

Trend Study 1-13-06

Study site name: Raft River Narrows .

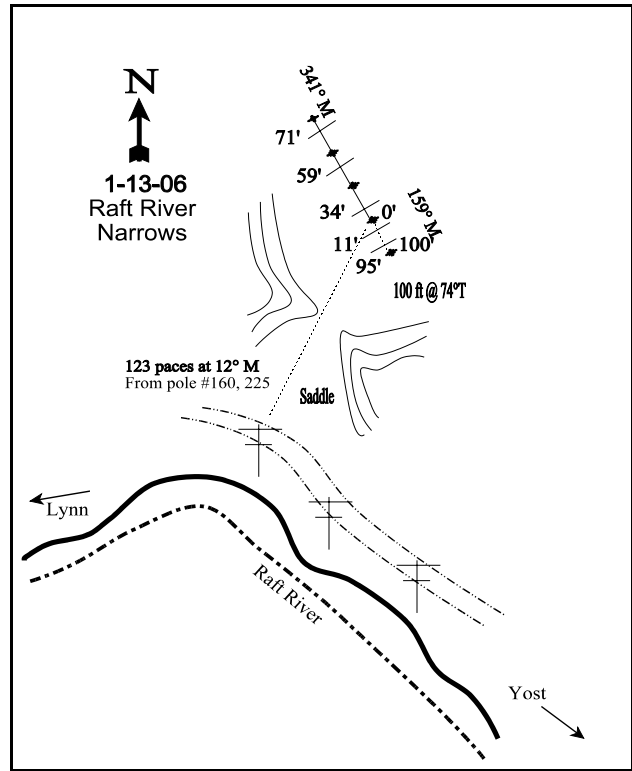
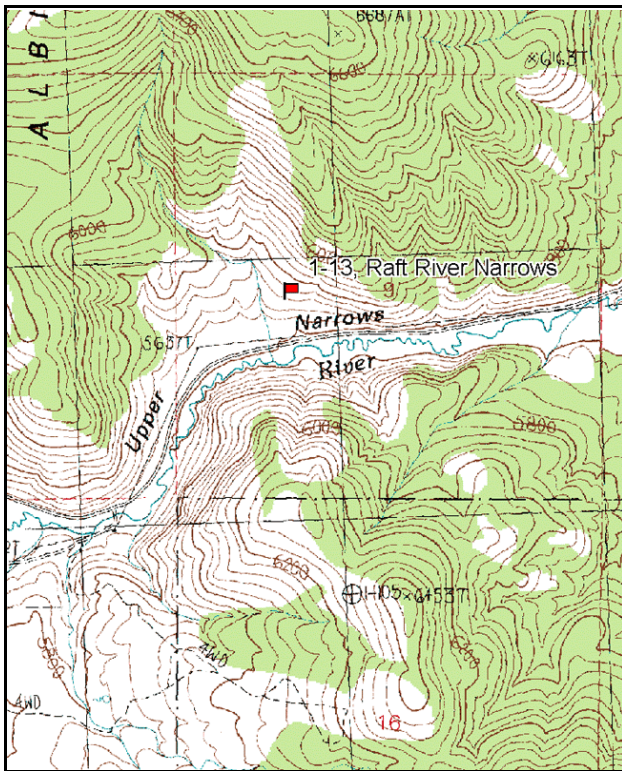
Vegetation type: Big Sagebrush .

Compass bearing: frequency baseline 160 degrees magnetic.

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

LOCATION DESCRIPTION

From Lynn proceed to the bridge over the Raft River just before the Upper Narrows. Proceed east 0.95 miles from the bridge to a set of double power poles (#'s 160 and 225). From the northernmost pole, walk 123 paces at 13 degrees magnetic, to the 0-foot stake of the frequency baseline, marked with browse tag #7917. The bearing of the baseline is 160 degrees magnetic. The rest of the baseline runs 341 degrees magnetic from the 0 foot baseline stake.



