

Trend Study 13A-5-04

Study site name: Amasas Back .

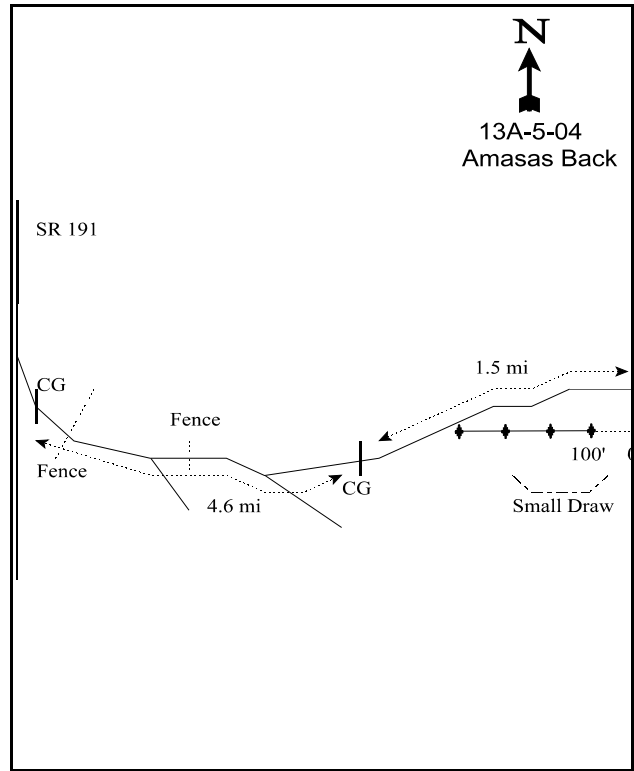
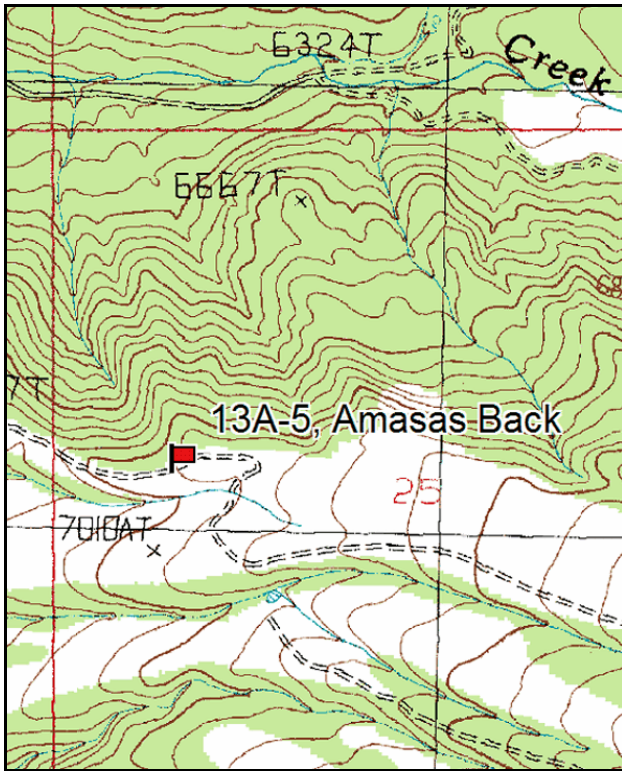
Vegetation type: Chained, Seeded P-J .

Compass bearing: frequency baseline 247 degrees magnetic.

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

LOCATION DESCRIPTION

Traveling south on SR 191 out of Moab, turn east off the highway onto a dirt road just past mile marker 114. Cross the cattleguard and stay right, continuing on the main road for 0.7 miles to a fence. Continue 1.3 miles to a fork. Stay left and go 0.4 miles to another fence. Continue 1.0 miles to a fork. Stay left, go 1.2 miles to the Forest Service boundary cattleguard. Cross the cattleguard and continue 1.5 miles to a witness post. The 0-foot stake is 16 paces from the witness post at a bearing of 165°M. The 0-foot stake is marked by browse tag #7859.



