

Trend Study 14-9-04

Study site name: Harts Draw .

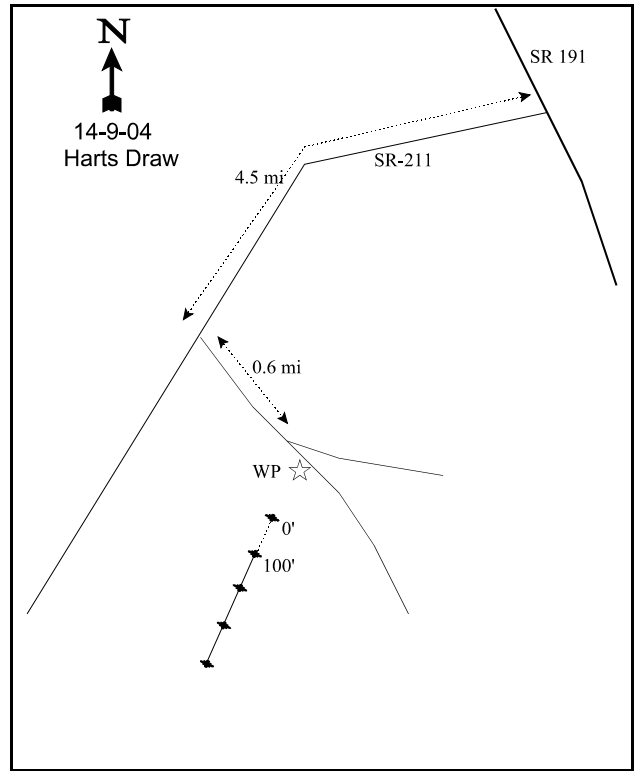
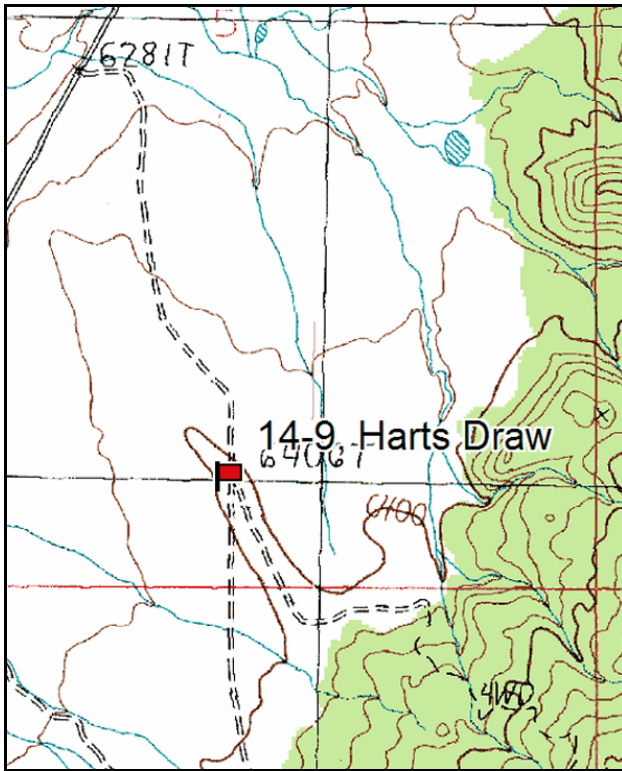
Vegetation type: Wyoming Big Sagebrush .

Compass bearing: frequency baseline 180 degrees magnetic.

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

LOCATION DESCRIPTION

Go north from Monticello on SR 191 to the turnoff to Canyonlands National Park (0.3 miles north of mile marker 86). Turn left (west) onto SR-211 and proceed approximately 4.0 miles to mile marker 14. Continue 0.5 miles past the mile marker, then turn left onto a dirt road that goes up and along a small ridge. Go 0.6 miles, bearing right at a faint fork and looking for two green fence posts on your left between the roads. There is a witness post on the right hand side of the road. The 0-foot stake is 19 paces away from the witness post at 218°M. The 0 ft baseline stake is also near a small juniper.



