -/-                          |  |
| 90                   | <b>0</b>                                 | 0                      | 0        | -          | -                         | 0          | 0           | 0            | -/-                          |  |
| 96                   | <b>200</b>                               | 10                     | 90       | -          | -                         | 90         | 0           | 0            | 15/18                        |  |
| 01                   | <b>100</b>                               | 20                     | 80       | -          | -                         | 0          | 0           | 0            | 10/15                        |  |
| 06                   | <b>0</b>                                 | 0                      | 0        | -          | -                         | 0          | 0           | 0            | 6/15                         |  |
| 11                   | <b>0</b>                                 | 0                      | 0        | -          | -                         | 0          | 0           | 0            | 11/24                        |  |