Map Name: Mount Tukuhtnikivatz

Diagrammatic Sketch

Township 27S , Range 23E , Section 25

GPS: NAD 27, UTM 12S 4254123 N, 644396 E

## DISCUSSION

### Amasas Back - Trend Study No. 13A-5

The Amasas Back study site is another area of critical big game winter range on the west side of the LaSal mountains. This can be demonstrated by the pellet group transects done on the site in 1999 and 2004. Pellet group data from 1999 estimated 34 deer (84 ddu/ha) and 54 elk days use/acre (133 edu/ha). In 2004, pellet group data estimated 20 deer (50 ddu/ha) and 19 elk days use/acre (46 edu/ha). This study samples a 750 acre chaining and seeding project that was completed in 1978 on the lower elevational limits of Forest Service administered land. The site demonstrates moderate encroachment of pinyon and juniper which has initiated some discussion and planning for future treatment with a roller-chopper. The study is located at an elevation of about 7,000 feet on a moderately sloping (15-18%) hillside facing south into a dry wash and an untreated pinyon-juniper woodland type.

The soil is a very rocky, sandy clay loam with rocks on the surface ranging in size from large rocks to small boulders that have been left on the surface from past erosion. The soil appears to be moderately shallow (effective rooting depth of less than 10 inches) as indicated by the dominance of the shallow-rooted species, black sagebrush. There are some areas showing some compaction and some soil loss on cattle trails, but overall there appears to be little current erosion. The erosion condition class determined soil movement as stable in 2004. The site has a mildly alkaline soil (7.5 pH). Soil phosphorus could be a limiting factor at 7.5 ppm. Values below 10 ppm may limit normal plant growth and development. Percent organic matter is average for sites in this area. Winter annuals could be quite successful on this type of site with these warm soil temperatures (71°F at 23cm).

Black sagebrush is the key browse, although there may be some hybridization with Wyoming big sagebrush. Black sagebrush made up 57% of the browse cover in 1994, 39% in 1999, and 28% in 2004. Overall browse cover has increased, but this is predominantly due to pinyon-juniper increase. Density of black sagebrush has remained stable at 2,000 plants/acre in 1999 and 2004, although density decreased from 2,720 plants/acre in 1994. Percent decadence has remained at 17% for 1999 and 2004, but this is an increase from 8% in 1994. Young recruitment has decreased from 8% of the population in 1999 to only 1% in 2004. Vigor is good while utilization has increased to mostly moderate hedging classification. Other desirable browse plants are limited but include fourwing saltbush and antelope bitterbrush.

The pinyon pine and juniper are becoming more dominant on the chaining where many plants are at the height of 8-10 feet. Point quarter data from 1994 and 1999 show densities that are almost the same with estimates of 89 trees/acre for pinyon and 104 trees/acre for juniper. Average diameter of juniper was 3.8 inches while that of pinyon was 2.3 inches. Point quarter for 2004 estimated 101 pinyon trees and 99 juniper trees/acre with an average diameter of 2.6 inches for pinyon and 4.8 inches for juniper. Line-intercept estimated canopy cover for juniper and pinyon is just over 18%. The way it has increased from 1999 to 2004, canopy cover by 2009 will easily be greater than 25%. At this high a value, understory cover will generally on average be less than 2%. Without active management intervention, this site will further deteriorate, making it more difficult and costly to rehabilitate. At this time, a roller chopper would be the first choice for treating the area. It would do an excellent job of selectively removing unwanted pinyon and juniper trees and still leave most of the understory in place. Aerially seeding with a mixture of herbaceous species and selected shrubs before the treatment would allow the p-j litter to cover the seed. Establishment of a good competitive understory is essential because of the high amounts of cheatgrass on the site.

The seeded wheatgrasses were more prevalent in the past, where now they provide about 31% of the grass cover, likely due to the drought conditions and competition from the increasing juniper and pinyon. Cheatgrass contributed 74% of the grass cover in 1994, 60% in 1999, and 55% in 2004. Decrease in cover is mostly due to drought conditions, nested frequency demonstrates a significant decrease. Perennial forb density

and diversity is low. Sixteen species were encountered in 1994, which has decreased to 11 species in 1999, and 9 species in 2004. The only forb species found with fair cover currently and in the past is rock goldenrod, although thistleleaf peavine was fairly abundant in 1994. Rock goldenrod makes up 81% of the total forb cover.