Map Name: Photograph Gap

Diagrammatic Sketch

Township 32S , Range 23E , Section 5

GPS: NAD 27, UTM 12S 4208973 N, 638774 E

## DISCUSSION

### Harts Draw - Trend Study No. 14-9

The Harts Draw range trend study is located in what is considered an important critical deer wintering area. The range is an extensive Wyoming big sagebrush type below the pinyon-juniper slopes of Peters Point mesa. The elevation is 6,400 feet with a 5% slope and southwest aspect. In the valley below the ridge, sagebrush has been removed and the flat has been planted to crested wheatgrass. Cattle use the flat rather heavily, with sign of grazing less common further up the hill. As of 1999, the BLM allowed 200-300 cattle in fall and spring. Deer pellet groups indicate moderate to heavy use and are especially common along the numerous dirt roads. A pellet group transect located nearby at an elevation of 6,600 feet continually shows the highest use of any transect on the herd unit with a 10 year average ('87-'97) of 91 deer days use/acre (225 ddu/ha). Pellet group data from the trend study site in 1999 estimated 85 deer days use/acre (210 ddu/ha) and 7 cow days use/acre (17 cdu/ha). In 2004, deer use increased to an estimated 104 deer days use/acre (256 ddu/ha). Cow use was estimated at 15 cow days use/acre (38 cdu/ha).

Soil on the site is relatively shallow with an effective rooting depth estimated at a little over 13 inches. A compacted layer exists at 13 to 14 inches. Texture of the soil is a sandy loam with a reddish color and a slightly alkaline pH (7.6). There is very little rock or pavement on the surface or within the profile. Much of the sandy soil is exposed on the site. Large unprotected patches have little protection from high intensity summer storms. Grasses provide good protection against erosion where they occur, but as the amount of herbaceous vegetative and litter cover is low and variable, there are microsite problems. There are a few small gullies in the area which appear to be healing. Erosion was rated as stable in 2004 due to the gentle terrain. In 2004, relative bare ground increased from 37 to 46%, while both vegetation and litter declined. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare ground decreased from 1:2.6 to 1:1.9 which is very poor.

The key browse species is Wyoming big sagebrush. Sagebrush cover was nearly 12% in 1994, but has declined to 9.5% in 1999 and 7% in 2004. Density was stable at about 3,400 plants/acre between 1986 and 1999, but declined by 37% in 2004 to 2,120 plants/acre. Percent decadency has always been relatively high, ranging from 33-55%, but in 2004 it increased to 92%. Decadent plants classified as dying increased to 80% in 2004 from only 14% in 1999. With increased deer use and lower sagebrush cover, plants showing heavy use increased in 2004 to 63%. Recruitment was poor with few seedling and young plants found during any sampling period. Drought and heavy use have been very detrimental to this population. However, drought has had the most effect on the sagebrush populations within the state.

Broom snakeweed occurred frequently in 1986 and appeared to be increasing at the expense of perennial grasses. Density actually declined by 1994, mostly due to drought conditions. It has since increased dramatically from 5,480 plants/acre in 1994 to 19,600 in 1999. In 2004, after drier conditions, it declined to only 2,140 plants/acre.

Blue grama, an increaser under spring cattle grazing because it is a warm season grass, is fairly abundant on the site and forms thick low mats on the side hill. It increased significantly from 1999 to 2004. In 1999, it was found in 29% of the quadrats with 3% cover. Then in 2004 it was found in 55% of the quadrats and cover was up to 13%. Other grasses include bottlebrush squirreltail, needle-and-thread, Indian ricegrass, and galleta. Bottlebrush squirreltail declined significantly in 2004. Two annual grass, cheatgrass and sixweeks fescue, are also present. Each declined significantly in abundance in 2004. Cheatgrass was extremely abundant in 1999 when fall and spring precipitation conditions were very wet. Forbs are insignificant with a total cover of only about 1% in each reading.