Map Name: Buck Hollow, Utah-Idaho

Diagrammatic Sketch

Township 14N , Range 16W , Section 9

UTM NAD 27 , UTM 12T 4647835 N , 276805 E

DISCUSSION

Raft River Narrows - Trend Study No. 1-13

Study Information

This study is located on important winter range on a Wyoming big sagebrush-grass vegetation type (elevation: 5,700 feet, slope: 30-35%, aspect: southwest). Part of the study was burned in 2000 as part of a backfire that was intended to stop a wildfire from crossing Raft River Canyon. As a result, the first 100 feet of the baseline was burned. The area is in the Junction Creek allotment. Cattle were observed grazing along the river bottom when the transect was established in 1984, but no sign of livestock grazing was noted on the steeper slopes. A pellet group transect in 2001 estimated 11 deer days use/acre (28 deer days use/ha). In 2006, 27 deer days use/acre (66 ddu/ha) and 1 cow day use/acre (2 cdu/ha) were estimated.

Soil

The Solak soil series consists of shallow, somewhat excessively drained, moderately permeable soils that formed in residuum and colluvium weathered from conglomerate composed of sandstone, quartzite, and limestone (USDA-NRCS 2006). Soils are rocky on the surface and throughout the profile. Soil texture is a sandy clay loam and reaction is moderately alkaline (8.2 pH). Phosphorus is low (3.6 ppm), which can limit normal plant growth and development (Tiedemann and Lopez 2004). Effective rooting depth is fairly shallow at 9 inches. However, the underlying parent material must contain numerous fractures to allow the deeper rooted Wyoming big sagebrush to establish. The soil is easily disturbed on the 30-35% slope. However, protective ground cover is sufficient to control erosion. A uniform litter cover composed primarily of dead cheatgrass seems effective in enhancing penetration of water into the soil and thus reducing runoff. The erosion condition was classified as stable in 2001 and 2006.

Browse

Browse composition is dominated by Wyoming big sagebrush, which contributed 15% cover in 1996 and about 9% cover in 2001 and 2006. Sagebrush were very heavily hedged in 1984 with 92% of the population showing heavy use. During the 1990 reading, density and percent decadence remained similar, yet use was mostly light to moderate. In 1996, the original baseline was lengthened from 100 ft to 400 ft. This increased sample estimated a much larger density for Wyoming big sagebrush at 15,500 plants/acre (2,499 plants/acre in 1990), 84% of which were young plants. Seedlings were also extremely numerous (14,200 plants/acre). In 2001, young plants were less numerous and the fire had killed part of the population. Density declined to 7,020 plants/acre. Young plants were still very common (47% of the population). In 2006, the total density of sagebrush was lower as the number of young plants declined, but total number of mature and decadent plants was higher (3,720 plants/acre to 4,540 plants/acre in 2006). Decadence increased from 7% in 2001 to 18% in 2006. Basin big sagebrush dominates the flat areas down slope where the soil is significantly deeper.

Greasewood is also found in greater numbers at the bottom of the hill, but some plants have been sampled up-slope. Narrowleaf low rabbitbrush was very numerous, but density has declined since 1996. Other less abundant shrubs include shadscale, broom snakeweed, and threadleaf rubber rabbitbrush.

Herbaceous Understory

The herbaceous understory is depleted. Cheatgrass is the most abundant species. Data for annual species were first collected in 1996, but the presence of cheatgrass was noted in 1984 and 1990. Since 1996, cheatgrass nested frequency has significantly increased in both 2001 and 2006. Cheatgrass cover also increased each year (3% in 1996, 13% in 2001, and 17% in 2006). This high amount of cheatgrass is a fire hazard, which would cause the destruction of sagebrush and other perennial species. Perennial grasses are not abundant. Sandberg bluegrass is the most abundant perennial grass and nested frequency increased significantly between 1996 and 2006. Forbs are very sparse.