#### 1994 TREND ASSESSMENT

The soil trend is considered slightly improved, but stable overall. There has been some loss of the litter cover, which would be expected with the extended drought, but percent bare ground has decreased slightly. The browse trend is stable to improving with an increased biotic potential and stable rate of decadence. There was a slight increase in those considered in poor vigor, but this will turn around with more normal precipitation patterns. The increase in the number of broom snakeweed found on the site is likely due to the larger sample size taken in 1994 which better estimates plants with a clumped or discontinuous distribution. The trend for the herbaceous understory is down, as the perennial grass species have greatly decreased nested frequency values and the perennial forb species have increased slightly, but they have cover values half that of the grasses. The Desirable Components Index rated this site as fair with a score of 43 due to fair perennial grass, few young shrubs, and high annual grasses (cheatgrass).

##### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - down (1)

winter range condition (DC Index) - 43 (fair) Black sagebrush type

#### 1999 TREND ASSESSMENT

The soil trend is still considered stable. There has been some loss in litter cover since 1987, but it has been stable between 1994 and 1999. Percent bare soil has also remained about the same. The browse trend for the key species (black sagebrush) is down. In 1994, it provided 57% of the browse cover, now it has gone down to only 39%. Conversely, cover for pinyon and juniper has increased from 34% of the browse cover to now where it provides 57% of the cover. There were no dead plants noted in 1994, now the ratio of dead to live is 1:7.2 (14% dead). Percent decadence has also increased from 8% to 18%. All this change has occurred with mostly light to moderate use. The long-term drought and competition of increasing p-j trees, coupled with shallow soils and moderately high soil temperatures have caused significant losses to this population. There was a slight increase in those considered in poor vigor, but this should turn around with more normal precipitation patterns. The increase in the number of broom snakeweed found on the site has actually decreased, a typical response to drought. The trend for the herbaceous understory is slightly down for the perennial grasses and forbs. The annual component of the herbaceous species fluctuated, however, one thing that is constant is that cheatgrass is increasing. The Desirable Components Index rated this site as fair with a score of 42 due to fair perennial grass, few young shrubs, and high annual grasses (cheatgrass).

##### TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - slightly down (2)

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

2004 TREND ASSESSMENT

The trend for soil continues to be stable. Protective cover has remained similar to previous values. Bare soil has also remained about the same. The trend for key browse, black sagebrush, is slightly down. Black sagebrush cover has remained at roughly 7% and density is still around 2,000 plants/acre. Percent decadence is still at a moderate value of 17%. The ratio of dead plants to live plants increased from 1:7.2 (14%) in 1999 to 1:4.8 (21%) in 2004. Young recruitment is still low and is not producing enough young plants to replace those that are dying. Moderate-heavy hedging did increase from 37% to 57% which now show this use. The trend for the herbaceous understory is slightly down. Nested frequency for perennial forbs and grasses has decreased although cover has remained similar to previous values. Cheatgrass nested frequency decreased significantly, although it is still very abundant on the site. The Desirable Components Index rated this site as fair with a score of 39 due to decreased perennial grasses, few young shrubs, and high annual grasses (cheatgrass).

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - slightly down (2)