## 1986 APPARENT TREND ASSESSMENT

Use on much of the sagebrush in the Harts Draw area is heavy enough to cause reduced vigor. Dry growing season conditions are also responsible for the poor vigor. Decadence, no recruitment, and a decline of sagebrush numbers on this important deer winter range indicate a downward trend. It is an especially serious condition if this trend is occurring over all the Harts Draw winter range. The bare soil, poor litter cover, and slight surface erosion combine to cause a downward soil trend.

## 1994 TREND ASSESSMENT

Soil trend for this site is stable but very poor condition. Percent bare soil has remained high since 1987, just over 50%. Litter cover is very low, with a cover value of less than 20%. The key browse species is Wyoming big sagebrush, which through the years has been heavily utilized. The slight increase in density is mostly reflective of the much larger sample size taken in 1994, but there are some important improvements in some other critical population parameters. There is a slight increase in the number of plants that are classified as mature healthy plants. Percent decadency has decreased slightly. There is a slight improvement for Wyoming big sagebrush. Negatively, poor vigor increased from 16% to 32%. The increaser broom snakeweed has a population that has decreased by 57%. Trend for browse would be judged slightly down with the high percentage of the population showing poor vigor. This could turn around with normal weather patterns. The trend for grasses and forbs is difficult to determine. Since 1992, annual species are now inventoried along with the perennial species, therefore when one compares the nested frequency numbers from year to year and group to group (e.g., grass and forbs), comparisons should only include perennial species when comparing with older data sets. With this in mind, the trend would be stable. The forbs are showing a decrease, but the forbs are of little consequence on this site and only provide 4% of the total vegetative cover, while the grass stayed about the same and they contribute 44% of the total vegetative cover. The Desirable Components Index (see methods) rating is fair at 42. There are very few young sagebrush, decadence is high, and forbs are lacking.

### TREND ASSESSMENT

soil - stable (3), but very poor condition

browse - slightly down (2)

herbaceous understory - stable (3)

winter range condition (DC Index) - 42 (fair) Wyoming big sagebrush type

## 1999 TREND ASSESSMENT

Trend for soil is up due to an increase in litter cover and a decline in percent bare ground. Sum of nested frequency of grasses also increased dramatically due primarily to cheatgrass. Trend for browse is mixed. Trend for the key browse species is considered up slightly due to a steady population density since 1994, improved vigor, and a decline in percent decadence from 46% to 33%. Reproduction is poor however, with no seedlings and few young sampled. Trend for broom snakeweed, an undesirable increaser, is up due to an explosive increase in density since 1994 (5,480 to 19,600 plants/acre). Taking all of these factors into consideration, trend for browse is considered down slightly. Trend for the herbaceous understory is considered slightly down with cheatgrass increasing from a quadrat frequency of only 9% in 1994 to 97% in 1999. However, the perennial grass component has remained constant, it actually has an improved average nested frequency value of 10%. Cover for cheatgrass (undesirable winter annual) has also increased dramatically. In 1994 it accounted for only 1% of the grass cover with a cover value of less than 1%. This increased to 13% cover (62% of the total grass cover) by 1999. Blue grama, a mat forming warm season perennial and increaser under grazing pressure, decreased significantly in nested frequency since 1994. Bottlebrush squirreltail increased significantly in frequency. Forbs are rare and unimportant on this site. All forbs combined have produced only 1% cover since 1994. The DCI decreased to poor to fair (26) due to a

decline in sagebrush cover and the increase in cheatgrass, which negatively impacts the rating.