1990 TREND ASSESSMENT

Density and age class structure of the key browse species (Wyoming big sagebrush) appears stable. Utilization is light to moderate and percent decadence has declined slightly. Narrowleaf low rabbitbrush decreased in density. The grass trend is slightly up as one of four sampled species significantly increased. The forb trend is also slightly up with an increase in the number of perennial forbs. The understory remains in a depleted and poor condition with very high densities of cheatgrass.

browse - stable (0)

grass - slightly up (+1)

forb - slightly up (+1)

1996 TREND ASSESSMENT

Trend for the Wyoming big sagebrush is up. Density increased while heavy use and decadence declined. Seedlings and young are abundant indicating a dynamic reproductive potential. Some of the change in density may be partially due to the lengthening of the baseline which increased the area sampled. Density of mature plants increased from 1,133 plants/acre to 1,780. Vigor is good on most plants. Trend for the undesirable narrowleaf low rabbitbrush appears stable. Trend for grasses is slightly up. Sum of nested frequency increased. Some of this change maybe the expanded sampling area. Annual cheatgrass is still dominant providing 63% of the grass cover. The forb trend is up. Forbs are rare, but frequency has increased. The DCI score is good, but perennial grasses and forbs are lacking.

winter range condition (DC Index) - good (54) Lower potential scale

browse - up (+2)

grass - slightly up (+1)

forb - up (+2)

2001 TREND ASSESSMENT

Trend for Wyoming big sagebrush is down due to the decrease in density of young plants (13,080 to 3,300 plants/acre) and after part of the study burned in 2000. Sagebrush cover declined from 15% to 10%. Utilization is now entirely classified as light. Decadence is low at only 7% and vigor is good on almost all plants. The undesirable narrowleaf low rabbitbrush now appears at its lowest density since 1984. Trend for grasses is slightly down. Perennial grasses have remained stable, but cheatgrass has significantly increased in nested frequency and cover increased from 3% to 13%. The forb trend is down as perennial forbs decreased substantially since 1996. The DCI score declined to fair due to the loss of sagebrush cover after the fire and the increase of cheatgrass cover.

winter range condition (DC Index) - fair (37) Lower potential scale

browse - down (-2)

grass - slightly down (-1)

forb - down (-2)

2006 TREND ASSESSMENT

The soil trend is stable. Ground cover characteristics have changed very little and the erosion condition class rating was stable. The browse trend is slightly down. Overall sagebrush density declined from 7,020 plants/acre in 2001 to 4,920 plants/acre in 2006, but much of this decline is due to the decline of the number of young shrubs. The decline in young recruitment may coincide with the increase in cheatgrass which competes with seedlings and young sagebrush. The density of mature and decadent plants actually increased from 3,720 plants/acre to 4,540 plants/acre. The number of decadent plants increased from 480/acre to 880/acre. Sagebrush cover was 9% in 2006. The grass trend is stable. Sum of nested frequency for perennial grasses increased. Sandberg bluegrass has significantly increased since 1996. Unfortunately, cheatgrass has also significantly increased. It was sampled in 100% of the quadrats. Cover has also increased to 17%. The forb trend is stable, although the weedy, annual species tumble mustard was sampled for the first time and was sampled in 37% of the quadrats. The DCI score was lower as sagebrush recruitment was lower and percent decadence was higher.

winter range condition (DC Index) - fair (28) Lower potential scale

browse - slightly down (-1)

grass - stable (0)

forb - stable (0)