winter range condition (DC Index) - 39 (fair) Black sagebrush type

HERBACEOUS TRENDS --

Management unit 13A, Study no: 5

| Type                        | Species                   | Nested Frequency |                  |                  |                  | Average Cover % |       |       |
|-----------------------------|---------------------------|------------------|------------------|------------------|------------------|-----------------|-------|-------|
|                             |                           | '87              | '94              | '99              | '04              | '94             | '99   | '04   |
| G                           | Agropyron cristatum       | 94               | 65               | 83               | 78               | 2.66            | 3.08  | 3.42  |
| G                           | Agropyron intermedium     | <sub>b</sub> 137 | <sub>a</sub> 48  | <sub>a</sub> 49  | <sub>a</sub> 37  | 1.01            | 1.23  | 1.18  |
| G                           | Bromus japonicus (a)      | <sub>c</sub> 31  | <sub>b</sub> 7   | <sub>b</sub> 2   | <sub>a</sub> -   | .15             | .01   | -     |
| G                           | Bromus tectorum (a)       | -                | <sub>b</sub> 317 | <sub>b</sub> 333 | <sub>a</sub> 280 | 16.43           | 9.10  | 8.30  |
| G                           | Hilaria jamesii           | -                | 13               | 22               | 17               | .13             | .66   | .98   |
| G                           | Oryzopsis hymenoides      | <sub>b</sub> 56  | <sub>ab</sub> 30 | <sub>ab</sub> 24 | <sub>a</sub> 19  | 1.12            | .79   | .86   |
| G                           | Poa fendleriana           | <sub>b</sub> 36  | <sub>ab</sub> 26 | <sub>ab</sub> 19 | <sub>a</sub> 6   | .43             | .24   | .08   |
| G                           | Sitanion hystrix          | <sub>c</sub> 64  | <sub>b</sub> 33  | <sub>ab</sub> 16 | <sub>a</sub> 6   | .14             | .17   | .10   |
| G                           | Sporobolus cryptandrus    | -                | -                | -                | 1                | -               | -     | .15   |
| Total for Annual Grasses    |                           | 31               | 324              | 335              | 280              | 16.58           | 9.11  | 8.30  |
| Total for Perennial Grasses |                           | 387              | 215              | 213              | 164              | 5.51            | 6.18  | 6.77  |
| Total for Grasses           |                           | 418              | 539              | 548              | 444              | 22.09           | 15.30 | 15.07 |
| F                           | Arabis perennans          | <sub>c</sub> 12  | <sub>bc</sub> 6  | <sub>a</sub> -   | <sub>b</sub> 2   | .01             | -     | .00   |
| F                           | Astragalus convallarius   | <sub>a</sub> -   | <sub>bc</sub> 10 | <sub>c</sub> 15  | <sub>b</sub> 2   | 1.54            | .43   | .18   |
| F                           | Astragalus coltoni        | 2                | 3                | 2                | -                | .03             | .01   | -     |
| F                           | Castilleja linariaefolia  | -                | 3                | -                | -                | .01             | -     | -     |
| F                           | Chenopodium fremontii (a) | -                | -                | -                | 1                | -               | -     | .00   |
| F                           | Cryptantha humilis        | -                | -                | -                | -                | .00             | -     | -     |
| F                           | Cymopterus spp.           | -                | -                | 1                | -                | -               | .03   | -     |

| Type                      | Species                            | Nested Frequency |                 |                 |                  | Average Cover % |      |      |
|---------------------------|------------------------------------|------------------|-----------------|-----------------|------------------|-----------------|------|------|
|                           |                                    | '87              | '94             | '99             | '04              | '94             | '99  | '04  |
| F                         | <i>Descurainia pinnata</i> (a)     | -                | 5               | 2               | -                | .01             | .00  | -    |
| F                         | <i>Draba reptans</i> (a)           | -                | <sub>c</sub> 61 | <sub>b</sub> 3  | <sub>a</sub> -   | .15             | .03  | -    |
| F                         | <i>Erigeron pumilus</i>            | 3                | -               | -               | -                | -               | -    | -    |
| F                         | <i>Gilia</i> spp. (a)              | -                | <sub>b</sub> 36 | <sub>a</sub> 5  | <sub>a</sub> 14  | .08             | .01  | .02  |
| F                         | <i>Lathyrus lanszwertii</i>        | <sub>a</sub> 2   | <sub>b</sub> 81 | <sub>b</sub> 56 | <sub>a</sub> 8   | 2.56            | .74  | .10  |
| F                         | <i>Lesquerella</i> spp.            | -                | 1               | 6               | -                | .00             | .01  | -    |
| F                         | <i>Machaeranthera canescens</i>    | 5                | 3               | -               | -                | .00             | -    | -    |
| F                         | <i>Microsteris gracilis</i> (a)    | -                | <sub>c</sub> 46 | <sub>a</sub> 5  | <sub>b</sub> 31  | .12             | .01  | .09  |
| F                         | <i>Petroradia pumila</i>           | <sub>a</sub> 34  | <sub>b</sub> 75 | <sub>b</sub> 62 | <sub>ab</sub> 48 | 4.05            | 2.96 | 2.20 |
| F                         | <i>Phlox longifolia</i>            | -                | 7               | -               | 3                | .02             | -    | .00  |
| F                         | <i>Ranunculus testiculatus</i> (a) | -                | 6               | -               | -                | .04             | -    | -    |
| F                         | <i>Sphaeralcea coccinea</i>        | -                | 6               | 8               | 9                | .41             | .07  | .09  |
| Total for Annual Forbs    |                                    | 0                | 154             | 15              | 46               | 0.40            | 0.07 | 0.12 |
| Total for Perennial Forbs |                                    | 58               | 195             | 150             | 72               | 8.67            | 4.26 | 2.60 |
| Total for Forbs           |                                    | 58               | 349             | 165             | 118              | 9.07            | 4.33 | 2.72 |