TREND ASSESSMENT

soil - up (5)

browse - slightly down (2)

herbaceous understory - slightly down (2)

winter range condition (DC Index) - 26 (poor to fair) Wyoming big sagebrush type

2004 TREND ASSESSMENT

The trend for soil is slightly down. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare ground decreased from 1:2.6 to 1:1.9. Relative bare ground is up to 46%. The decline in cheatgrass is good for other species, but has left more bare ground. The browse trend is also down. Wyoming big sagebrush density declined by 37%. Cover is lower and decadency has increased to 92% (with 80% of these classified as dying), while 82% of the population show signs of poor vigor. With less sagebrush forage and more deer use, more plants are showing signs of heavy use. The combination of drought and heavy use will continue to be very detrimental to this population. Cheatgrass has also been very damaging to sagebrush recruitment, which is currently very low. On a positive note, broom snakeweed declined, which is reflective of precipitation patterns. The trend for the herbaceous understory is slightly down. Sum of nested frequency for perennial grasses declined. This decline is mostly from cool season grasses like bottlebrush squirreltail. The warm season grass blue grama is taking over as cool season grasses are declining. This may be due to spring grazing and summer precipitation patterns that are favorable to blue grama. Cheatgrass declined significantly, but this is due to precipitation. It should return when precipitation is favorable. Forbs continue to be insignificant on this site. The DCI score remained at poor to fair (29). Perennial grass increased and cheatgrass was very low, but sagebrush cover was lower and the extreme high decadence negatively impacted the rating.

TREND ASSESSMENT

soil - slightly down (2)

browse - down (1)

herbaceous understory - slightly down (2)

winter range condition (DC Index) - 29 (poor to fair) Wyoming big sagebrush type

HERBACEOUS TRENDS --

Management unit 14 , Study no: 9

| T<br>y<br>p<br>e | Species                | Nested Frequency |                  |                  |                  | Average Cover % |       |       |
|------------------|------------------------|------------------|------------------|------------------|------------------|-----------------|-------|-------|
|                  |                        | '86              | '94              | '99              | '04              | '94             | '99   | '04   |
| G                | Agropyron cristatum    | -                | 6                | 4                | -                | .03             | .06   | -     |
| G                | Bouteloua gracilis     | <sub>b</sub> 165 | <sub>b</sub> 130 | <sub>a</sub> 77  | <sub>b</sub> 166 | 5.41            | 2.97  | 12.73 |
| G                | Bromus tectorum (a)    | -                | <sub>a</sub> 16  | <sub>b</sub> 344 | <sub>a</sub> 19  | .07             | 12.91 | .52   |
| G                | Hilaria jamesii        | <sub>a</sub> 1   | <sub>a</sub> 5   | <sub>b</sub> 39  | <sub>a</sub> -   | .04             | 1.52  | -     |
| G                | Oryzopsis hymenoides   | <sub>a</sub> -   | <sub>b</sub> 15  | <sub>b</sub> 20  | <sub>b</sub> 9   | .39             | .27   | 1.03  |
| G                | Sitanion hystrix       | <sub>a</sub> 25  | <sub>b</sub> 123 | <sub>c</sub> 153 | <sub>a</sub> 46  | 4.70            | 2.62  | .93   |
| G                | Sporobolus cryptandrus | -                | -                | -                | 2                | -               | -     | .00   |
| G                | Stipa comata           | <sub>b</sub> 81  | <sub>a</sub> -   | <sub>a</sub> 4   | <sub>a</sub> 4   | -               | .04   | .03   |