HERBACEOUS TRENDS --
Management unit 01 , Study no: 13

| Type | Species | Nested Frequency | | | | | Average Cover % | | |
|-----------------------------|----------------------------|------------------|-----|------|------|------|-----------------|-------|-------|
| | | '84 | '90 | '96 | '01 | '06 | '96 | '01 | '06 |
| G | Agropyron spicatum | 8 | 10 | 12 | 19 | 25 | .31 | .28 | 1.02 |
| G | Bromus tectorum (a) | - | - | 287 | 334 | 364 | 3.48 | 13.07 | 16.60 |
| G | Oryzopsis hymenoides | a5 | ab8 | ab11 | ab9 | b16 | .07 | .45 | 1.91 |
| G | Poa secunda | a3 | b35 | b44 | bc55 | c72 | .68 | .53 | 2.32 |
| G | Sitanion hystrix | 16 | 13 | 35 | 14 | 12 | .56 | .11 | .16 |
| G | Stipa comata | a- | a- | b16 | b17 | b15 | .31 | .64 | .63 |
| G | Vulpia octoflora (a) | - | - | b11 | a- | b16 | .07 | - | .04 |
| Total for Annual Grasses | | 0 | 0 | 298 | 334 | 380 | 3.55 | 13.07 | 16.64 |
| Total for Perennial Grasses | | 32 | 66 | 118 | 114 | 140 | 1.94 | 2.02 | 6.06 |
| Total for Grasses | | 32 | 66 | 416 | 448 | 520 | 5.50 | 15.10 | 22.71 |
| F | Alyssum alyssoides (a) | - | - | a11 | a5 | b132 | .02 | .01 | 2.73 |
| F | Arabis sp. | - | 3 | 4 | - | - | .01 | - | - |
| F | Astragalus beckwithii | a6 | a4 | b19 | a3 | a6 | .22 | .00 | .48 |
| F | Astragalus sp. | - | - | - | - | 1 | - | - | .15 |
| F | Castilleja chromosa | - | - | 5 | 1 | 4 | .06 | .00 | .00 |
| F | Caulanthus crassicaulis | - | - | 2 | - | - | .03 | - | - |
| F | Castilleja linariaefolia | - | - | - | - | 3 | - | - | .00 |
| F | Chaenactis douglasii | a1 | a16 | b36 | a4 | a9 | .16 | .03 | .05 |
| F | Collinsia parviflora (a) | - | - | 4 | - | 6 | .01 | - | .01 |
| F | Cryptantha sp. | - | - | 9 | - | - | .04 | - | - |
| F | Delphinium nuttallianum | - | - | - | 1 | - | - | .00 | - |
| F | Descurainia pinnata (a) | - | - | a23 | b100 | a8 | .07 | 1.49 | .03 |
| F | Eriogonum caespitosum | - | 3 | 5 | - | - | .04 | - | - |
| F | Eriogonum ovalifolium | - | - | - | - | 2 | - | - | .06 |
| F | Erigeron pumilus | a1 | a- | b11 | ab6 | ab4 | .10 | .03 | .03 |
| F | Gayophytum ramosissimum(a) | - | - | - | 3 | - | - | .00 | - |
| F | Gilia sp. (a) | - | - | a7 | b106 | a- | .02 | .43 | - |
| F | Lappula occidentalis (a) | - | - | 15 | 26 | 29 | .03 | .12 | .08 |
| F | Lactuca serriola | - | - | ab1 | b11 | a- | .00 | .10 | - |
| F | Machaeranthera canescens | - | - | 3 | - | 4 | .00 | - | .01 |
| F | Microsteris gracilis (a) | - | - | - | - | 4 | - | - | .01 |
| F | Oenothera caespitosa | - | - | 5 | - | - | .03 | - | - |
| F | Phlox hoodii | 5 | 5 | 9 | 6 | - | .15 | .06 | - |
| F | Sisymbrium altissimum (a) | - | - | a- | a- | b78 | - | - | .31 |
| F | Tragopogon dubius | - | - | 1 | - | - | .00 | - | .00 |

| Type | Species | Nested Frequency | | | | | Average Cover % | | |
|------|---------------------------|------------------|-----|-----|-----|-----|-----------------|------|------|
| | | '84 | '90 | '96 | '01 | '06 | '96 | '01 | '06 |
| | Total for Annual Forbs | 0 | 0 | 60 | 240 | 257 | 0.15 | 2.05 | 3.18 |
| | Total for Perennial Forbs | 13 | 31 | 110 | 32 | 33 | 0.89 | 0.24 | 0.82 |
| | Total for Forbs | 13 | 31 | 170 | 272 | 290 | 1.05 | 2.29 | 4.00 |

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

BROWSE TRENDS --

Management unit 01 , Study no: 13

| Type | Species | Strip Frequency | | | Average Cover % | | |
|------|---|-----------------|-----|-----|-----------------|-------|-------|
| | | '96 | '01 | '06 | '96 | '01 | '06 |
| B | <i>Artemisia tridentata wyomingensis</i> | 96 | 60 | 61 | 14.67 | 9.76 | 9.03 |
| B | <i>Atriplex confertifolia</i> | 2 | 3 | 2 | - | - | - |
| B | <i>Chrysothamnus nauseosus consimilis</i> | 0 | 0 | 0 | - | - | - |
| B | <i>Chrysothamnus viscidiflorus stenophyllus</i> | 91 | 37 | 42 | 7.21 | .36 | 1.00 |
| B | <i>Leptodactylon pungens</i> | 1 | 0 | 0 | - | - | - |
| B | <i>Opuntia sp.</i> | 16 | 8 | 8 | 1.12 | .41 | .00 |
| B | <i>Sarcobatus vermiculatus</i> | 2 | 2 | 2 | .15 | .63 | .63 |
| | Total for Browse | 208 | 110 | 115 | 23.16 | 11.17 | 10.68 |