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

#### BROWSE TRENDS --

Management unit 13A, Study no: 5

| Type             | Species                                  | Strip Frequency |     |     | Average Cover % |       |       |
|------------------|--|-----------------|-----|-----|-----------------|-------|-------|
|                  |  | '94             | '99 | '04 | '94             | '99   | '04   |
| B                | <i>Artemisia nova</i>                    | 48              | 47  | 48  | 10.10           | 7.46  | 7.26  |
| B                | <i>Artemisia tridentata wyomingensis</i> | 0               | 1   | 1   | -               | -     | .38   |
| B                | <i>Atriplex canescens</i>                | 3               | 3   | 3   | 1.00            | .76   | 1.41  |
| B                | <i>Coryphantha vivipara arizonica</i>    | 0               | 2   | 0   | -               | -     | -     |
| B                | <i>Ephedra viridis</i>                   | 3               | 2   | 2   | -               | -     | -     |
| B                | <i>Gutierrezia sarothrae</i>             | 12              | 13  | 26  | .50             | .03   | .26   |
| B                | <i>Juniperus osteosperma</i>             | 0               | 11  | 8   | 4.92            | 7.59  | 11.64 |
| B                | <i>Opuntia erinacea</i>                  | 1               | 0   | 1   | .00             | -     | -     |
| B                | <i>Pediocactus simpsonii</i>             | 0               | 1   | 3   | -               | -     | .03   |
| B                | <i>Pinus edulis</i>                      | 0               | 6   | 6   | 1.18            | 3.32  | 4.26  |
| B                | <i>Purshia tridentata</i>                | 0               | 0   | 1   | -               | -     | .63   |
| B                | <i>Yucca baccata baccata</i>             | 0               | 0   | 0   | -               | -     | -     |
| Total for Browse |  | 67              | 86  | 99  | 17.71           | 19.16 | 25.89 |

CANOPY COVER, LINE INTERCEPT --  
 Management unit 13A, Study no: 5

| Species                           | Percent Cover |       |
|-----------------------------------|---------------|-------|
|                                   | '99           | '04   |
| Artemisia nova                    | -             | 10.10 |
| Artemisia tridentata wyomingensis | -             | .75   |
| Atriplex canescens                | -             | .80   |
| Gutierrezia sarothrae             | -             | .71   |
| Juniperus osteosperma             | 1.00          | 12.80 |
| Pinus edulis                      | -             | 5.23  |
| Purshia tridentata                | -             | .10   |

KEY BROWSE ANNUAL LEADER GROWTH --  
 Management unit 13A, Study no: 5

| Species            | Average leader growth (in) |
|--------------------|----------------------------|
|                    | '04                        |
| Artemisia nova     | 1.7                        |
| Atriplex canescens | 6.4                        |