| Type | Species                            | Nested Frequency |                  |                 |                 | Average Cover % |       |       |
|------|------------------------------------|------------------|------------------|-----------------|-----------------|-----------------|-------|-------|
|      |                                    | '86              | '94              | '99             | '04             | '94             | '99   | '04   |
| G    | <i>Vulpia octoflora</i> (a)        | <sub>a</sub> -   | <sub>d</sub> 240 | <sub>c</sub> 99 | <sub>b</sub> 11 | .55             | .33   | .02   |
|      | Total for Annual Grasses           | 0                | 256              | 443             | 30              | 0.62            | 13.24 | 0.54  |
|      | Total for Perennial Grasses        | 272              | 279              | 297             | 227             | 10.59           | 7.50  | 14.73 |
|      | Total for Grasses                  | 272              | 535              | 740             | 257             | 11.21           | 20.75 | 15.28 |
| F    | <i>Arnica mollis</i>               | 7                | -                | -               | -               | -               | -     | -     |
| F    | <i>Astragalus mollissimus</i>      | 2                | -                | 5               | -               | -               | .06   | -     |
| F    | <i>Chenopodium album</i> (a)       | -                | -                | -               | 3               | -               | -     | .01   |
| F    | <i>Chenopodium</i> spp. (a)        | -                | 2                | -               | -               | .00             | -     | -     |
| F    | <i>Cryptantha</i> spp.             | <sub>a</sub> -   | <sub>b</sub> 12  | <sub>b</sub> 20 | <sub>a</sub> -  | .03             | .23   | -     |
| F    | <i>Descurainia pinnata</i> (a)     | -                | <sub>b</sub> 38  | <sub>a</sub> 1  | <sub>a</sub> 10 | .09             | .00   | .21   |
| F    | <i>Eriogonum cernuum</i> (a)       | -                | 1                | -               | -               | .00             | -     | -     |
| F    | <i>Erigeron</i> spp.               | 9                | -                | -               | -               | -               | -     | -     |
| F    | <i>Erigeron pumilus</i>            | <sub>c</sub> 44  | <sub>a</sub> 1   | <sub>b</sub> 17 | <sub>a</sub> 1  | .03             | .31   | .01   |
| F    | <i>Gilia hutchinfolia</i> (a)      | -                | <sub>a</sub> 20  | <sub>a</sub> 8  | <sub>b</sub> 34 | .05             | .02   | .30   |
| F    | <i>Lappula occidentalis</i> (a)    | -                | <sub>a</sub> -   | <sub>a</sub> 1  | <sub>b</sub> 17 | -               | .00   | .27   |
| F    | <i>Leucelene ericoides</i>         | -                | 10               | -               | 7               | .33             | -     | .09   |
| F    | <i>Lepidium</i> spp. (a)           | -                | <sub>b</sub> 20  | <sub>a</sub> 7  | <sub>a</sub> 3  | .42             | .23   | .07   |
| F    | <i>Orobanche fasciculata</i>       | -                | -                | 4               | -               | -               | .01   | -     |
| F    | <i>Phlox longifolia</i>            | -                | -                | -               | 3               | -               | -     | .00   |
| F    | <i>Ranunculus testiculatus</i> (a) | -                | -                | -               | 1               | -               | -     | .00   |
| F    | <i>Sclerocactus</i>                | 2                | -                | -               | -               | -               | -     | -     |
| F    | <i>Senecio multilobatus</i>        | -                | -                | -               | 4               | -               | -     | .00   |
| F    | <i>Sphaeralcea coccinea</i>        | <sub>b</sub> 52  | <sub>a</sub> 14  | <sub>a</sub> 13 | <sub>a</sub> 6  | .03             | .05   | .07   |
| F    | Unknown forb-perennial             | -                | -                | -               | 1               | -               | -     | .03   |
|      | Total for Annual Forbs             | 0                | 81               | 17              | 68              | 0.58            | 0.26  | 0.87  |
|      | Total for Perennial Forbs          | 116              | 37               | 59              | 22              | 0.42            | 0.67  | 0.21  |
|      | Total for Forbs                    | 116              | 118              | 76              | 90              | 1.00            | 0.94  | 1.09  |