CANOPY COVER, LINE INTERCEPT --

Management unit 01 , Study no: 13

| Species | Percent Cover |
|---|---------------|
| | '06 |
| <i>Artemisia tridentata wyomingensis</i> | 9.55 |
| <i>Chrysothamnus viscidiflorus stenophyllus</i> | 1.41 |
| <i>Sarcobatus vermiculatus</i> | 1.54 |

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 01 , Study no: 13

| Species | Average leader growth (in) | |
|--------------------------------------|----------------------------|-----|
| | '01 | '06 |
| Artemisia tridentata wyomingensis | 1.3 | 0.9 |

BASIC COVER --

Management unit 01 , Study no: 13

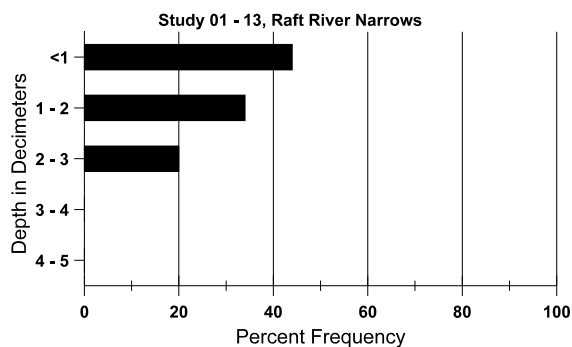
| Cover Type | Average Cover % | | | | |
|-------------|-----------------|-------|-------|-------|-------|
| | '84 | '90 | '96 | '01 | '06 |
| Vegetation | 2.00 | 5.50 | 30.90 | 29.56 | 37.43 |
| Rock | 18.25 | 24.50 | 26.53 | 21.75 | 21.67 |
| Pavement | 10.50 | 31.00 | 8.90 | 19.43 | 9.73 |
| Litter | 56.50 | 31.75 | 29.68 | 21.09 | 28.21 |
| Cryptogams | .50 | 2.25 | 2.19 | 3.12 | 3.04 |
| Bare Ground | 12.25 | 5.00 | 12.53 | 10.47 | 8.54 |

SOIL ANALYSIS DATA --

Herd Unit 01, Study no: 13, Raft River Narrows

| Effective rooting depth (in) | Temp °F (depth) | PH | Sandy clay loam | | | %OM | PPM P | PPM K | dS/m |
|------------------------------|-----------------|-----|-----------------|--------|--------|-----|-------|-------|------|
| | | | % sand | % silt | % clay | | | | |
| 8.6 | 59.6 (7.8) | 8.2 | 46.5 | 23.4 | 30.0 | 1.7 | 3.6 | 441.6 | 1.9 |

Stoniness Index



PELLET GROUP DATA --

Management unit 01 , Study no: 13

| Type | Quadrat Frequency | | |
|--------|-------------------|-----|-----|
| | '96 | '01 | '06 |
| Rabbit | 4 | 6 | 11 |
| Deer | 15 | 2 | 19 |
| Cattle | - | - | 4 |

| Days use per acre (ha) | |
|------------------------|---------|
| '01 | '06 |
| - | - |
| 11 (28) | 27 (66) |
| - | 1 (2) |