POINT-QUARTER TREE DATA --  
 Management unit 13A, Study no: 5

| Species               | Trees per Acre |     |
|-----------------------|----------------|-----|
|                       | '99            | '04 |
| Juniperus osteosperma | 104            | 99  |
| Pinus edulis          | 89             | 101 |

| Average diameter (in) |     |
|-----------------------|-----|
| '99                   | '04 |
| 3.8                   | 4.8 |
| 2.7                   | 2.6 |

BASIC COVER --  
 Management unit 13A, Study no: 5

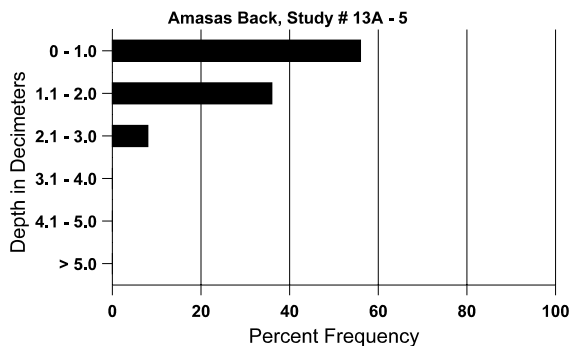
| Cover Type  | Average Cover % |       |       |       |
|-------------|-----------------|-------|-------|-------|
|             | '87             | '94   | '99   | '04   |
| Vegetation  | 4.75            | 41.08 | 37.70 | 42.25 |
| Rock        | 17.50           | 19.76 | 20.53 | 22.23 |
| Pavement    | 1.25            | 1.53  | 5.09  | 4.92  |
| Litter      | 61.50           | 42.43 | 42.45 | 42.45 |
| Cryptogams  | .50             | .58   | 1.34  | .59   |
| Bare Ground | 14.50           | 12.41 | 12.25 | 11.99 |

SOIL ANALYSIS DATA --

Management unit 13A, Study no: 5, Study Name: Amasas Back

| Effective rooting depth (in) | Temp °F (depth) | pH  | %sand | %silt | %clay | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----------------|-----|-------|-------|-------|-----|-------|-------|------|
| 9.7                          | 71.0 (9.1)      | 7.5 | 50.9  | 19.8  | 29.3  | 3.5 | 7.5   | 96.0  | 0.6  |

Stoniness Index



PELLET GROUP DATA --

Management unit 13A, Study no: 5

| Type   | Quadrat Frequency |     |     | Days use per acre (ha) |         |
|--------|-------------------|-----|-----|------------------------|---------|
|        | '94               | '99 | '04 | '99                    | '04     |
| Rabbit | 9                 | 20  | 12  | -                      | -       |
| Elk    | 7                 | 20  | 22  | 54 (133)               | 19 (46) |
| Deer   | 13                | 23  | 12  | 34 (84)                | 20 (50) |

BROWSE CHARACTERISTICS --

Management unit 13A, Study no: 5

|  |                                       | 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>Artemisia nova</b>                    |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                       | <b>2333</b>                           | -  | 400   | 1733   | 200      | -    | 27          | 1       | 9          | -       | 10           | 12/16                     |
| 94                                       | <b>2720</b>                           | 160                                      | 200   | 2300   | 220      | -    | 22          | 1       | 8          | 1       | 23           | 18/31                     |
| 99                                       | <b>2020</b>                           | -  | 160   | 1500   | 360      | 280  | 31          | 6       | 18         | 5       | 6            | 17/27                     |
| 04                                       | <b>2000</b>                           | 60                                       | 20    | 1640   | 340      | 420  | 52          | 5       | 17         | 7       | 7            | 14/24                     |
| <b>Artemisia tridentata wyomingensis</b> |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                       | <b>0</b>                              | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 94                                       | <b>0</b>                              | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | 34/56                     |
| 99                                       | <b>40</b>                             | -  | -     | 40     | -        | -    | 100         | 0       | -          | -       | 0            | 30/34                     |
| 04                                       | <b>60</b>                             | -  | -     | 60     | -        | -    | 0           | 100     | -          | -       | 0            | 19/36                     |