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

BROWSE TRENDS --

Management unit 14 , Study no: 9

| Type             | Species                                  | Strip Frequency |     |     | Average Cover % |       |       |
|------------------|--|-----------------|-----|-----|-----------------|-------|-------|
|                  |  | '94             | '99 | '04 | '94             | '99   | '04   |
| B                | Artemisia tridentata wyomingensis        | 77              | 78  | 70  | 11.80           | 9.50  | 7.10  |
| B                | Chrysothamnus viscidiflorus stenophyllus | 10              | 6   | 9   | .18             | .46   | 1.77  |
| B                | Gutierrezia sarothrae                    | 70              | 94  | 38  | 1.02            | 3.95  | 2.40  |
| B                | Opuntia spp.                             | 11              | 5   | 3   | .04             | .18   | .18   |
| B                | Sclerocactus                             | 0               | 0   | 0   | .01             | -     | -     |
| Total for Browse |  | 168             | 183 | 120 | 13.07           | 14.11 | 11.46 |

CANOPY COVER, LINE INTERCEPT --

Management unit 14 , Study no: 9

| Species                                  | Percent Cover |
|--|---------------|
|  | '04           |
| Artemisia tridentata wyomingensis        | 8.23          |
| Chrysothamnus viscidiflorus stenophyllus | 1.01          |
| Gutierrezia sarothrae                    | 2.53          |

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 14 , Study no: 9

| Species                           | Average leader growth (in) |
|-----------------------------------|----------------------------|
|                                   | '04                        |
| Artemisia tridentata wyomingensis | 2.4                        |

BASIC COVER --

Management unit 14 , Study no: 9

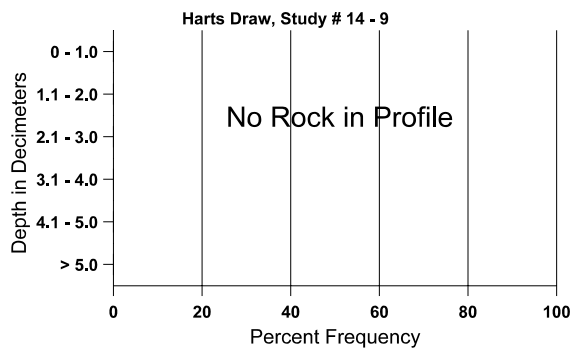
| Cover Type  | Average Cover % |       |       |       |
|-------------|-----------------|-------|-------|-------|
|             | '86             | '94   | '99   | '04   |
| Vegetation  | 4.25            | 21.01 | 34.93 | 28.69 |
| Rock        | 0               | .45   | .09   | .04   |
| Pavement    | 8.25            | 1.01  | 2.01  | 2.56  |
| Litter      | 35.75           | 18.98 | 30.61 | 27.45 |
| Cryptogams  | .75             | 1.52  | 1.99  | 1.28  |
| Bare Ground | 51.00           | 51.87 | 41.37 | 48.84 |

SOIL ANALYSIS DATA --

Management unit 14, Study no: 9, Study Name: Harts Draw

| Effective rooting depth (in) | Temp °F (depth) | pH  | %sand | %silt | %clay | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----------------|-----|-------|-------|-------|-----|-------|-------|------|
| 13.4                         | 66.3 (10.5)     | 7.6 | 72.9  | 12.6  | 14.6  | 1.3 | 8.8   | 51.2  | 0.4  |

Stoniness Index



PELLET GROUP DATA --

Management unit 14 , Study no: 9

| Type   | Quadrat Frequency |     |     | Days use per acre (ha) |           |
|--------|-------------------|-----|-----|------------------------|-----------|
|        | '94               | '99 | '04 | '99                    | '04       |
| Sheep  | -                 | 1   | -   | -                      | -         |
| Rabbit | 14                | 53  | 9   | -                      | -         |
| Elk    | 8                 | 1   | -   | -                      | -         |
| Deer   | 36                | 40  | 41  | 84 (207)               | 104 (256) |
| Cattle | -                 | 1   | 5   | 7 (17)                 | 15 (38)   |