BROWSE CHARACTERISTICS --
Management unit 01 , Study no: 13

| | | 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 tripartita tripartita | | | | | | | | | | | | |
| 84 | 199 | - | - | 166 | 33 | - | 0 | 100 | 17 | - | 0 | 13/17 |
| 90 | 0 | - | - | - | - | - | 0 | 0 | 0 | - | 0 | -/- |
| 96 | 0 | - | - | - | - | - | 0 | 0 | 0 | - | 0 | -/- |
| 01 | 0 | - | - | - | - | - | 0 | 0 | 0 | - | 0 | -/- |
| 06 | 0 | - | - | - | - | - | 0 | 0 | 0 | - | 0 | -/- |
| Artemisia tridentata wyomingensis | | | | | | | | | | | | |
| 84 | 2599 | - | 166 | 1100 | 1333 | - | 8 | 92 | 51 | 2 | 9 | 26/42 |
| 90 | 2499 | 66 | 166 | 1133 | 1200 | - | 15 | 4 | 48 | 4 | 20 | 27/31 |
| 96 | 15500 | 14200 | 13080 | 1780 | 640 | 500 | 2 | .12 | 4 | .51 | .64 | 24/37 |
| 01 | 7020 | 40 | 3300 | 3240 | 480 | 1860 | .28 | 0 | 7 | 3 | 3 | 23/27 |
| 06 | 4920 | 80 | 380 | 3660 | 880 | 720 | 35 | 20 | 18 | 7 | 9 | 22/26 |
| Atriplex confertifolia | | | | | | | | | | | | |
| 84 | 33 | - | - | 33 | - | - | 0 | 0 | 0 | - | 0 | 9/9 |
| 90 | 33 | - | - | - | 33 | - | 0 | 0 | 100 | - | 0 | -/- |
| 96 | 40 | - | 20 | 20 | - | - | 0 | 0 | 0 | - | 0 | 13/21 |
| 01 | 60 | - | - | 60 | - | - | 0 | 0 | 0 | - | 0 | 10/13 |
| 06 | 40 | - | - | 40 | - | - | 0 | 0 | 0 | - | 0 | 12/20 |
| Chrysothamnus nauseosus consimilis | | | | | | | | | | | | |
| 84 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 90 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 96 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | 36/40 |
| 01 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | 25/32 |
| 06 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | 19/26 |
| Chrysothamnus viscidiflorus stenophyllus | | | | | | | | | | | | |
| 84 | 7333 | 66 | 1300 | 2600 | 3433 | - | 46 | 12 | 47 | .54 | 2 | 7/9 |
| 90 | 6666 | 33 | 500 | 4100 | 2066 | - | 0 | 0 | 31 | .90 | 8 | 8/10 |
| 96 | 6360 | 640 | 1420 | 3900 | 1040 | - | 4 | 0 | 16 | 4 | 4 | 12/19 |
| 01 | 1120 | - | 80 | 540 | 500 | 660 | 0 | 0 | 45 | 30 | 30 | 8/11 |
| 06 | 1400 | 20 | 120 | 1120 | 160 | 100 | 3 | 0 | 11 | 7 | 7 | 11/14 |

| | | 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) |
| Leptodactylon pungens | | | | | | | | | | | | |
| 84 | 600 | - | 500 | 100 | - | - | 0 | 0 | - | - | 0 | 3/2 |
| 90 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 96 | 20 | - | - | 20 | - | - | 0 | 0 | - | - | 0 | 9/10 |
| 01 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 06 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| Opuntia sp. | | | | | | | | | | | | |
| 84 | 166 | - | - | 166 | - | - | 0 | 0 | 0 | - | 0 | 6/7 |
| 90 | 500 | 33 | 200 | 300 | - | - | 0 | 0 | 0 | - | 0 | 5/9 |
| 96 | 340 | 20 | 40 | 260 | 40 | - | 0 | 0 | 12 | 6 | 6 | 4/14 |
| 01 | 160 | - | 20 | 120 | 20 | 140 | 0 | 0 | 13 | - | 0 | 4/9 |
| 06 | 160 | - | 20 | 120 | 20 | 20 | 0 | 0 | 13 | - | 13 | 4/9 |
| Sarcobatus vermiculatus | | | | | | | | | | | | |
| 84 | 33 | - | - | - | 33 | - | 100 | 0 | 100 | - | 0 | -/- |
| 90 | 33 | - | - | 33 | - | - | 0 | 0 | 0 | - | 0 | 35/35 |
| 96 | 40 | - | - | 40 | - | - | 0 | 0 | 0 | - | 0 | 36/62 |
| 01 | 40 | - | 20 | 20 | - | - | 0 | 0 | 0 | - | 0 | -/- |
| 06 | 40 | - | - | 40 | - | - | 0 | 0 | 0 | - | 0 | 39/48 |