|                                       |                                       | 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) |
| <i>Atriplex canescens</i>             |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | 0          | -       | 0            | -/-                       |
| 94                                    | 80                                    | -  | 20    | 60     | -        | -    | 0           | 0       | 0          | -       | 0            | 36/44                     |
| 99                                    | 100                                   | -  | 40    | 40     | 20       | -    | 60          | 40      | 20         | -       | 0            | 34/40                     |
| 04                                    | 100                                   | -  | -     | 100    | -        | -    | 40          | 60      | 0          | -       | 0            | 38/52                     |
| <i>Coryphantha vivipara arizonica</i> |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 94                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 99                                    | 40                                    | -  | 20    | 20     | -        | -    | 0           | 0       | -          | -       | 0            | 3/8                       |
| 04                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| <i>Ephedra viridis</i>                |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 94                                    | 100                                   | -  | 20    | 80     | -        | 100  | 0           | 80      | -          | -       | 0            | 11/6                      |
| 99                                    | 40                                    | -  | -     | 40     | -        | -    | 0           | 50      | -          | -       | 0            | 19/23                     |
| 04                                    | 40                                    | -  | -     | 40     | -        | -    | 50          | 0       | -          | -       | 0            | 15/27                     |
| <i>Gutierrezia sarothrae</i>          |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | 0          | -       | 0            | -/-                       |
| 94                                    | 660                                   | 40                                       | 120   | 420    | 120      | 20   | 0           | 0       | 18         | 3       | 3            | 8/11                      |
| 99                                    | 420                                   | -  | 80    | 340    | -        | 100  | 0           | 0       | 0          | -       | 0            | 8/11                      |
| 04                                    | 1600                                  | -  | 240   | 1360   | -        | 20   | 0           | 0       | 0          | -       | 0            | 7/11                      |
| <i>Juniperus osteosperma</i>          |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                    | 100                                   | -  | -     | 100    | -        | -    | 0           | 0       | -          | -       | 0            | 46/31                     |
| 94                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 99                                    | 220                                   | -  | 60    | 160    | -        | 40   | 0           | 0       | -          | -       | 0            | -/-                       |
| 04                                    | 160                                   | -  | 20    | 140    | -        | 20   | 0           | 0       | -          | -       | 0            | -/-                       |
| <i>Opuntia erinacea</i>               |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 94                                    | 20                                    | 20                                       | -     | 20     | -        | -    | 0           | 0       | -          | -       | 100          | 2/4                       |
| 99                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | 5/15                      |
| 04                                    | 40                                    | -  | -     | 40     | -        | -    | 0           | 0       | -          | -       | 0            | 5/21                      |
| <i>Pediocactus simpsonii</i>          |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | 0          | -       | 0            | -/-                       |
| 94                                    | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | 0          | -       | 0            | -/-                       |
| 99                                    | 40                                    | -  | 20    | 20     | -        | -    | 0           | 0       | 0          | -       | 0            | 1/3                       |
| 04                                    | 60                                    | -  | -     | 40     | 20       | -    | 0           | 0       | 33         | 33      | 33           | 4/7                       |

|                              |                                       | 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>Pinus edulis</b>          |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | 0          | -       | 0            | -/-                       |
| 94                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | 0          | -       | 0            | -/-                       |
| 99                           | 120                                   | -  | 40    | 80     | -        | -    | 0           | 0       | 0          | -       | 0            | -/-                       |
| 04                           | 120                                   | -  | 20    | 80     | 20       | -    | 0           | 0       | 17         | 17      | 17           | -/-                       |
| <b>Purshia tridentata</b>    |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                           | 33                                    | -  | -     | 33     | -        | -    | 100         | 0       | -          | -       | 0            | 5/11                      |
| 94                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | 16/29                     |
| 99                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | 19/43                     |
| 04                           | 20                                    | -  | -     | 20     | -        | -    | 0           | 100     | -          | -       | 0            | 13/31                     |
| <b>Yucca baccata baccata</b> |                                       |  |       |        |          |      |             |         |            |         |              |                           |
| 87                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 94                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | 4/8                       |
| 99                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |
| 04                           | 0                                     | -  | -     | -      | -        | -    | 0           | 0       | -          | -       | 0            | -/-                       |