BROWSE CHARACTERISTICS --

Management unit 14 , Study no: 9

|                                   |                                       | Age class distribution (plants per acre) |       |        |          |      | Utilization |         |            |         |              |                           |
|-----------------------------------|---------------------------------------|--|-------|--------|----------|------|-------------|---------|------------|---------|--------------|---------------------------|
| Year                              | Plants per Acre (excluding seedlings) | Seedling                                 | Young | Mature | Decadent | Dead | % moderate  | % heavy | % decadent | % dying | % poor vigor | Average Height Crown (in) |
| Artemisia tridentata wyomingensis |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 86                                | <b>3332</b>                           | -  | 66    | 1600   | 1666     | -    | 46          | 14      | 50         | 5       | 16           | 20/19                     |
| 94                                | <b>3580</b>                           | 40                                       | 80    | 1840   | 1660     | 780  | 60          | 9       | 46         | 25      | 32           | 20/33                     |
| 99                                | <b>3340</b>                           | -  | 20    | 2220   | 1100     | 1560 | 53          | 23      | 33         | 14      | 14           | 23/31                     |
| 04                                | <b>2120</b>                           | 40                                       | 40    | 140    | 1940     | 1900 | 32          | 63      | 92         | 80      | 82           | 23/34                     |

|   |                                       | Age class distribution (plants per acre) |       |        |          |      | Utilization |         |            |         |              |                           |
|---|---------------------------------------|--|-------|--------|----------|------|-------------|---------|------------|---------|--------------|---------------------------|
| Year  | Plants per Acre (excluding seedlings) | Seedling                                 | Young | Mature | Decadent | Dead | % moderate  | % heavy | % decadent | % dying | % poor vigor | Average Height Crown (in) |
| <b>Chrysothamnus viscidiflorus stenophyllus</b> |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 86  | <b>199</b>                            | -  | 66    | 133    | -        | -    | 0           | 0       | 0          | -       | 33           | 9/11                      |
| 94  | <b>480</b>                            | -  | 40    | 440    | -        | -    | 0           | 0       | 0          | -       | 0            | 10/18                     |
| 99  | <b>300</b>                            | 20                                       | 60    | 160    | 80       | -    | 0           | 0       | 27         | -       | 0            | 12/16                     |
| 04  | <b>400</b>                            | -  | -     | 340    | 60       | -    | 0           | 0       | 15         | 10      | 10           | 13/23                     |
| <b>Gutierrezia sarothrae</b>                    |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 86  | <b>12866</b>                          | 3533                                     | 3733  | 8533   | 600      | -    | .51         | 0       | 5          | .15     | .51          | 8/6                       |
| 94  | <b>5480</b>                           | 260                                      | 580   | 4800   | 100      | 180  | 1           | 0       | 2          | 2       | 2            | 5/6                       |
| 99  | <b>19600</b>                          | 80                                       | 3260  | 15980  | 360      | 920  | 0           | 0       | 2          | 2       | 2            | 7/8                       |
| 04  | <b>2140</b>                           | -  | 40    | 2060   | 40       | 80   | 0           | 0       | 2          | .93     | 2            | 8/11                      |
| <b>Opuntia spp.</b>                             |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 86  | <b>133</b>                            | -  | -     | 133    | -        | -    | 0           | 0       | 0          | -       | 50           | 3/6                       |
| 94  | <b>500</b>                            | 160                                      | 240   | 260    | -        | -    | 0           | 0       | 0          | -       | 0            | 2/10                      |
| 99  | <b>240</b>                            | 120                                      | 120   | 120    | -        | -    | 0           | 0       | 0          | -       | 17           | 3/7                       |
| 04  | <b>100</b>                            | 40                                       | 40    | 40     | 20       | -    | 0           | 0       | 20         | 20      | 20           | 2/4                       |
| <b>Sclerocactus</b>                             |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 86  | <b>0</b>                              | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 94  | <b>0</b>                              | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | 3/9                       |
| 99  | <b>0</b>                              | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 04  | <b>0</b>                              | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |