2022-2023 Report of Findings

TESTING FOR REVEGETATION SUCCESS

for PHASE III BOND RELEASE

(Years One and Two)

Seneca IIW Mine

Routt County, Colorado

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1.0 INTRODUCTION

1.1 General

Quantitative sampling of reclaimed and reference areas at Seneca Property, LLC (SPL) Seneca IIW Mine (Seneca) was undertaken in 2022 and 2023 by Cedar Creek Associates, Inc. (Cedar Creek) for formal testing of Revegetation Success in application for Phase III Bond Release. The present report constitutes data from years one and two of the required two years of testing. Methods, sample areas, and sample sizes were those specified in a study plan submitted by SPL to Colorado Division of Reclamation, Mining, and Safety (CDRMS) prior to sampling in 2022.

1.2 Climatic Conditions

Precipitation data from 2009 to present were obtained from the NOAA administered Western Regional climate Center (WRCC) for the nearby town of Hayden (Station 053867). For years 1990 through 2008, precipitation data collected at the nearby Seneca IIW Mine were used. For years 1982 through 1989, SPL provided precipitation data from the nearby Seneca II Mine. Since the data record for Seneca IIW exists for only a relatively short period, the long-term average monthly precipitation data from the Western Regional Climate Center (WRCC) for the nearby town of Hayden was used as an appropriate base for comparison. Information on degree-days was also based on temperature data from the Hayden station.

Precipitation alternated between above average and below average amounts between January and April in 2023. This follows a similar pattern beginning in September of 2022, excluding December which saw precipitation well above average. Most months between September 2022 and April 2023 were well above average, creating a favorable growing season in 2023. The 2022 growing season saw normal precipitation levels (Figure D-5b). This ample amount of available moisture during the early growing season can cause a boost in germination and an increase in abundance of dominant perennial species in established areas. Precipitation in 2022 totaled at or above average during the 12, 6, and 4 months prior to July, while precipitation in 2023 saw similar amounts during the 12 months prior to July, but then decreased to below average amounts during the 6 and 4 months prior to July (Figures D-6b, D-7b, and D-8b, respectively). Total degree days were below averages in 2022 and 2023 (Figures C-10). This combination of normal to above average precipitation in the spring season and below average temperatures is favorable for vegetation growth which is observed in the results and both years vegetation benefited from these conditions.

2.0 SAMPLING AREAS

2.1 Phase III Bond Release Block 6 Sampling

The 81.1 acres of the Bond Release Block 6 (BRB-6) was assembled from reclamation parcels seeded from 2006 to 2014. The inclusion of areas seeded in 2014 was approved by CDRMS prior to sampling in 2022; this area totals 4.2 acres (5% of the BRB-6). BRB-6 includes land reclaimed after September 22, 1981, and is subject to provisions of the Colorado Permanent Regulatory Program. There are no woody plant density concentration areas identified in the BRB-6. Sampling areas and locations for BRB-6 in 2022 and 2023 are shown on Maps 1 and 3, respectively.

2.42 Extended Reference Area Sampling

Historically, there have been two distinct ERAs located in the Seneca IIW Mine permit area; one used as a reference for reclaimed areas located in Seneca IIW and one used as a reference for the reclaimed lands located in Seneca IIW-South. Each of these areas have the same 5 community based ERAs; The Aspen ERA, Mountain Brush ERA, Sagebrush ERA, Steep Mountain Brush ERA, and Western Wheatgrass/Alkali Sagebrush ERA. These areas were established separately between the north and south permit areas to capture potential differences in vegetation cover caused by the higher elevation of Seneca IIW, which appears to be fractionally lower than the adjacent Seneca IIW-South vegetation cover.

In 2015, it was proposed that if the reclaimed areas span both the northern and southern portions of the permit area, the two ERAs be combined into one larger, mine-wide, ERA (here after referred to as the Combined ERA) to capture any variance that exists between the two areas. Adequacy correspondence for SL5 demonstrates CDRMS concurrence with this approach (ESCO Associates, Inc. Scope of Work, 2015). To prevent bias in the dataset, when the combined ERA is utilized, sampling is generated using stratified approach, based on the percent of reclaimed area located within the northern and southern portions.

Given that the BRB-6 spans both the northern (67.1 ac.) and southern (14.0 ac.) portions of the permit area, the combined ERA was sampled in 2022 and 2023 for cover and production for comparison with the reclaimed area data. Based on these acreages, 17% of samples for each of the ERAs will be collected in the southern portion of the permit area (see Table 1 below). Sampling areas and locations for the five ERAs in 2022 and 2023 are shown on Maps 2 and 4, respectively.

Table 1. Summary of Sampling Design 2022 and 2023

Evaluation Parameter	BRB-6	ERAs
Ground Cover Sampling	Min. 30 samples	Min. 15 samples (to adequacy*) (12 North / 3 South)
Production Sampling	Min. 30 samples	Min. 30 samples (25 North / 5 South)
WPD Sampling – Background (Co-located with Cover)	Min. 30 samples	NA
Species Density Sampling (Co-located with Cover)	Min. 30 samples	Min. 15 samples
Success Demonstration Approach	Hypoth. Testing for cover, production and woody plant density 3 of 4 specified tests for species diversity	NA

* Up to a maximum of 50 samples or use of upper 90% confidence limit after 15 samples. Should additional samples be needed to achieve adequacy in the ERAs, data will be collected so that 17% of collected samples are located in the Southern permit area.

3.0 METHODS AND DATA PRESENTATION

3.1 Cover Sampling

Cover data were collected along 50 m transects using a point-intercept method in which data were recorded as interceptions of a point with a plant species, litter, standing dead plant material, soil, or rock. Plant material produced during the current year and still standing was tallied by species. Litter was considered to be any organic material that had fallen or had begun to fall to the soil surface. Standing dead was any dead plant material that was produced in previous years, but which was still standing and had not lodged or broken off to become litter. Inorganic material greater than 1 cm in diameter was considered rock. The cover sampling points were optically projected using a Cover-Point Optical Point Projection Device developed by ESCO Associates, Inc. The 50 m transects were randomly located and randomly oriented in the reclaimed and reference areas. One hundred points were collected along each transect. At each meter along the 50 m length, points were projected 0.5 m to the right and 0.5 to the left of the transect, thus minimizing trampling effects.

First hit interceptions were used to calculate absolute top layer foliar cover (see FIRST HIT AVERAGE COVER column in data tables) by dividing the number of interceptions for a particular species or ground cover type by the total number of points taken (100). First hit relative vegetation cover was calculated by dividing first hit absolute cover for each species by the total first hit vegetation cover (see FIRST HIT RELATIVE VEGETATION COVER). All-layer absolute cover (AVERAGE COVER-ALL column in data tables) was calculated by dividing all hits (first-hits and additional-hits) for a particular species by the total number of points taken (100). In addition, all-layer relative cover was calculated using all hits for a particular species, divided by the total hits accumulated during sampling of the transect (see ALL HIT RELATIVE VEGETATION COVER).

3.2 Herbaceous Production Sampling

Herbaceous production sampling was accomplished using one-half square meter (0.5 m^2) circular plots within which all herbaceous growth in a vertical projection was clipped and placed in labeled paper bags. Clipped plant material was grouped into the following lifeforms, bagged and labeled as:

- Native Annual / Biennial Forbs
- Native Annual Grasses
- Native Perennial Forbs
- Native Perennial Grasses and Graminoids
- Introduced Annual / Biennial Forbs
- Introduced Annual Grasses
- Introduced Perennial Forbs
- Introduced Perennial Grasses

Lichens, mosses, and woody plant species present in the sample plot were not collected. Noxious weeds were not collected. Clipped material was returned to the Cedar Creek laboratory and oven dried at 105 °C for 24 hours, then weighed to the nearest 0.1 gm.

3.3 Woody Plant Density Sampling

Woody plant density sampling was undertaken in the reclaimed BRB-6 but not in the reference areas or BRB-4. Samples were collected along 50 m transects. All shrubs with root crowns located within the boundaries of 2 m x 50 m quadrats (100 m^2 belt transects) were tallied according to species and life stage as either seedling, mature, or dead. The presence of dead individuals was recorded but did not contribute to woody plant density calculations.

3.4 Lifeforms Used in Data Presentation

To enhance understanding of the collected data, all data and summary tables are organized by lifeform. Lifeform categories used here reflect both plant growth habit and provenance (place of origin). Categories observed in 2022 and 2023 were: native annual and biennial forbs, introduced annual and biennial forbs, introduced annual grasses, native perennial forbs, introduced perennial forbs, native perennial grasses and graminoids, introduced perennial grasses, native subshrubs, native shrubs, native trees, bryophytes (mosses), lichens, succulents, and fungi (mushrooms). Native perennial warm season grasses were observed in small quantities during the 2022 evaluation.

3.5 Plant Species Frequency and Density Measurements

During the course of cover sampling, all plant species occurring within one meter of either side of the cover sample transect were noted as present. Frequency for each plant species observed during sampling was calculated by dividing the number of sample transects in which the species was observed by the total number of samples (see cover sample distribution by area above). As such, this value is probably more correctly known as constancy.

The total number of species within each lifeform observed in each 100 square meter sample provides a measure of "species density", indicating the relative species richness of different areas. This measure provides a means of examining progress toward the return of diverse species composition in the reclaimed areas.

3.6 Plant Species Listing

Scientific names used except as noted follow the Flora of North America (FNA, 1993+). Species not yet identified by the FNA, follow Weber and Wittmann (2001); common names cited are found in Beetle (1970), Nickerson *et al.* (1976), Soil Conservation Service (1979), or USDA Plants Database (2017).

Cross-reference between older names and revised names used here can be made by referring to Appendix E of this report.

During the course of fieldwork, a list of all plant species encountered (quantitative plus incidental observations) was compiled for both of the bond release blocks and for each of the six reference areas. These lists are tabulated in Appendix E, "Species Presence for All Areas." Note that all big sagebrush plants encountered were referred to as *Artemisia tridentata.* Plants referred to here as *Poa secunda ssp. juncifolia* include the plants formerly known as big bluegrass (*Poa ampla*) a species commonly included in reclamation seed mixes. The taxonomic treatment of FNA (Vol. 24, 2007) places *Poa ampla* with *Poa secunda ssp. juncifolia.* Despite this merger, the distinctness of *Poa ampla* is worth noting. Mountain bromegrass encountered during sampling is referred to as *Bromus carinatus var. marginatus* in recognition of its perennial habit compared to the *Ceratochloa carinatus* taxon included in Weber and Wittmann (2001) as the appropriate name for Colorado plants. The latter taxon (*C. carinatus*) is an annual.

3.7 Photographic Record

Within each area, representative color photographs were taken at cover transects to document the appearance of the vegetation in 2022 and 2023 (Appendix G). Sample area, number, orientation, and UTM locations are all recorded on each photo. This data was collected using the Solocator app and some error is to be expected.

3.8 Sample Location Methods

Sampling was conducted at randomly located sites. Random sampling locations were generated using ESRI ArcMap 10.2 software and Hawth's Analysis Tools for ArcGIS (Beyer 2004). Garmin Montana units (accuracy to 3 m) and topographic maps were used in the field to locate random points. Cover transects and co-located species density belt transects (centered on cover transects) were randomly oriented throughout the BRB-6 and each of the ERAs; production samples were located randomly behind the transect origin in these areas. Co-located woody plant density belt transects were centered on the cover transects throughout the BRB-6 to collect data for "Background" WPD areas. At each co-located point in the reclamation, the slope, expressed as a percent, and aspect of the site, in degrees not corrected for magnetic declination, were determined, and recorded, as was the orientation of the transect.

4.0 PERFORMANCE STANDARDS AND HYPOTHESIS TESTING

4.1 Assessment of Sample Adequacy

4.1.1 General

Formal (statistical) hypothesis testing (see below) was undertaken for the Phase III Bond Release Block (post-law, Permanent program lands). Statistical procedures follow the CDRMS Regulations of the Colorado Mined Land Reclamation Board for Coal Mining (revised in 2005).

4.1.2 Determination of Sample Adequacy

Sample adequacy for cover and production was evaluated based on total all-hit cover and total production (minimum of 15 samples) using the following expression (adequacy based on allowable means are also proved in Table C-4):

$$n_m = \frac{t^2 - s^2}{(d\bar{x})^2}$$

Where: n_m = minimum sample size
s^2 = sample variance (n-1 degrees of freedom)
d = precision (0.10 for cover and production)
$\bar{x}$ = sample arithmetic mean
t = the (α=.10) t-table value for a 1 tail t-test, n-1 degrees of freedom (infinite degrees of freedom may be used if n>30)

Sample adequacy for woody plant density was evaluated based on total woody plant density using the following expression:

$$n_{min} = \frac{(st)^2}{(dx)^2}$$

Where:

n_{min} = the number of sample points needed in a given vegetation type to be capable of detecting a 15% reduction in the mean with 90% confidence;
s = standard deviation (n-1);
t = the t statistic (one-tailed, 90% confidence; n-1 degrees of freedom; if n>30, t = 1.282 for purposes of this study);
d = acceptable amount of inherent variability to be identified between the sample mean and the true population mean (0.15 for purposes of this analysis);
x = sample mean for woody plant density data.

4.2 Calculating Reference Area Standards

4.2.1 Corrections for Noxious Weeds and Excess Annuals

Upon the formal comparison of cover and production data from reclaimed areas to applicable performance standards, observed total all-hit cover percentage and collected biomass production, must be adjusted for excessive contribution by annual / biennial species (i.e. no more than 10 percent relative cover or production, CDMG 1995, Guidelines Regarding Selected Coal Mine Bond Release Issues, 1(IV) A(4)). Herbaceous cover and production values used in such comparisons also must exclude values for species present on the Routt County Prohibited or Restricted Noxious list (listed as of 2023) or that are listed as noxious by the State of Colorado (Colorado Dept. of Agriculture, Division of Plant Industry, Title 35, Article 5.5, 101-119, Lists A, B, and C of Rules effective August 6, 2003). Mean values that have had excessive annuals and noxious weeds removed are referred to as "allowable". For purposes of assessment of reclamation adequacy, allowable all-hit herbaceous cover data from reference area sampling is used as per Seneca permit provisions.

4.2.2 Applicable Reference Area Standards

The allowable means from each of the five extended reference areas are weighted in accordance with the original relative abundance of the types in the pre-mining landscape (11.0% aspen, 34.5% mountain brush, 31.3% sagebrush/snowberry, 12.8% steep mountain brush and 10.4% Western wheatgrass/alkali sagebrush). In the process of weighting, a reliable estimate of variance is lost. Thus, the reference area standard thereafter in the process is treated as a technical standard (i.e. without confidence limits) and a one-sample t-test is used.

Should sample adequacy based on allowable means not be met and sample size is between 15 and 30 in the extended reference area an "upwards adjustment" is made to the appropriate ERA mean prior to calculating the performance standard. The adjustment value can be calculated by using the confidence interval for 90% confidence or by way of rearranging the sample adequacy formula and solving for the detectable percent reduction then multiplying by the mean. The adjustment value is then added to the allowable mean, here after referred to as the "upward adjustment of the mean" or "upwardly adjusted mean". This method of applying the upper limit of the possible values of the allowable mean protects the interest of the state (Appendix H).

C.I. = (Standard Deviation / square root (n)) x $t_{(n-1)}$
Upward Adjustment of Mean = C.I. + Allowable All-Hit Herbaceous Cover

-OR-

Altered Sample Adequacy Expression (d) = square root ((Standard Deviation^2 x $t_{(n-1)}$^2) / (Allowable All-Hit Herbaceous Cover^2 x n))

Upward Adjustment of Mean = (d x Allowable All-hit Herbaceous Cover) + Allowable All-hit Herbaceous Cover

4.3 Performance Criteria and Hypothesis Testing

For formal hypothesis testing relative to Phase III Bond Release the following procedures were followed:

4.3.1 Cover and Production

Phase III Revegetation success for cover and production will be demonstrated by one of following statistical approaches.

1) If sample adequacy (based on total mean) has been achieved (minimum of 15 samples, technical standards not subject to sample adequacy) in the reclamation and all applicable reference areas, and the reclaimed area allowable herbaceous mean is above 90% of the performance standard, All criteria are met for a direct comparison and revegetation would be deemed successful (CDMG 2010 revised rule, 4.15.11 (2)(a)).

2) Were the reclaimed area allowable herbaceous mean is above 90% of performance standard, and sample adequacy (based on total mean) was not met (minimum of 30 samples, technical standards not subject to sample adequacy), then the hypothesis of reclamation success would be tested using a parametric test of the "reverse null" hypothesis. This would be conducted using the following expression (CDMG 2010 revised rule, 4.15.11 (2)(c)).

$$t_c = \frac{\bar{x} - Q}{S_{\bar{x}}}$$

Where: $\bar{x}$ = Bond Release Block 1 Sample Mean
Q = 90% of standard
$S_{\bar{x}}$ = standard error of mean [$s / \sqrt{n}$]
S = sample standard deviation
n = sample size
t_c = calculated t value
t_t = table t value (alpha = 0.2)

The (reverse) null hypothesis being tested would be that the bond release block mean (μ) was less than or equal to 90% of the standard, stated as H_o: $\mu \leq Q$. If t_c was greater than the 1-tailed t table value for

alpha error probability of 0.20 and n-1 degrees of freedom then H_0 would be rejected, and revegetation would be deemed successful.

3) If sample adequacy (based on total mean) has been achieved (minimum of 15 samples, technical standards not subject to sample adequacy) and the reclaimed area allowable herbaceous mean is less than 90% of performance standard, then a one-sample t-test would be made in the following form to test the hypothesis of reclamation success for cover (CDMG 2010 revised rule, 4.15.11 (2)(b)):

$$t_c = \frac{Q - \bar{x}}{S_{\bar{x}}}$$

Where: $\bar{x}$ = Bond Release Block Sample Mean
Q = 90% of standard
$S_{\bar{x}}$ = standard error of mean [$s/\sqrt{n}$]
S = sample standard deviation
n = sample size
t_c = calculated t value
t_t = table t value (alpha = 0.1)

The (traditional) null hypothesis being tested would be that the bond release block mean (μ) was greater than or equal to 90% of the standard, stated as H_o: $\mu \geq Q$. If t_c was less than or equal to the 1-tailed t table value for alpha error probability of 0.10, at (n-1) degrees of freedom, then H_0 was not rejected, and revegetation was deemed successful.

4.3.2 WOODY PLANT DENSITY

The performance standards for establishment of woody plants at Seneca are as follows:

Overall average (background) density ≥ 200 stems per acre on 100% of the un-fenced reclaimed land (Mandatory Standard 1) with at least 10% of the un-fenced acreage (mine wide), possessing ≥ 1,000 stems per acre (Mandatory Standard 2). If needed, "volunteer" areas may be mapped and sampled separately to demonstrate success of this second mandatory standard.

Fenced woody plant density concentration areas are held to Secondary Standards 1-3, dependent upon community type. The fenced riparian WPD concentration areas are held to Secondary Standard #2, where total WPD ≥ 945 stems per acre with tree or tall shrub species contributing at least 150 stems per acre.

Phase III Revegetation success for woody plant density will be demonstrated by one of the statistical approaches used to assess cover and production (see above), or a non-parametric rank-order "L" test

(minimum of 30 samples, technical standards not subject to adequacy) as set forth in CDRMS/CDMG 2010 revised rule, 4.15.11 (3)(a), shown as follows:

$$L = p(n+1) - Z\,[np\,(1-p)]\,\hat{}\,0.5$$

Where:

L = order statistic corresponding to the one sided lower 80% confidence limit
p = 0.5 (e.g. the 0.5 quantile, or median)
n = sample size
Z = 0.842 (the t-table value for infinite degrees of freedom for 1 sided test; alpha = 0.2)

Note that the value for L will be an order statistic, and likely will not be an integer. If L is an integer the lower confidence limit is the corresponding ranked value in the data set. If L is not an integer, the limit is obtained by linear interpolation between the closest order statistics.

In this approach, it must be demonstrated that the lower 80% confidence limit (L-vlaue) on the reclaimed area median is greater than 70% of the relevant success standard to demonstrate success.

A direct comparison between mean woody plant density and the technical standard to demonstrate success is allowed by CDRMS if a minimum of 75 (100 m^2) samples are collected (CDMG 2010 revised rule, 4.15.11 (3)(b)(i)).

4.3.3 Species Diversity

For purposes of assessment of progress toward bond release standards, species diversity is judged using the following four tests present in the provisions of the permit; success is demonstrated by passing the first (A) and at least two of the remaining three (B, C, and D).

Mandatory Test A): No Overwhelming Dominant

No single plant species may exceed 60% relative cover.

Alternative Test B): Total Species Density Test

In this test, overall reclamation diversity standard is judged based on the species density values observed along with cover sampling in 100 sq.m. sample plots. Species density numbers are subjected to sample adequacy assessment in the usual manner.

For purpose of establishing the range of species density within the reference areas, the 75% range of variation is established as the number of standard deviations (both ways from the mean) encompassing 75% of the normal distribution (= 1.15; see Rohlf and Sokal 1969, Table P) multiplied by the standard deviation (n-1).
The probability-adjusted density standard is the lower bound of the central 75% of the distribution of overall species density in the reference areas. Mathematically this is:

Mean reference area species density (no. of species per 100 sq.m.) - 1.15 s
(*Here the mean and standard deviation (s) is based on area weighted values if applicable)*

Note that this test addresses total species density, not just native species density (see Test D) below. Noxious weeds are omitted. The point of addressing total species density, including annual/biennial species and introduced species, is that the total species density is arguably a strong indication of the existence of niche spaces that could eventually be occupied by the native forb and woody plant species typical of the pre-mining plant communities.

The final step for the Test B assessment is a straight comparison of the mean total species density of the reclaimed area to the reference area-derived standard number (above). If the reclaimed area mean exceeds the standard, Test B is passed.

Alternative Test C): Species Density Distribution Assessment Among Lifeforms

This test relates to the distribution of species presence among the various lifeforms in comparison to the reference areas. This standard uses the Motyka similarity index to assess the resemblance of species density distribution by lifeform of the reclamation vegetation to that of the reference areas. Because the average internal resemblance (i.e. between-sample similarity) of applicable reference areas for species density data is often in the range of 70%, the standard is 63% (0.9 x 70%). The assessment of internal similarity was performed on data from the extended reference areas.

The Motyka similarity index is used as follows:

$$IS_{mo} = \frac{2c}{(a+b)}$$

Where:

c = the smaller of the paired species density values (for each lifeform) of the reclaimed and reference areas*
a = total of species density values for lifeforms of the reclaimed areas

b = total of species density values for the lifeforms of the reference area*

* Weighted average lifeform species density using the Seneca Reference Areas (weighted based on 24.4% aspen, 48.9% mountain brush, 24.0% sagebrush/snowberry, and 2.7% steep mountain brush).

Only species density by vascular plants are included. Lifeforms used include:

Annual/biennial forbs

Annual grasses

Perennial forbs

Perennial grasses and graminoids

If the index of similarity between the species density within the specified lifeforms of the reclaimed and reference areas exceeds 63%, then Test C is passed.

Alternative Test D): Native Species Presence Assessment

The third alternative assessment of the species diversity of reclaimed lands makes direct reference to the presence of native western North American plant species in reclaimed areas.

Total cumulative # of native species ≥ avg. reference area native species density (# species / 100 sq.m.)*

*in the cumulative presence data from 2 m x 50 m samples associated with the collection of a statistically adequate sample of the reclaimed area and including alfalfa and/or cicer milkvetch, which have often been included in seed mixes as nitrogen–fixers, due to the lack of suitable and available native nitrogen-fixers.

If the total cumulative number of native species in the reclamation sampling exceeds the average number of native species per 100 sq.m. in the weighted average of the reference area sampling, then Test D is passed.

5.0 RESULTS

5.1 *General*

Supporting documentation is provided in the appendices of this report. Sample data from 2022 are presented in Appendix A as Tables A-1 through A-12. Sample data from 2023 are presented in Appendix B as Tables B-1 through B-12. Sampling data are summarized in Appendix C as Tables C-1 through C-4. Graphs of vegetation and climate data are presented in Appendix D as Figures D-1a through D-9. The list of plant species observed during sampling (reclaimed and reference areas) is included in Appendix E. Seed mixes used in the reclamation areas are included for reference in Appendix F. Photographs of representative locations within the reclaimed and extended reference areas are included in Appendix G.

In the plant cover descriptions below, species discussed as present without contributing to cover were not "hit" during point-intercept sampling but were observed within one meter of either side of the 50 m sample transect line. Unless otherwise stated, all cover values reported below are for all-hit data. Percentages are rounded to one decimal place to facilitate discussion of the results.

5.2 Year 1 Results (2022)

5.2.1 Bond Release Block 6

(Photographs 1 through 32)

Cover

(Table A-1)

Cover data were collected at 32 samples in the BRB-6 during the 2022 evaluation. Native perennial cool season grasses, introduced perennial cool season grasses, and introduced perennial forbs were the predominant lifeforms observed, contributing similar amounts with 11.9 percent, 11.9 percent, and 10.3 percent to vegetation cover, respectively. Native perennial cool season grasses were predominately comprised of Western wheatgrass (*Pascopyrum smithii*, 9.1 percent). Introduced perennial cool season grasses were predominately comprised of intermediate wheatgrass (*Thinopyrum intermedium*, 7.9 percent) and smooth brome (2.5 percent). Introduced perennial forbs were comprised primarily of alfalfa (*Medicago sativa*, 9.5 percent). Five other lifeforms were present with similar amounts; Introduced annual and biennial forbs (5.2 percent), native shrubs (4.7 percent), and native perennial forbs (4.5 percent), native annual and biennial forbs (2.4 percent), and introduced annual grasses (1.8 percent).

The B-List noxious weeds hound's tongue (*Cynoglossum officinale*, 4.5 percent) and Canada thistle (*Cirsium arvense*, 0.2 percent) were present. Musk thistle (*Carduus nutans* ssp. *macrolepis*) was also

present without contributing to cover. The C-List noxious weeds bulbous bluegrass (0.5 percent), field bindweed (*Convolvulus arvensis*, 0.2 percent) and cheatgrass (*Bromus tectorum*, 0.03 percent) contributed similar amounts to cover.

Total average all-hit vegetation cover was 52.7 percent. Allowable all-hit herbaceous vegetation cover was 42.6 percent. Cover by standing dead, litter, bare soil and rock averaged 1.7, 27.4, 18.2, and 4.0 percent, respectively (first hit). Average species density was 23.6 species per 100m^2.

Production

(Table A-7)

Production data were collected at 32 samples in the BRB-6 during the 2022 evaluation. Total herbaceous production was 1,820.8 pounds per acre. Of this, 659.4 pounds were native perennial cool season grasses, 650.5 pounds were introduced perennial cool season grasses, 197.3 pounds were introduced perennial forbs, and 125.2 pounds were introduced annual and biennial forbs. Three other lifeforms followed; Native perennial forbs (92.7 pounds per acre), native annual and biennial forbs (77.8 pounds per acre) and introduced annual grasses (17.9 pound per acre). Allowable herbaceous production averaged 1,699.4 pounds per acre.

"Background" Density

(Table A-13)

Woody plant density data were collected at 32 samples in the BRB-6 "Background" area during the 2022 evaluation. Total density was 1,217.9 stems per acre comprised entirely of native shrubs. Native shrubs were comprised primarily of rubber rabbitbrush (*Ericameria nauseosa*, 443.9 stems per acre), silver sagebrush (*Artemisia cana*, 360.4 stems per acre) and big sagebrush (*Artemisia tridentata*, 341.5 stems per acre).

5.2.3 Aspen Extended Reference Area

(Photographs 33 through 40)

Cover

(Table A-2)

Cover data were collected at 17 samples in the Aspen ERA during the 2022 evaluation. Native perennial forbs were the predominant lifeform observed, contributing 42.5 percent to vegetation cover; followed by native shrubs (32.1 percent), native trees (25.2 percent), and native perennial cool season grasses (13.7 percent). Native perennial forbs were comprised of many species, with Pacific aster (*Symphyotrichum*

ascendens, 5.3 percent), and Colorado violet (*Viola scopulorum*, 4.2 percent) contributing the most to cover; followed by serrate groundsel (*Senecio serra,* 3.9 percent) and nettle-leaf giant hyssop (*Agastache urticifolia*, 3.7 percent). All other native perennial forb species were present with 2.2 percent cover or less. Native shrubs were predominately comprised of mountain snowberry (*Symphoricarpos rotundifolius*, 11.8 percent) and Saskatoon serviceberry (*Amelanchier alnifolia*, 9.8 percent). Native trees were predominately comprised of quaking aspen (*Populus tremuloides*, 25.1 percent). Native perennial cool season grasses were predominately comprised of Agassiz bluegrass (*Poa pratensis* ssp. *agassizensis*, 5.8 percent), elk sedge (*Carex geyeri*, 2.8 percent), mountain brome (*Bromus carinatus* var. *marginatus*, 2.7 percent), and blue wildrye (*Elymus glaucus*, 2.2 percent). Seven other lifeforms were also present; native fern (2.4 percent), introduced perennial cool season grasses (1.9 percent), introduced annual and biennial forbs (1.6 percent), native annual and biennial forbs (1.0 percent), introduced perennial forbs (0.8 percent), native vines (0.3 percent), and bryophytes (0.1 percent).

The B-List noxious weeds hound's tongue (1.1 percent), Canada thistle (0.5 percent), and musk thistle (0.1 percent) were present at low levels and the C-List noxious weed, common mullein (*Verbascum thapsus*), was present without contributing to cover.

Total average all-hit vegetation cover was 121.7 percent. Allowable all-hit herbaceous vegetation cover was 62.2 percent. Cover by standing dead, litter, bare soil and rock averaged 0.6, 13.4, 3.4, and 0.0 percent, respectively (first hit). Average species density was 30.5 species per 100m^2.

Production

(Table A-8)

Production data were collected at 32 samples in the Aspen ERA during the 2022 evaluation. Total herbaceous production was 961.9 pounds per acre. Of this, 642.9 pounds were native perennial forbs and 206.2 pounds were native perennial cool season grasses; followed by native ferns (40.3 pounds per acre) and introduced perennial cool season grasses (39.6 pounds per acre). Three other lifeforms were present, each with 20.9 pounds per acre or less. Allowable herbaceous production averaged 951.2 pounds per acre.

5.2.4 Mountain Brush Extended Reference Area

(Photographs 41 through 48)

Cover

(Table A-3)

Cover data were collected at 15 samples in the Mountain Brush ERA in 2022. Native shrubs were the predominant lifeform observed, contributing 76.1 percent to all-hit vegetation cover. Of this, Gambel's oak (*Quercus gambelii*) contributed 43.8 percent, mountain snowberry contributed 16.9 percent, and Saskatoon serviceberry contributed 7.8 percent. Native perennial cool season grasses (18.8 percent) and native perennial forbs (12.3 percent) made similar contributions to cover. Native perennial cool season grasses were predominantly comprised of elk sedge (10.2 percent). Native perennial forbs were comprised of several species, with no overwhelming dominant. Five other lifeforms were also present; introduced annual and biennial forbs (1.5 percent), native annual and biennial forbs (1.2 percent), introduced perennial cool season grasses (0.9 percent), introduced annual grasses (0.1 percent), and introduced perennial forbs (0.1 percent).

The B-List noxious weed hound's tongue contributed 0.6 percent to cover while musk thistle was present without contributing to cover.

Total average all-hit vegetation cover was 111.0 percent. Allowable all-hit herbaceous vegetation cover was 34.1 percent. Cover by standing dead, litter, bare soil, and rock averaged 1.1, 14.7, 6.1, and 0.1 percent, respectively (first hit). Average species density was 27.2 species per 100m^2.

Production

(Table A-9)

Production data were collected at 32 samples in the Mountain Brush ERA during the 2022 evaluation. Total herbaceous production was 426.3 pounds per acre. Of this, 271.8 pounds were native perennial cool season grasses, and 132.3 pounds were native perennial forbs. Three other lifeforms were present, each with 15.8 pounds per acre or less. Allowable herbaceous production averaged 419.6 pounds per acre.

5.2.5 Sagebrush/Snowberry Extended Reference Area

(Photographs 49 through 56)

Cover

(Table A-4)

Cover data were collected at 18 samples in the Sagebrush ERA in 2022. Native shrubs were the predominant lifeform observed, contributing 40.3 percent vegetation cover. Of this, big sagebrush contributed 22.6 percent and mountain snowberry contributed 13.6 percent to cover. Native perennial forbs (15.1 percent) and native perennial cool season grasses (12.6 percent) followed with similar amounts. Native perennial forbs were comprised of several species with no overwhelming dominant; Western yarrow (*Achillea millefolium*) contributed the greatest amount with 2.2 percent. Native perennial cool season grasses were comprised of several species, with no overwhelming dominant; Agassiz bluegrass (2.7 percent) and bluebunch wheatgrass (*Pseudoroegneria spicata* ssp. *spicata*, 2.3 percent) contributed the greatest amounts. Five other lifeforms were also present; introduced annual grasses (1.7 percent), introduced perennial cool season grasses (1.6 percent), native annual and biennial forbs (1.3 percent), introduced annual and biennial forbs (0.9 percent), and introduced perennial forbs (0.1 percent).

The B-List noxious weed hound's tongue contributed 0.1 percent to cover while musk thistle was present without contributing to cover. The C-List noxious weed cheatgrass was also present without contributing to cover.

Total average all-hit vegetation cover was 73.6 percent. Allowable all-hit herbaceous vegetation cover was 32.5 percent. Cover by standing dead, litter, bare soil and rock averaged 4.3, 21.1, 11.6, and 0.4 percent, respectively (first hit). Average species density was 28.6 species per 100m^2.

Production

(Table A-10)

Production data were collected at 32 samples in Sagebrush ERA during the 2022 evaluation. Total herbaceous production was 472.6 pounds per acre. Of this, 213.4 pounds were native perennial forbs, 180.3 pounds were native perennial cool season grasses, and 40.5 pounds were native annual and biennial forbs. Three other lifeforms were present, each with 16.5 pounds per acre or less. Allowable herbaceous production averaged 440.1 pounds per acre.

5.2.6 Steep Mountain Brush Extended Reference Area

(Photographs 57 through 64)

Cover

(Table A-5)

Cover data were collected at 18 samples in the Steep Mountain Brush ERA in 2022. Native shrubs (15.7 percent), native perennial cool season grasses (10.8 percent), and introduced annual grasses (10.6 percent) were the predominant lifeforms observed. Native shrubs were comprised primarily of big sagebrush (7.2 percent). Native perennial cool season grasses were comprised primarily of bluebunch wheatgrass (5.6 percent). Introduced annual grasses were comprised primarily of Japanese brome (*Bromus arvensis*, 8.1 percent). Introduced annual grasses and native perennial forbs followed with 8.1 percent and 4.8 percent cover, respectively. Introduced annual grasses were comprised primarily of Japanese brome (*Bromus arvensis*, 6.4 percent). Introduced annual and biennial forbs (5.1 percent) and native perennial forbs (3.9 percent) followed with similar amounts. Four other lifeforms were also present; introduced perennial cool season grasses (1.3 percent), native annual and biennial forbs (0.2 percent), native sub-shrubs (0.1 percent), and lichens (0.1 percent).

The B-List noxious weed hound's tongue was present without contributing to cover. The C-List noxious weed cheatgrass contributed 2.5 percent to cover while bulbus bluegrass (*Poa bulbosa*) was present without contributing to cover.

Total average all-hit vegetation cover was 47.7 percent. Allowable all-hit herbaceous vegetation cover was 20.5 percent. Cover by standing dead, litter, bare soil and rock averaged 2.1, 15.6, 30.4, and 10.4 percent, respectively (first hit). Average species density was 23.7 species per $100m^2$.

Production

(Table A-11)

Production data were collected at 32 samples in the Steep Mountain Brush ERA during the 2022 evaluation. Total herbaceous production was 516.0 pounds per acre. Of this, 180.0 pounds were native perennial cool season grasses, 133.8 pounds were introduced annual and biennial forbs, 118.1 pounds were introduced annual grasses, and 78.3 pounds were native perennial forbs. Two other lifeforms were present, each with 4.6 pounds per acre or less. Allowable herbaceous production averaged 309.6 pounds per acre.

5.2.6 Western Wheat/Alkali Sagebrush Extended Reference Area

(Photographs 65 through 72)

Cover

(Table A-6)

Cover data were collected at 24 samples in the Western Wheat ERA in 2022. Native perennial cool season grasses (18.3 percent), native perennial forbs (12.4 percent), and native shrubs (11.6 percent) were the predominant lifeform observed. Native perennial cool season grasses were comprised of several species, with Sandburg bluegrass (*Poa secunda*, 4.7 percent) and Junegrass (*Koeleria macrantha*, 4.2 percent) contributed the greatest amounts. Native perennial forbs were comprised of several species with weedy milkvetch (*Astragalus miser* var. *oblongifolius*, 3.0 percent) and mule's ear (*Wyethia amplexicaulis*, 2.4 percent). Native shrubs were comprised primarily of big sagebrush (2.9 percent) and alkali sagebrush (*Artemisia arbuscula* ssp. *longiloba*, 2.9 percent). Six other lifeforms were also present; introduced annual grasses (4.2 percent), introduced annual and biennial forbs (3.3 percent), native annual and biennial forbs (2.8 percent), introduced perennial cool season grasses (2.7 percent), introduced perennial forbs (0.3 percent), and bryophytes (0.04 percent).

The B-List noxious weed dalmation toadflax (*Linaria genistifolia* ssp. *dalmatica*) and hound's tongue were present without contributing to cover. The C-List noxious weed bulbus bluegrass contributed 0.04 percent to cover.

Total average all-hit vegetation cover was 55.7 percent. Allowable all-hit herbaceous vegetation cover was 38.4 percent. Cover by standing dead, litter, bare soil and rock averaged 1.3, 26.6, 22.1, and 0.5 percent, respectively (first hit). Average species density was 26.6 species per 100m^2.

Production

(Table A-12)

Production data were collected at 32 samples in the Western Wheat ERA during the 2022 evaluation. Total herbaceous production was 728.5 pounds per acre. Of this, 228.6 pounds were native perennial cool season grasses, 219.8 pounds were native perennial forbs, 103.2 pounds were introduced annual grasses, 69.8 pounds were introduced perennial cool season grasses, 56.7 pounds were introduced annual and biennial forbs, and 49.0 pounds were native annual and biennial forbs. Introduced perennial forbs were also present with 1.4 pounds per acre. Allowable herbaceous production averaged 573.5 pounds per acre.

5.3 Year 2 Results (2023)

5.3.2 BOND RELEASE BLOCK 6

(Photographs 73 through 104)

Cover

(Table B-1)

Cover data were collected at 32 samples in the BRB-6 during the 2023 evaluation. Introduced perennial cool season grasses were the predominant lifeform observed, contributing 21.9 percent to vegetation cover; followed closely by native perennial cool season grasses (15.8 percent). Introduced perennial cool season grasses were predominately comprised of intermediate wheatgrass (13.1 percent) and smooth brome (5.1 percent). Native perennial cool season grasses were predominately comprised of Western wheatgrass (10.3 percent). Introduced annual and biennial forbs (8.3 percent) and introduced perennial forrbs (7.6 percent) contributed similar amounts to cover. Introduced annual and biennial forbs were comprised of several species, with yellow sweetclover (*Melilotus officinalis*, 3.8 percent) contributing the greatest amount. Introduced perennial forbs were comprised primarily of alfalfa (7.1 percent). Six other lifeforms were also present; native perennial forbs (3.2 percent), native shrubs (3.1 percent), introduced annual grasses (2.3 percent), native annual and biennial forbs (1.1 percent), and native sub-shrubs and bryophytes which were each present without contributing to cover.

The B-List noxious weeds hound's tongue (0.1 percent) and Canada thistle (0.03 percent) were also present. The C-List noxious weeds bulbous bluegrass (0.4 percent) and field bindweed (*Convolvulus arvensis*, 0.03 percent).

Total average all-hit vegetation cover was 63.3 percent. Allowable all-hit herbaceous vegetation cover was 53.5 percent. Cover by standing dead, litter, bare soil and rock averaged 1.3, 26.2, 11.4, and 2.7 percent, respectively (first hit). Average species density was 18.2 species per 100m^2.

Production

(Table B-7)

Production data were collected at 32 samples in the BRB-6 during the 2023 evaluation. Total herbaceous production was 1,641.2 pounds per acre. Of this, 1,133.3 pounds were native perennial cool season grasses, 259.0 pounds were native perennial cool season grasses, 114.6 pounds were introduced annual and biennial forbs, and 82.0 pounds were introduced perennial forbs. Three other lifeforms contributed to total production, each with 36.5 pounds or less. Allowable herbaceous production averaged 1,559.5 pounds per acre.

"Background" Density

(Table B-15)

Woody plant density data were collected at 32 samples in the BRB-6 "Background" area during the 2023 evaluation. Total density was 1,025.6 stems per acre, predominantly comprised of native shrubs (1,015.5 stems per acre). Of which, big sagebrush (366.8 stems per acre), silver sagebrush (294.7 stems per acre), and rubber rabbitbrush (284.6 stems per acre) were the predominant species. Native sub-shrubs (10.1 stems per acre) were comprised entirely of snakeweed (*Gutierrezia sarothrae*).

5.3.3 Aspen Extended Reference area

(Photographs 105 through 112)

Cover

(Table B-2)

Cover data were collected at 18 samples in the Aspen ERA during the 2023 evaluation. Native shrubs were the predominant lifeform observed, contributing 60.5 percent to vegetation cover; followed by native perennial forbs (48.4 percent), native trees (19.6 percent), and native perennial cool season grasses (14.6 percent). Native shrubs were predominately comprised of Saskatoon serviceberry (17.5 percent), mountain snowberry (15.0 percent), and Rocky Mountain maple (9.1 percent). Native perennial forbs were comprised of several species, with bracted aster (*Aster foliaceus*, 9.8 percent) and sweet cicely (*Osmorhiza chilensis*, 5.5 percent) contributing the most to cover. Native trees were comprised primarily of quaking aspen (19.2 percent). Native perennial cool season grasses were predominately comprised of elk sedge (5.7 percent) and blue wildrye (4.7 percent). Six other lifeforms were also present; introduced perennial cool season grasses (4.7 percent), native ferns (1.3 percent), native annual and biennial forbs (1.2 percent), introduced annual and biennial forbs (0.5 percent), introduced perennial forbs (0.1 percent), and bryophytes (0.1 percent).

The B-List noxious weeds hound's tongue (0.4 percent), bull thistle (*Cirsium vulgare*, 0.1 percent), and Canada thistle (0.1 percent) were also present.

Total average all-hit vegetation cover was 150.8 percent. Allowable all-hit herbaceous vegetation cover was 70.2 percent. Cover by standing dead, litter, bare soil and rock averaged 0.6, 7.4, 3.6, and 0.1 percent, respectively (first hit). Average species density was 32.1 species per $100m^2$.

Production

(Table B-8)

Production data were collected at 32 samples in the Aspen ERA during the 2023 evaluation. Total herbaceous production was 643.3 pounds per acre. Of this, 409.7 pounds were native perennial forbs, 138.9 pounds were introduced perennial cool season grasses, 84.1 pounds were native perennial cool season grasses. Three other lifeforms were present, each with 9.5 pounds per acre or less. Allowable herbaceous production averaged 640.2 pounds per acer.

5.3.4 Mountain Brush Extended Reference Area

(Photographs 113 through 120)

Cover

(Table B-3)

Cover data were collected at 15 samples in the Mountain Brush ERA in 2023. Native shrubs were the predominant lifeform observed, contributing 60.9 percent all-hit vegetation cover, followed by native perennial cool season grasses (17.5 percent) and native perennial forbs (17.1 percent). Native shrubs were comprised primarily of Gambel's oak (28.1 percent) and mountain snowberry (20.1 percent). Native perennial forbs and native perennial cool season grasses made contributions to cover, with 21.7 percent and 19.5 percent, respectively. Native perennial cool season grasses were predominantly comprised of elk sedge (9.3 percent) and Agassiz bluegrass (3.5 percent). Native perennial forbs were comprised of several species, with James starwort (*Pseudostellaria jamesiana*, 5.3 percent) contributing the greatest amount. Six other lifeforms were also present; introduced annual grasses (1.9 percent), native annual and biennial forbs (1.8 percent), with introduced perennial cool season grasses (0.9 percent), introduced annual and biennial forbs (0.5 percent), with introduced perennial forbs and bryophytes present without contributing to cover.

The B-List noxious weed hound's tongue (0.1 percent) and the C-List noxious weed cheatgrass (0.7 percent) were also present.

Total average all-hit vegetation cover was 100.5 percent. Allowable all-hit herbaceous vegetation cover was 38.7 percent. Cover by standing dead, litter, bare soil, and rock averaged 1.8, 15.3, 6.5, and 0.3 percent, respectively (first hit). Average species density was 28.1 species per $100m^2$.

Production

(Table B-9)

Production data were collected at 32 samples in the Mountain Brush ERA during the 2023 evaluation. Total herbaceous production was 461.4 pounds per acre. Of this, 224.7 pounds were native perennial

cool season grasses, 185.4 pounds were native perennial forbs. Five other lifeforms were present, each with 16.9 pounds per acre or less. Allowable herbaceous production averaged 439.4 pounds per acre.

5.3.5 Sagebrush/Snowberry Extended Reference Area

(Photographs 121 through 128)

Cover

(Table B-4)

Cover data were collected at 18 samples in the Sagebrush ERA in 2023. Native shrubs were the predominant lifeform observed, contributing 44.9 percent vegetation cover. Of this, mountain snowberry contributed 21.2 percent and big sagebrush contributed 20.2 percent to cover. Native perennial forbs (21.5 percent) and native perennial cool season grasses (16.0 percent) followed. Native perennial forbs were comprised of several species with silver lupine (Lupinus argenteus, 3.7 percent), Western yarrow (2.5 percent), and James starwort (2.0 percent) contributing the greatest amounts. Native perennial cool season grasses were comprised of several species, with bluebunch wheatgrass (4.5 percent) contributing the greatest amount. Five other lifeforms were also present; introduced perennial cool season grasses (4.3 percent), introduced annual grasses (2.2 percent), introduced annual and biennial forbs (1.9 percent), native annual and biennial forbs (1.7 percent), and introduced perennial forbs (0.1 percent).

The B-List noxious weed hound's tongue (0.2 percent) was present at a low level and the C-List noxious weed cheatgrass was present without contributing to cover.

Total average all-hit vegetation cover was 92.6 percent. Allowable all-hit herbaceous vegetation cover was 46.1 percent. Cover by standing dead, litter, bare soil and rock averaged 3.9, 13.1, 4.8, and 0.4 percent, respectively (first hit). Average species density was 23.9 species per $100m^2$.

Production

(Table B-10)

Production data were collected at 32 samples in Sagebrush ERA during the 2023 evaluation. Total herbaceous production was 722.8 pounds per acre. Of this, 288.6 pounds were native perennial cool season grasses, 274.5 pounds were native perennial forbs, and 138.1 pounds were introduced perennial cool season grasses. Four other lifeforms were present, each with 9.7 pounds per acre or less. Allowable herbaceous production averaged 713.1 pounds per acre.

5.3.6 Steep Mountain Brush Extended Reference Area

(Photographs 129 through 136)

Cover

(Table B-5)

Cover data were collected at 15 samples in the Steep Mountain Brush ERA in 2023. Native shrubs were the predominant lifeform observed, contributing 22.9 percent vegetation cover. Of this, big sagebrush contributed 8.9 percent, Gambel's oak contributed 3.2 percent, Saskatoon serviceberry contributed 2.8 percent, bitter brush contributed 2.4 percent, and mountain snowberry contributed 2.2 percent to cover. Native perennial cool season grasses also made a strong contribution to cover, with 18.5 percent, comprised primarily of bluebunch wheatgrass (12.5 percent). Introduced annual grasses (7.1 percent), native perennial forbs (5.3 percent), and introduced annual and biennial forbs (5.2 percent) followed with similar amounts. Introduced annual grasses were comprised primarily of Japanese brome (6.3 percent). Native perennial forbs were comprised of several species, with arrowleaf balsamroot (*Balsamorhiza sagittate*, 2.1 percent) contributing the most to cover. Introduced annual and biennial forbs were comprised primarily of alyssum (*Alyssum parviflorum*, 3.9 percent). Four other lifeforms were also present; introduced perennial cool season grasses (0.6 percent), native sub-shrubs (0.4 percent), native annual and biennial forbs (0.2 percent), with introduced perennial forbs present without contributing to cover.

The C-List noxious weed cheatgrass contributed 0.8 percent to cover.

Total average all-hit vegetation cover was 60.3 percent. Allowable all-hit herbaceous vegetation cover was 29.9 percent. Cover by standing dead, litter, bare soil and rock averaged 1.7, 14.9, 19.9, and 8.5 percent, respectively (first hit). Average species density was 18.2 species per $100m^2$.

Production

(Table B-11)

Production data were collected at 32 samples in the Steep Mountain Brush ERA during the 2023 evaluation. Total herbaceous production was 666.8 pounds per acre. Of this, 510.6 pounds were native perennial cool season grasses, and 107.9 pounds were native perennial forbs. Four other lifeforms were present, each with 34.5 pounds per acre or less. Allowable herbaceous production averaged 631.7 pounds per acre. Allowable herbaceous production averaged 631.7 pounds per acre.

5.3.7 Western Wheat/Alkali Sagebrush Extended Reference Area

(Photographs 137 through 144)

Cover

(Table B-6)

Cover data were collected at 16 samples in the Western Wheat ERA in 2023. Native perennial cool season grasses were the predominant lifeform observed, contributing 26.9 percent vegetation cover. Of this, Western wheatgrass was the dominant species contributing 14.6 percent to cover. Native perennial forbs (15.6 percent) and introduced annual grasses (7.6 percent), and native shrubs (6.2 percent) followed. Native perennial forbs were comprised of several species, with weedy milkvetch (4.0 percent) contributing the greatest amount. Introduced annual grasses were comprised entirely of Japanese brome. Native shrubs were comprised predominately of big sagebrush (4.3 percent). Four other lifeforms were also present; native annual and biennial forbs (5.2 percent), introduced annual and biennial forbs (4.6 percent), introduced perennial cool season grasses (1.4 percent), introduced perennial forbs (0.2 percent), and native succulents which were present without contributing to cover.

The B-List noxious weeds hound's tongue were present without contributing to cover.

Total average all-hit vegetation cover was 67.6 percent. Allowable all-hit herbaceous vegetation cover was 50.5 percent. Cover by standing dead, litter, bare soil and rock averaged 0.8, 22.4, 14.2, and 0.2 percent, respectively (first hit). Average species density was 21.4 species per $100m^2$.

Production

(Table B-12)

Production data were collected at 32 samples in the Western Wheat ERA during the 2023 evaluation. Total herbaceous production was 477.1 pounds per acre. Of this, 222.1 pounds were native perennial cool season grasses, and 182.4 pounds were introduced perennial forbs. Five other lifeforms were present, each with 25.3 pounds per acre or less. Allowable herbaceous production averaged 443.4 pounds per acre.

6.0 DISCUSSION

6.1 Sample Adequacy Calculations

In 2022, sample adequacy based on all-hit allowable herbaceous cover was achieved in all areas. All areas also achieved sample adequacy based on total all-hit cover. In 2023, sample adequacy based on all-hit allowable herbaceous cover was achieved in all areas except the Steep Mountain Brush ERA. All areas achieved sample adequacy based on total all-hit cover. For this reason, upward adjustment was not needed in 2022, but was calculated for the Steep Mountain Brush ERA mean in 2023. Examples of the detailed calculation used for allowable herbaceous cover (all-hit) in each area are provided in Appendix H as Tables H-1 and H-2 along with the calculations for the upward adjustment.

In 2022, sample adequacy based on allowable herbaceous production was achieved in the Mountain Brush EREA, while all other areas failed to demonstrate the minimum sample size necessary to detect a 10% reduction in the mean with 90% confidence. All areas failed to demonstrate sample adequacy when calculations are based on total production. In 2023, sample adequacy based on allowable herbaceous production was not achieved in any area. The same results were achieved when sample adequacy calculations were based on total production. Examples of the detailed calculations used for allowable herbaceous production in each area are provided in Appendix I as Tables I-1 and I-2.

In 2022, sample adequacy based on total woody plant density was not achieved in the "background" shrub density area. These same results were achieved in 2023.

6.2 Bond Release Block 6 (2022-2023)

Table 2 and Table 4 below demonstrate a quick summary of the bond release evaluation conducted during the 2022 and 2023 Phase III Bond Release Evaluation of BRB-6.

Table 2. 2022 Assessment of the BRB-6 for Compliance with Phase III Performance Standards

Parameter	Mean Allowable BRB-6	Success Standard	Sample Size	Sample Adequacy Met	Testing Result	Method or Rule
Cover (%)	42.6	31.9	32	Yes	PASS	Direct Comparison, Rule 4.15.11 (2)(a)
Production (lbs/acre)	1,699.4	437.8	32	No	PASS	One sample t-test of the "reverse null" hypothesis, Rule 4.15.11 (2)(C)
Woody Plant Density						
Mandatory Standard 1 (stems/acre)	1,217.9	180.0	32	No	PASS	Non-parametric L-test, Rule 4.15.11 (3)(a)
Species Diversity						
Test A (%)	18.1	60.0	32	Yes	PASS	No single species will comprise greater than 60% relative cover
Test B (species/100m^2)	23.4	20.6	32	Yes	PASS	The BRB must exceed the probability-adjusted density standard
Test C (%)	81.00	63.00	32	Yes	PASS	The BRB must exceed the similarity of the species density by life form standard
Test D (Number of Species vs. species/100m^2)	31.0	22.8	32	Yes	PASS	Total cumulative # of native species > or = avg ref area native species density (# species/100 sq.m.)

When a t-test was used to demonstrate revegetation success, the data were first evaluated for normality using the Shapiro-Francia test. These results are summarized in Table 3 below.

Table 3. 2022 BRB-6 Normality Success Summary

Parameter	Data Transformation Performed[1]	Mean Allowable BRB-6	Success Standard[2]	Sample Size	Calculated "W"	Critical "W"	Testing Results
Cover (%)	Not Applicable - hypothesis testing was not required						
Production (lbs/acre)	No	1,699.4	437.8	32	0.925	0.919	PASS
Woody Plant Density							
Mandatory Standard 1 (stems/acre)	Not Applicable - hypothesis testing by non-parametric L-test						

[1] Individual sample data were subjected to square root transformation to produce a normal data set when necessary. The transformation is also applied to performance standards.

Table 4. 2023 Assessment of the BRB-6 for Compliance with Phase III Performance Standards

Parameter	Mean Allowable BRB-6	Success Standard	Sample Size	Sample Adequacy Met	Testing Result	Method or Rule
Cover (%)	53.5	40.5	32	Yes	PASS	Direct Comparison, Rule 4.15.11 (2)(a)
Production (lbs/acre)	1,559.5	514.9	32	No	PASS	One sample t-test of the "reverse null" hypothesis, Rule 4.15.11 (2)(C)
Woody Plant Density						
Mandatory Standard 1 (stems/acre)	1,025.6	180.0	32	No	PASS	One sample t-test of the "reverse null" hypothesis, Rule 4.15.11 (2)(C)
Species Diversity						
Test A (%)	20.7	60.0	32	Yes	PASS	No single species will comprise greater than 60% relative cover
Test B (species/100m^2)	18.2	18.7	32	Yes	FAIL	The BRB must exceed the probability-adjusted density standard
Test C (%)	79.00	63.00	32	Yes	PASS	The BRB must exceed the similarity of the species density by life form standard
Test D (Number of Species vs. species/100m^2)	46.0	21.9	32	Yes	PASS	Total cumulative # of native species > or = avg ref area native species density (# species/100 sq.m.)

When a t-test was used to demonstrate revegetation success, data were first evaluated for normality using the Shapiro-Francia test. These results are summarized in Table 5 below.

Table 5. 2023 BRB-6 Normality Success Summary

Parameter	Data Transformation Performed[1]	Mean Allowable BRB-5	Success Standard[2]	Sample Size	Calculated "W"	Critical "W"	Testing Results
Cover (%)	Not Applicable - hypothesis testing was not required						
Production (lbs/acre)	Yes	37.2	19.7	32	0.940	0.919	PASS
Woody Plant Density							
Mandatory Standard 1 (stems/acre)	Yes	21.7	13.4	32	0.930	0.919	PASS

[1] Individual sample data were subjected to square root transformation to produce a normal data set when necessary. The transformation is also applied to performance standards.

6.2.1 COVER SUCCESS

Calculation of 90 percent of the weighted cover performance standard appropriate for 2022 comparison to the BRB-6 is demonstrated below.

Aspen ERA Allowable All-Hit Herbaceous Cover[1] = 62.2%

Mountain Brush ERA Allowable All-Hit Herbaceous Cover[1] = 34.1%

Sagebrush/Snowberry ERA Allowable All-Hit Herbaceous Cover[1] = 32.5%

Steep Mountain Brush ERA Allowable All-Hit Herbaceous Cover[1] = 20.5%

Western Wheat ERA Allowable All-Hit Herbaceous Cover[1] = 38.4%

[1] Herbaceous cover adjusted by subtracting noxious weeds and annual/biennial plant cover in excess of 10% of the remainder.

90 percent of the area weighted Cover Standard =

0.90* [0.110(62.2%) + 0.345(34.1%) + 0.313(32.5%) + 0.128(20.5%) + 0.104(38.4%)] = 31.9%

Calculation of 90 percent of the weighted cover performance standard appropriate for 2023 comparison to the BRB-6 is demonstrated below.

Aspen ERA Allowable All-Hit Herbaceous Cover[1] = 70.1%

Mountain Brush ERA Allowable All-Hit Herbaceous Cover[1] = 38.7%

Sagebrush/Snowberry ERA Allowable All-Hit Herbaceous Cover[1] = 46.1%

Steep Mountain Brush ERA Allowable All-Hit Herbaceous Cover[1] = 33.8% (upward adj. from 29.9%)

Western Wheat ERA Allowable All-Hit Herbaceous Cover[1] = 50.5%

[1] Herbaceous cover adjusted by subtracting noxious weeds and annual/biennial plant cover in excess of 10% of the remainder.

90 percent of the area weighted Cover Standard =

0.90* [0.110(70.1%) + 0.345(38.7%) + 0.313(46.1%) + 0.128(33.8%) + 0.104(50.5%)] = 40.5%

In 2022, the mean allowable all-hit herbaceous vegetation cover sampled in the BRB-6 was 42.6 percent, exceeding 90 percent of the area weighted cover performance standard (31.9%) (see also Figure D-1a,

Table C-1). This direct comparison of reclaimed area mean to standard is allowed under DRMS rules (CDMG 2010 revised rule, 4.15.11 (2)(a)) when sample adequacy has been demonstrated for the reclaimed area.

In 2023, the mean allowable all-hit herbaceous vegetation cover sampled in the BRB-6 was 53.5 percent, exceeding 90 percent of the area weighted cover performance standard (40.5%) (see also Figure D-1a, Table C-1). This direct comparison of reclaimed area mean to standard is allowed under DRMS rules (CDMG 2010 revised rule, 4.15.11 (2)(a)) when sample adequacy has been demonstrated for the reclaimed area.

Thus, successful revegetation with respect to allowable all-hit herbaceous cover is demonstrated in 2022 and 2023.

6.2.2 PRODUCTION SUCCESS

Calculation of 90 percent of the production performance standard appropriate for the 2022 comparison to the BRB-6 is demonstrated below.

Aspen ERA Allowable Herbaceous Production[1] = 951.2 lbs/acre
Mountain Brush ERA Allowable Herbaceous Production[1] = 419.6 lbs/acre
Sagebrush/Snowberry ERA Allowable Herbaceous Production[1] = 440.1 lbs/acre
Steep Mountain Brush ERA Allowable Herbaceous Production[1] = 309.5 lbs/acre
Western Wheat ERA Allowable All-Hit Herbaceous Cover[1] = 573.5 lbs/acre

[1] Herbaceous production adjusted by subtracting annual/biennial plant production in excess of 10% of the remainder. Production by noxious weed species is not collected.

90 percent of the area weighted production standard for 2022 =
0.90* [0.110(951.2) + 0.345(419.6) + 0.313(440.1) + 0.128(309.5) + 0.104(573.5)] = 437.8 lbs/acre

Calculation of 90 percent of the production performance standard appropriate for the 2023 comparison to the BRB-6 is demonstrated below.

Aspen ERA Allowable Herbaceous Production[1] = 640.2 lbs/acre
Mountain Brush ERA Allowable Herbaceous Production[1] = 439.4 lbs/acre
Sagebrush/Snowberry ERA Allowable Herbaceous Production[1] = 713.0 lbs/acre
Steep Mountain Brush ERA Allowable Herbaceous Production[1] = 631.7 lbs/acre
Western Wheat ERA Allowable All-Hit Herbaceous Cover[1] = 443.4 lbs/acre

[1] Herbaceous production adjusted by subtracting annual/biennial plant production in excess of 10% of the remainder. Production by noxious weed species is not collected.

90 percent of the area weighted production standard for 2023 =
0.90* [0.110(640.2) + 0.345(439.4) + 0.313(713.0) + 0.128(631.7) + 0.104(443.4)] = 514.9 lbs/acre

In 2023, the mean allowable herbaceous production sampled in the BRB-6 was 1,699.4 pounds per acre, exceeding 90 percent of the production performance standard (437.8 pounds per acre) (see also Figure D-2, Table C-1). Since the performance standard has been exceeded and a minimum of 30 samples were collected without demonstrating sample adequacy (Table C-4), reclamation success for BRB-6 has been demonstrated by passing a one sample t-test of the "reverse null" hypothesis (CDMG 2010 revised rule, 4.15.11 (2)(c)). The BRB-6 production data were first evaluated for normality using the Shapiro-Francia test. Based on the allowable herbaceous production data, the normality test was passed.

A one-sample t-test of the "reverse null" hypothesis of the assertion that the 2022 BRB-6 total allowable herbaceous production (pounds per acre) is indistinguishable from 90% of the area-weighted standard derived from the Extended Reference Areas (see formula in section 4.3.1 above).

Since critical t_t = 0.853 (one-tailed table value, alpha = 0.2, 32-1 df) is exceeded by t_{calc} (6.865), the hypothesis of no difference is rejected and reclamation success for 2022 BRB-6 production under Phase III is demonstrated.

In 2023, the mean allowable herbaceous production sampled in the BRB-6 was 1,559.5 pounds per acre, exceeding 90 percent of the production performance standard (514.9 pounds per acre) (see also Figure D-2, Table C-1). Since the performance standard has been exceeded and a minimum of 30 samples were collected without demonstrating sample adequacy (Table C-4), reclamation success for BRB-6 has been demonstrated by passing a one sample t-test of the "reverse null" hypothesis (CDMG 2010 revised rule, 4.15.11 (2)(c)). The BRB-6 production data were first evaluated for normality using the Shapiro-Francia test. Based on the square root transformation applied to the allowable herbaceous production data, the normality test was passed.

A one-sample t-test of the "reverse null" hypothesis of the assertion that the 2023 BRB-6 total allowable herbaceous production (pounds per acre) is indistinguishable from 90% of the area-weighted standard derived from the Extended Reference Areas (see formula in section 4.3.1 above). It should be noted that the t-test was conducted for both allowable herbaceous production and transformed data, with the same results.

Since critical t_t = 0.853 (one-tailed table value, alpha = 0.2, 32-1 df) is exceeded by t_{calc} (5.333), the hypothesis of no difference is rejected and reclamation success for 2023 BRB-6 production under Phase III is demonstrated. Testing the transformed data demonstrates this same result (t_{calc} is 9.127).

Thus, successful revegetation with respect to allowable herbaceous production is demonstrated in 2022 and 2023.

6.2.3 Woody Plant Density Success

"Background" Density

In 2022, the 1,217.9 stems per acre observed in the Background area exceeds 180 stems per acre (90 percent of the 200 stems per acre mandatory performance standard 1) (see also Figure D-3a, Table C-1). Since the performance standard has been exceeded and a minimum of 30 samples were collected without demonstrating sample adequacy (Table C-4), reclamation success for BRB-6 has been demonstrated by passing a non-parametric rank-order "L" test (CDMG 2010 revised rule, Rule 4.15.11 (3)(a)).

The L-order statistic (lower 80% confidence interval) = 14.118
L-value (Lower 80% confidence limit for BRB-6 median) = rank value 14+11.8% of Rank 15-Rank 14 = 288.1 stems per acre
70% of the performance standard = 140 stems per acre

Since L-value (288.1 stems per acre) exceeds 70% of the standard (140 stems per acre), the test has passed and reclamation success for 2022 BRB-6 Background WPD under Phase III is demonstrated.

In 2023, the 1,025.6 stems per acre observed in the Background area exceeds 180 stems per acre (90 percent of the 200 stems per acre mandatory performance standard 1) (see also Figure D-3a, Table C-1). Since the performance standard has been exceeded and a minimum of 30 samples were collected without demonstrating sample adequacy (Table C-4), reclamation success for Phase III BRB-6 has been demonstrated by passing a one sample t-test of the "reverse null" hypothesis (CDMG 2010 revised rule, 4.15.11 (2)(c)). The BRB-6 background WPD data were first evaluated for normality using the Shapiro-Francia test. Based on the square root transformation of the total WPD data; the normality test was passed.

A one-sample t-test of the "reverse null" hypothesis of the assertion that the 2023 BRB-6 background WPD area (stems per acre) is indistinguishable from 90% of the area-weighted standard derived from the Mandatory Shrub Standard 1 (see formula in section 4.3.1 above). It should be noted that the t-test was conducted for both total density and transformed data, with the same results.

Since critical t_t = 0.853 (one-tailed table value, alpha = 0.2, 32-1 df) is exceeded by t_{calc} (2.316), the hypothesis of no difference is rejected and reclamation success for 2023 BRB-6 Background WPD is demonstrated.

Thus, successful revegetation with respect to mandatory shrub standard 1 is demonstrated in 2022 and 2023. The mine wide performance standard (mandatory standard 2) was achieved during previous bond release evaluations.

6.2.4 Species Diversity and Composition Success

With regard to Mandatory Test **A**, that no single species comprise greater than 60% relative cover in the BRB-6. Table J-1 shows that the most abundant single species was Alfalfa with 18.1% relative all-hit cover in 2022 and intermediate wheatgrass with 20.7% relative all-hit cover in 2023, far below the 60% threshold of concern.

Hence **Mandatory Test A is passed** for 2022 and 2023 data.

With regard to Alternative Test **B**, the Total Species Density test the following is calculated for the BRB-6 (Table J-2):

2022 Mean Species density (area-weighted, without noxious species) in the 5 reference areas = 26.9 species per 100 m^2.

2023 Mean Species density (area-weighted, without noxious species) in the 5 reference areas = 24.5 species per 100 m^2.

Probability-adjusted density standard:

2022 Mean Reference Area Species Density – 1.15s = 26.9 – 1.15 (5.5) = 20.6

2022 Mean total species density without noxious species in the BRB-6 = 22.4 (min. 21.4)

2023 Mean Reference Area Species Density – 1.15s = 24.5 – 1.15 (5.0) = 18.7

2023 Mean total species density without noxious species in the BRB-6 = 17.0 (max. 18.2)

Since the reclaimed area value was greater than the standard for 2022, **Alternative Test B is passed in 2022**. However, the reclaimed area value was less than the standard for 2023, so **Alternative Test B is failed in 2023.**

Regarding Alternative Test **C**, the similarity index between the lifeform species density values for the prescribed lifeforms for the BRB-6 and the Mean Species density (area-weighted) in the five reference areas compared to 90% of the standard (0.9 x 70% = 63%) (Table J-3).

2022 similarity index is 81%, which exceeds 63%
2023 similarity index is 79%, which exceeds 63%

Hence **Alternative Test C is passed** for 2022 and 2023 data.

Regarding Alternative Test **D**, the total number of native species encountered an adequate number of samples of the BRB-6 (based on species density) compared to the area weighted native species density standard (based on the four extended reference areas) (Table J-4).

2022 The total number of native species encountered in the first seven 100m^2 samples was 31.
2022 Area weighted native species density standard was 22.8 species per 100 m^2.
2023 The total number of native species encountered in the first sixteen 100m^2 samples was 46.
2023 Area weighted native species density standard was 21.9 species per 100m^2.

Hence **Alternative Test D is passed** for 2022 and 2023 data.

In summary, Mandatory Test **A** was passed as were Alternative Tests **B** (in 2022), **C** and **D**. Thus, the species diversity test as a whole is **passed** for the 2022 and 2023 BRB-6 and revegetation success for species diversity for Phase III is demonstrated.

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APPENDIX A

2022 PHASE III BOND RELEASE EVALUATION DATA TABLES

Cover data tables: Both first and additional hit data are presented in these tables. Additional hit data are shown in parentheses.

APPENDIX B

2023 PHASE III BOND RELEASE EVALUATION DATA TABLES

Cover data tables: Both first and additional hit data are presented in these tables. Additional hit data are shown in parentheses.

APPENDIX C

SUMMARY TABLES

APPENDIX D

VEGETATION AND CLIMATE FIGURES

APPENDIX E

SPECIES PRESENCE FOR ALL AREAS

APPENDIX F

SEED MIXES

APPENDIX G

RECLAIMED AND REFERENCE AREAS
REPRESENTATIVE FIELD PHOTOS

APPENDIX H

ALLOWABLE HERBACEOUS COVER CALCULATIONS
(SEE EXCEL FILES)

APPENDIX I

ALLOWABLE HERBACEOUS PRODUCTION CALCULATIONS

(SEE EXCEL FILES)

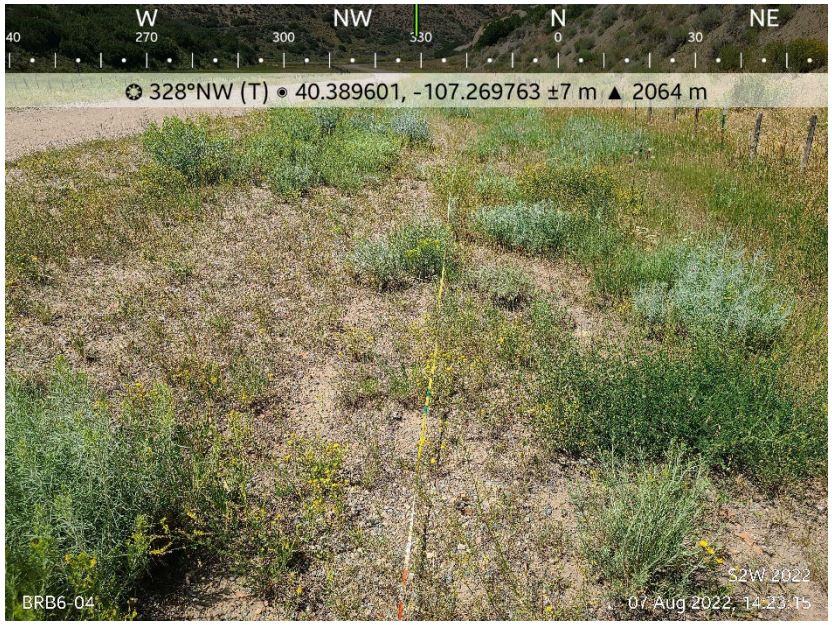
APPENDIX J

SPECIES DIVERSITY TEST CALCULATIONS

Photograph 1. Seneca 2W Mine 2022, BRB-6, Sample 01

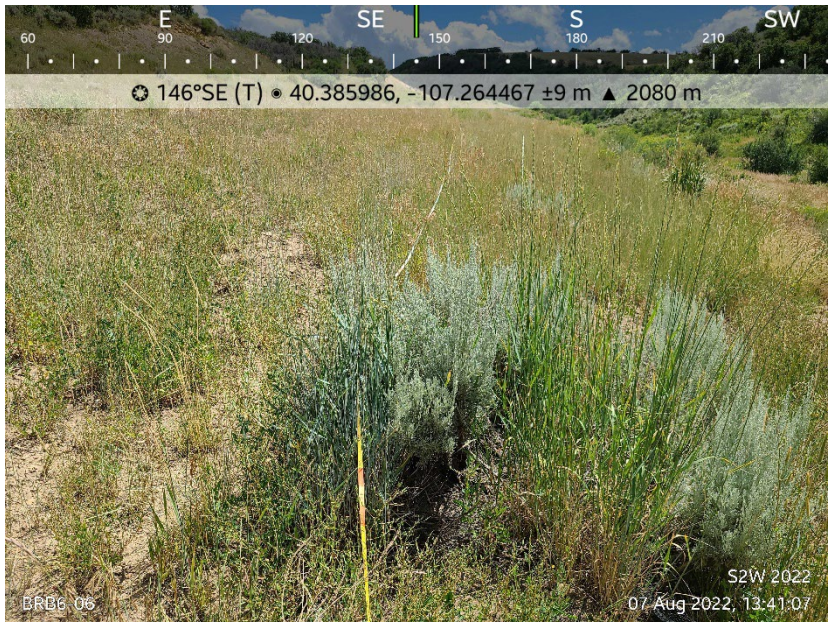
Photograph 2. Seneca 2W Mine 2022, BRB-6, Sample 02

Photograph 3. Seneca 2W Mine 2022, BRB-6, Sample 03



Photograph 4. Seneca 2W Mine 2022, BRB-6, Sample 04

Photograph 5. Seneca 2W Mine 2022, BRB-6, Sample 05



Photograph 6. Seneca 2W Mine 2022, BRB-6, Sample 06

Photograph 7. Seneca 2W Mine 2022, BRB-6, Sample 07

Photograph 8. Seneca 2W Mine 2022, BRB-6, Sample 08

Photograph 9. Seneca 2W Mine 2022, BRB-6, Sample 09

Photograph 10. Seneca 2W Mine 2022, BRB-6, Sample 10

Photograph 11. Seneca 2W Mine 2022, BRB-6, Sample 11

Photograph 12. Seneca 2W Mine 2022, BRB-6, Sample 12

Photograph 13. Seneca 2W Mine 2022, BRB-6, Sample 13

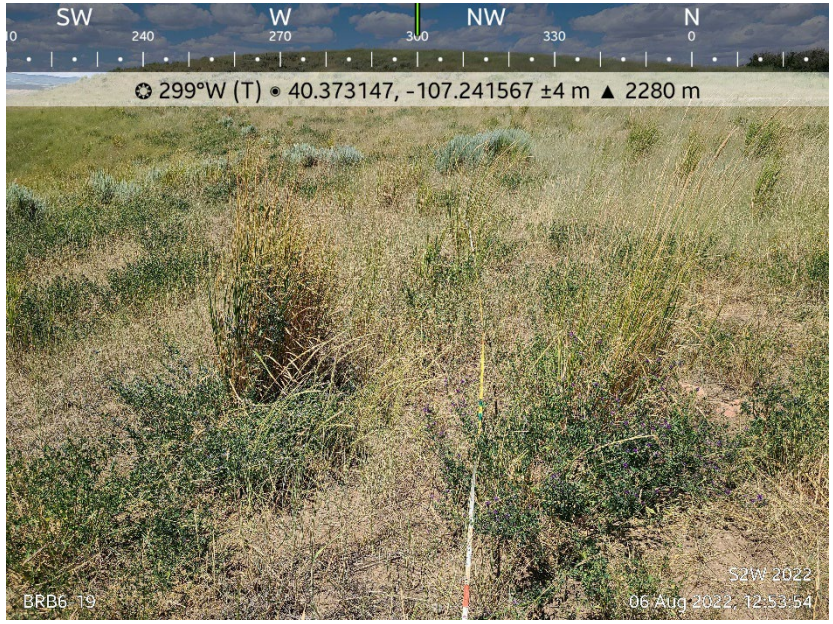
Photograph 14. Seneca 2W Mine 2022, BRB-6, Sample 14

Photograph 15. Seneca 2W Mine 2022, BRB-6, Sample 15

Photograph 16. Seneca 2W Mine 2022, BRB-6, Sample 16

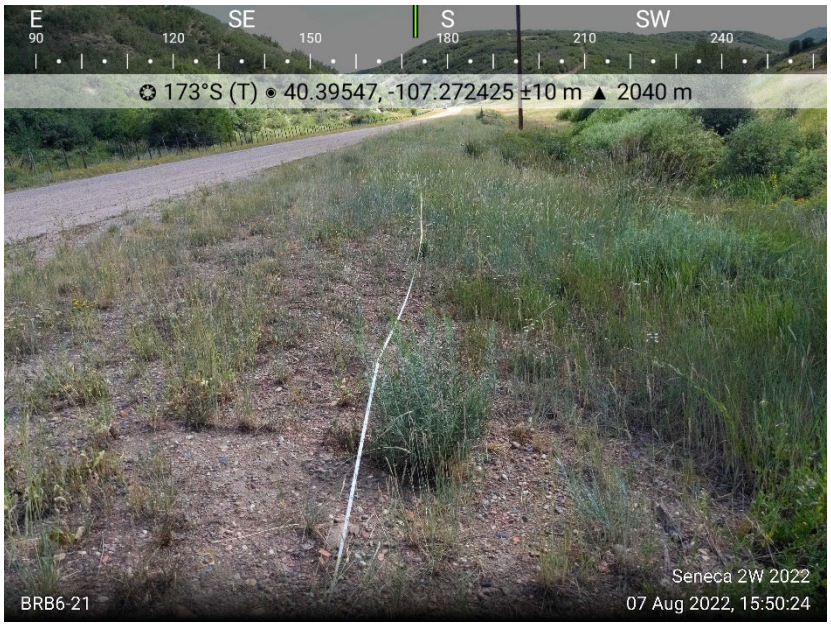
Photograph 17. Seneca 2W Mine 2022, BRB-6, Sample 17

Photograph 18. Seneca 2W Mine 2022, BRB-6, Sample 18



Photograph 19. Seneca 2W Mine 2022, BRB-6, Sample 19

Photograph 20. Seneca 2W Mine 2022, BRB-6, Sample 20



Photograph 21. Seneca 2W Mine 2022, BRB-6, Sample 21

Photograph 22. Seneca 2W Mine 2022, BRB-6, Sample 22

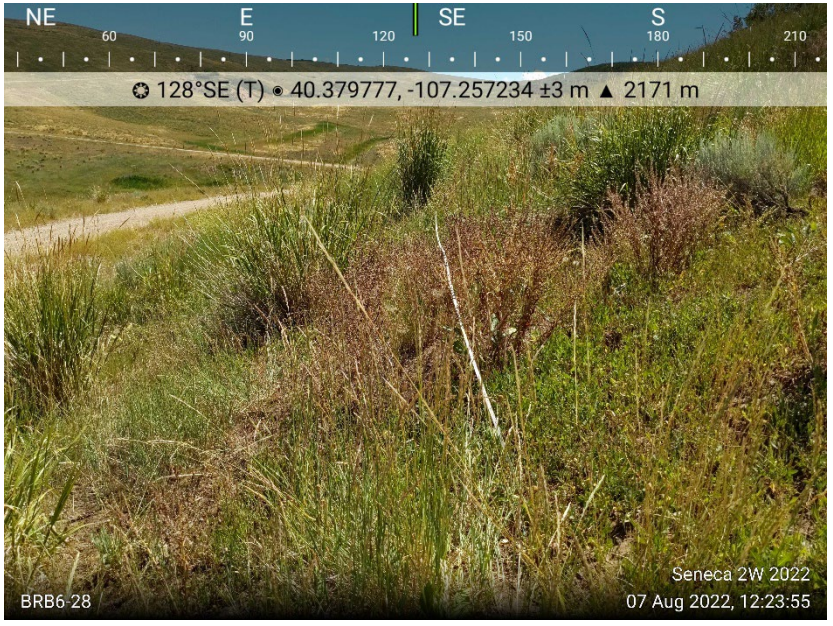
Photograph 23. Seneca 2W Mine 2022, BRB-6, Sample 23

Photograph 24. Seneca 2W Mine 2022, BRB-6, Sample 24

Photograph 25. Seneca 2W Mine 2022, BRB-6, Sample 25

Photograph 26. Seneca 2W Mine 2022, BRB-6, Sample 26

Photograph 27. Seneca 2W Mine 2022, BRB-6, Sample 27



Photograph 28. Seneca 2W Mine 2022, BRB-6, Sample 28

Photograph 29. Seneca 2W Mine 2022, BRB-6, Sample 29

Photograph 30. Seneca 2W Mine 2022, BRB-6, Sample 30

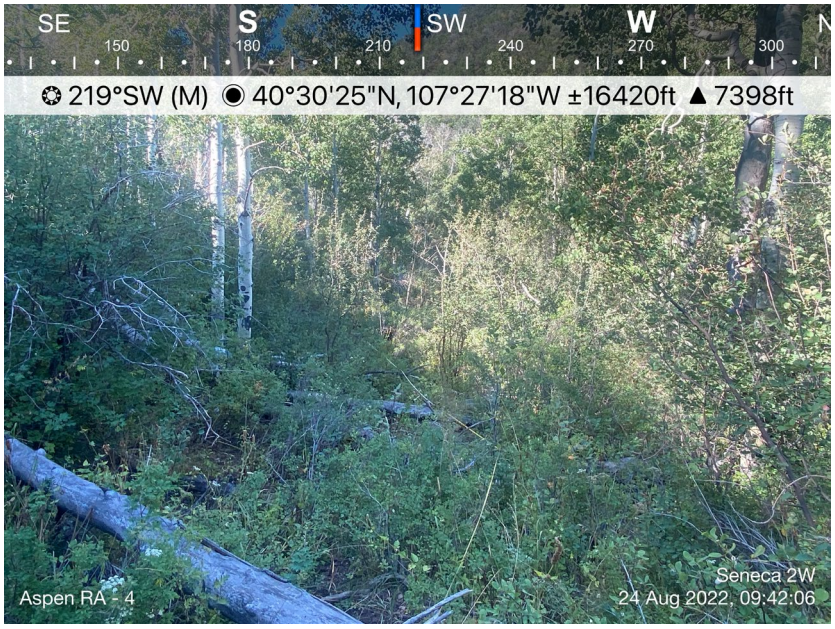
Photograph 31. Seneca 2W Mine 2022, BRB-6, Sample 31

Photograph 32. Seneca 2W Mine 2022, BRB-6, Sample 32

Photograph 33. Seneca 2W Mine 2022, Aspen ERA, Sample 01

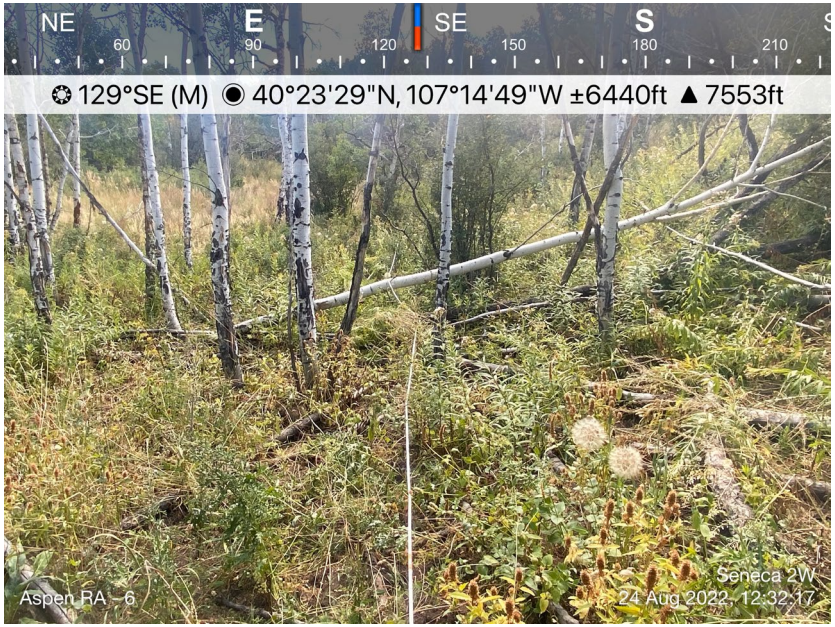
Photograph 34. Seneca 2W Mine 2022, Aspen ERA, Sample 02

Photograph 35. Seneca 2W Mine 2022, Aspen ERA, Sample 03 (Mislabeled)



Photograph 36. Seneca 2W Mine 2022, Aspen ERA, Sample 04

Photograph 37. Seneca 2W Mine 2022, Aspen ERA, Sample 05



Photograph 38. Seneca 2W Mine 2022, Aspen ERA, Sample 06

Photograph 39. Seneca 2W Mine 2022, Aspen ERA, Sample 14

Photograph 40. Seneca 2W Mine 2022, Aspen ERA, Sample 15

Photograph 41. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 01

Photograph 42. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 02

Photograph 43. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 03

Photograph 44. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 04

Photograph 45. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 05

Photograph 46. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 06

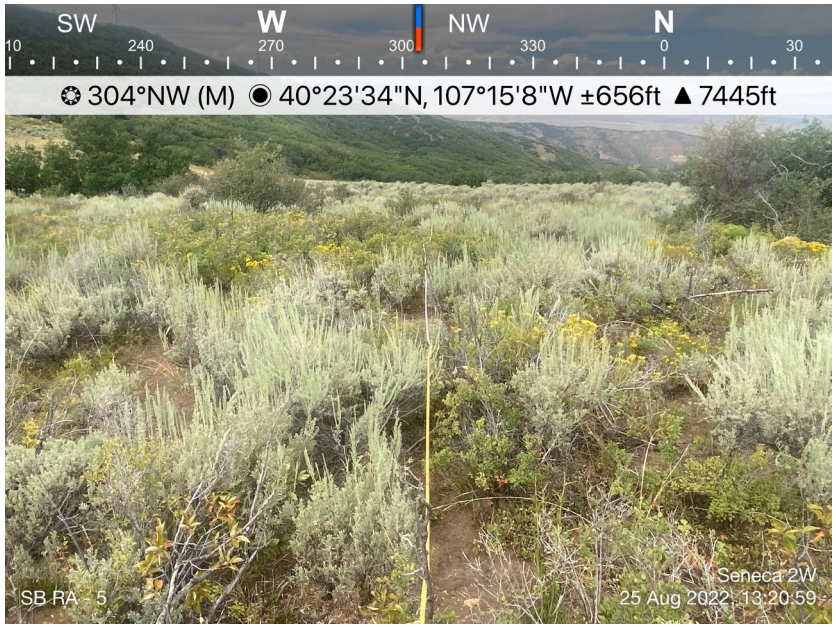
Photograph 47. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 14

Photograph 48. Seneca 2W Mine 2022, Mountain Brush ERA, Sample 15

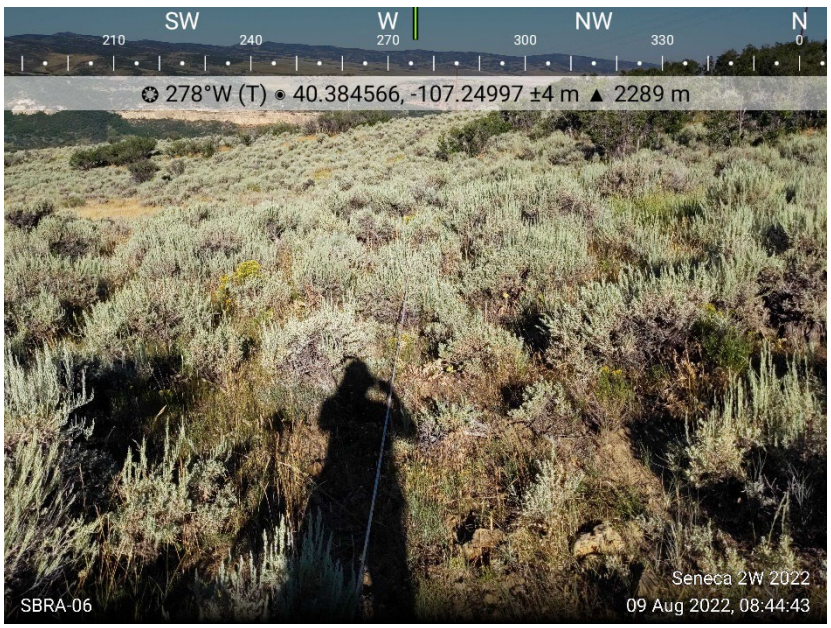
Photograph 49. Seneca 2W Mine 2022, Sagebrush ERA, Sample 01

Photograph 50. Seneca 2W Mine 2022, Sagebrush ERA, Sample 02

Photograph 51. Seneca 2W Mine 2022, Sagebrush ERA, Sample 03



Photograph 52. Seneca 2W Mine 2022, Sagebrush ERA, Sample 05



Photograph 53. Seneca 2W Mine 2022, Sagebrush ERA, Sample 06

Photograph 54. Seneca 2W Mine 2022, Sagebrush ERA, Sample 07

Photograph 55. Seneca 2W Mine 2022, Sagebrush ERA, Sample 13

Photograph 56. Seneca 2W Mine 2022, Sagebrush ERA, Sample 15

Photograph 57. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 01

Photograph 58. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 02

Photograph 59. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 03

Photograph 60. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 04

Photograph 61. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 05

Photograph 62. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 06

Photograph 63. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 13

Photograph 64. Seneca 2W Mine 2022, Steep Mountain Brush ERA, Sample 14

Photograph 65. Seneca 2W Mine 2022, Western Wheat ERA, Sample 01

Photograph 66. Seneca 2W Mine 2022, Western Wheat ERA, Sample 02

Photograph 67. Seneca 2W Mine 2022, Western Wheat ERA, Sample 03

Photograph 68. Seneca 2W Mine 2022, Western Wheat ERA, Sample 04

Photograph 69. Seneca 2W Mine 2022, Western Wheat ERA, Sample 05

Photograph 70. Seneca 2W Mine 2022, Western Wheat ERA, Sample 06

Photograph 71. Seneca 2W Mine 2022, Western Wheat ERA, Sample 14

Photograph 72. Seneca 2W Mine 2022, Western Wheat ERA, Sample 15

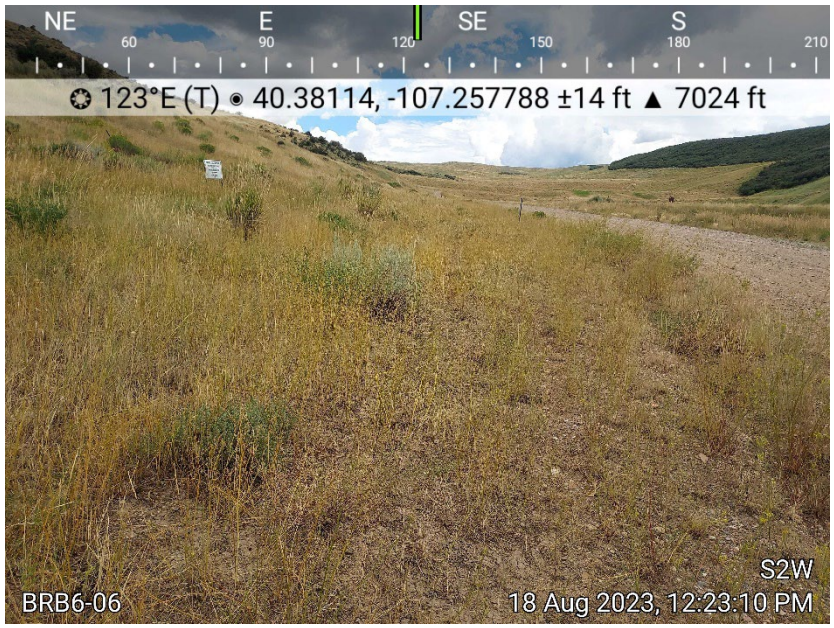
Photograph 73. Seneca 2W Mine 2023, BRB-6, Sample 01

Photograph 74. Seneca 2W Mine 2023, BRB-6, Sample 02

Photograph 75. Seneca 2W Mine 2023, BRB-6, Sample 03

Photograph 76. Seneca 2W Mine 2023, BRB-6, Sample 04

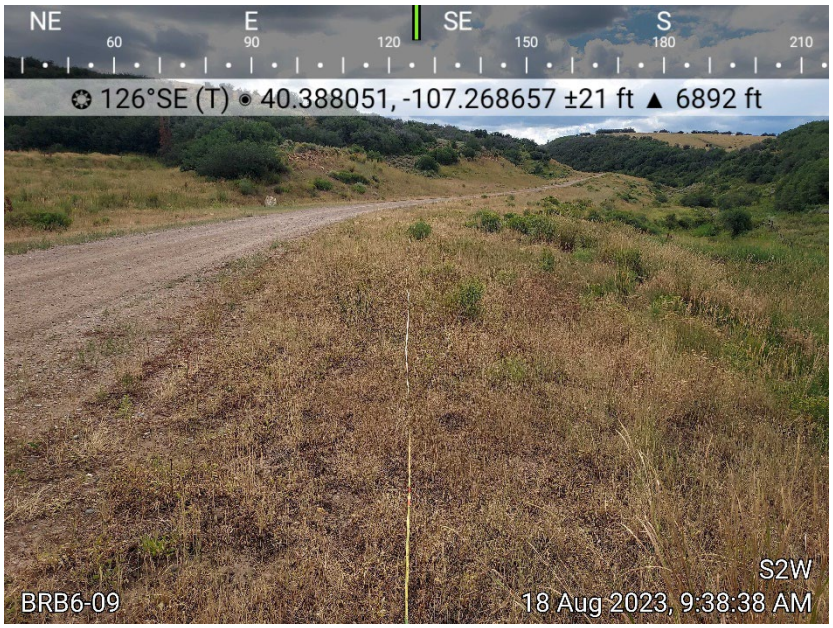
Photograph 77. Seneca 2W Mine 2023, BRB-6, Sample 05



Photograph 78. Seneca 2W Mine 2023, BRB-6, Sample 06

Photograph 79. Seneca 2W Mine 2023, BRB-6, Sample 07

Photograph 80. Seneca 2W Mine 2023, BRB-6, Sample 08



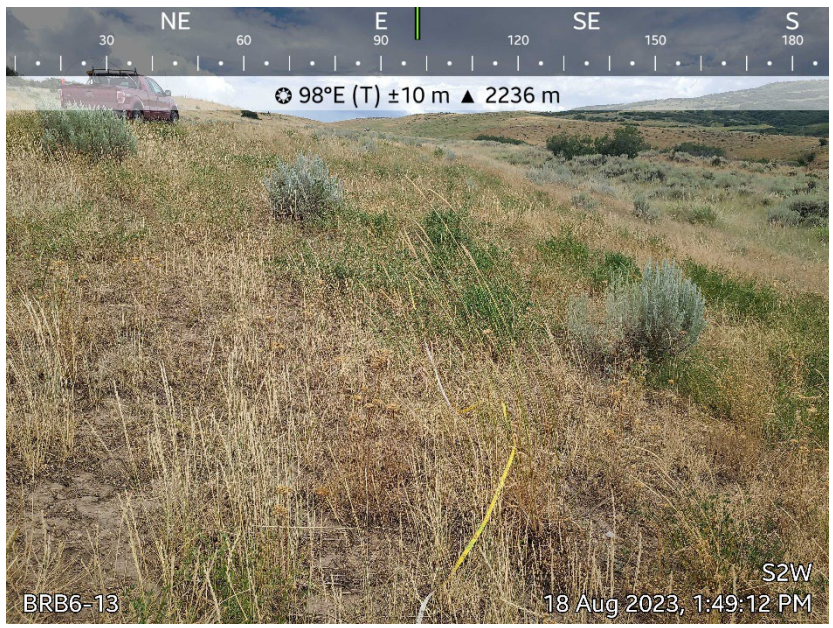
Photograph 81. Seneca 2W Mine 2023, BRB-6, Sample 09

Photograph 82. Seneca 2W Mine 2023, BRB-6, Sample 10

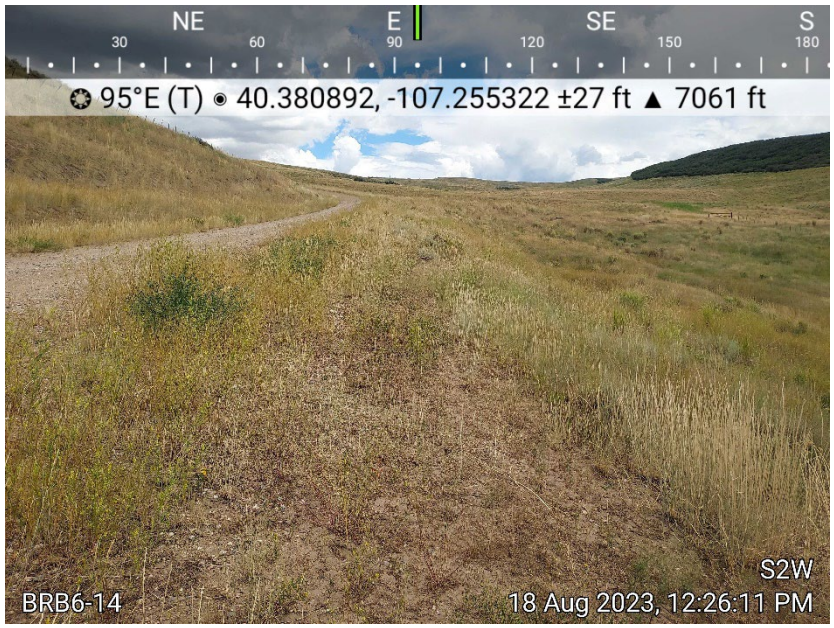
Photograph 83. Seneca 2W Mine 2023, BRB-6, Sample 11

Photograph Missing

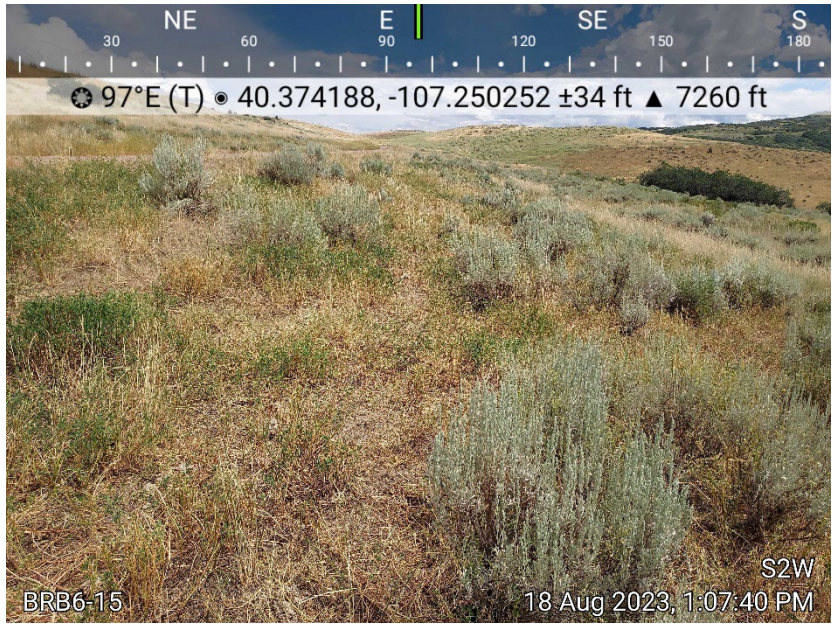
Photograph 84. Seneca 2W Mine 2023, BRB-6, Sample 12



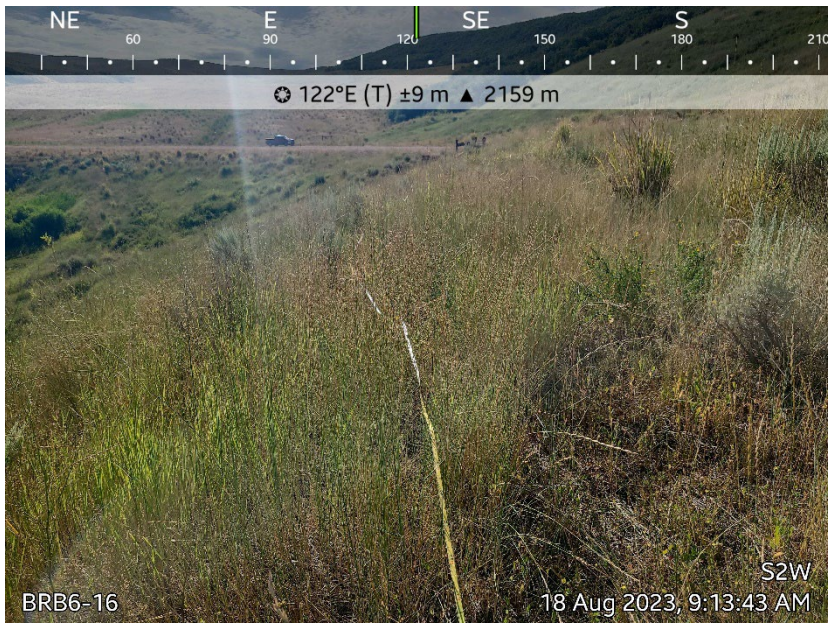
Photograph 85. Seneca 2W Mine 2023, BRB-6, Sample 13



Photograph 86. Seneca 2W Mine 2023, BRB-6, Sample 14



Photograph 87. Seneca 2W Mine 2023, BRB-6, Sample 15



Photograph 88. Seneca 2W Mine 2023, BRB-6, Sample 16

Photograph 89. Seneca 2W Mine 2023, BRB-6, Sample 17

Photograph 90. Seneca 2W Mine 2023, BRB-6, Sample 18

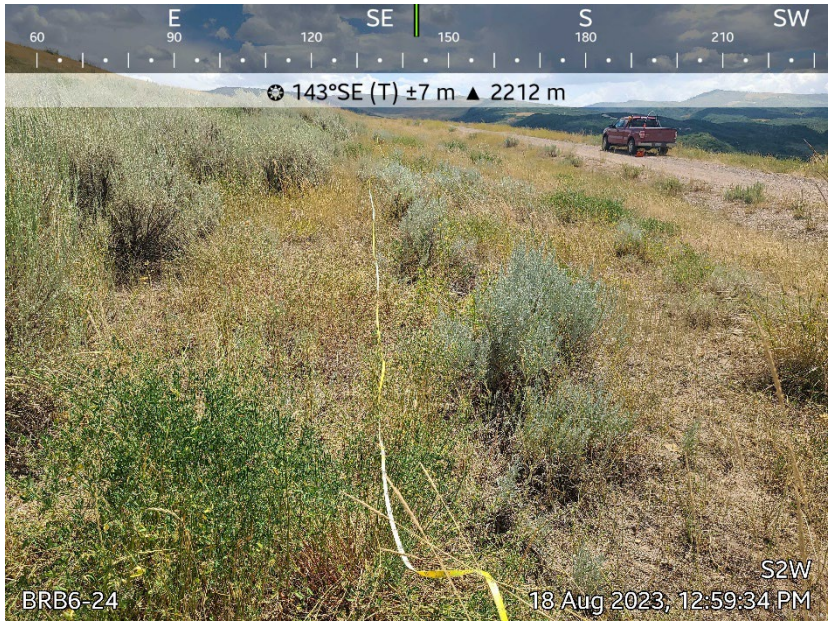
Photograph 91. Seneca 2W Mine 2023, BRB-6, Sample 19

Photograph 92. Seneca 2W Mine 2023, BRB-6, Sample 20

Photograph 93. Seneca 2W Mine 2023, BRB-6, Sample 21

Photograph 94. Seneca 2W Mine 2023, BRB-6, Sample 22

Photograph 95. Seneca 2W Mine 2023, BRB-6, Sample 23



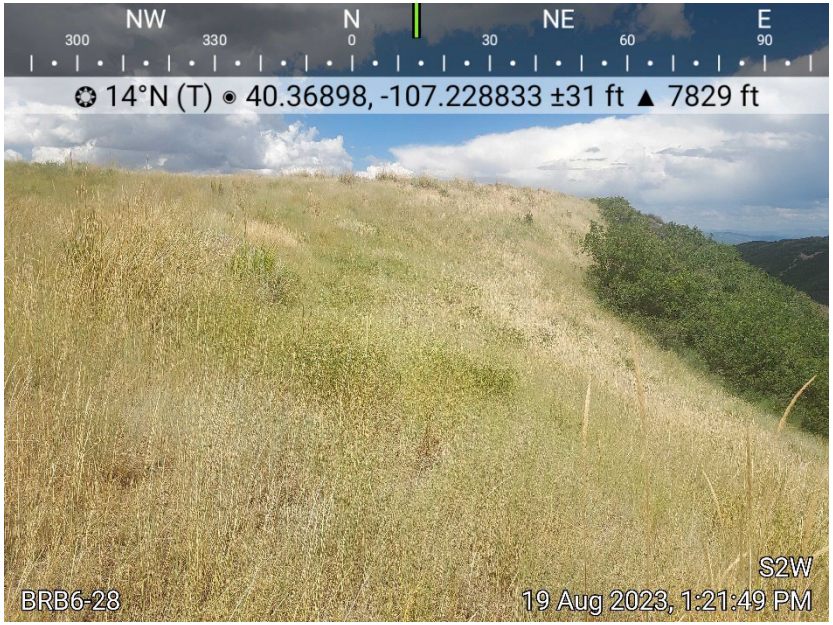
Photograph 96. Seneca 2W Mine 2023, BRB-6, Sample 24

Photograph Missing

Photograph 97. Seneca 2W Mine 2023, BRB-6, Sample 25

Photograph 98. Seneca 2W Mine 2023, BRB-6, Sample 26

Photograph 99. Seneca 2W Mine 2023, BRB-6, Sample 27

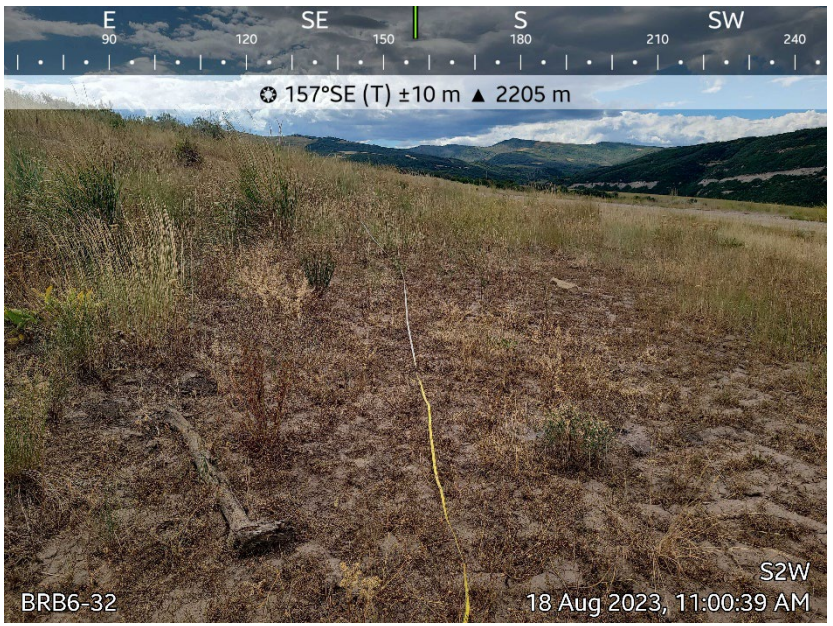


Photograph 100. Seneca 2W Mine 2023, BRB-6, Sample 28

Photograph 101. Seneca 2W Mine 2023, BRB-6, Sample 29

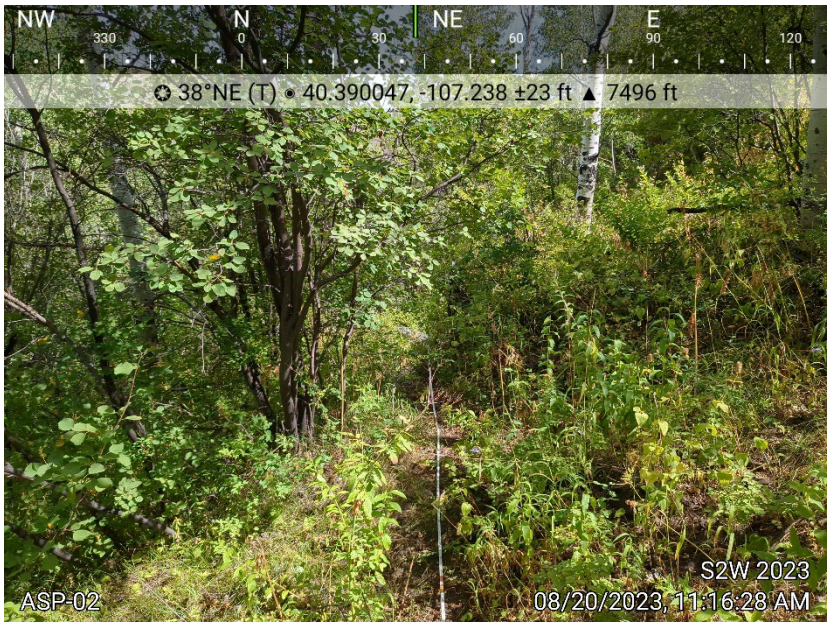
Photograph 02. Seneca 2W Mine 2023, BRB-6, Sample 30

Photograph 103. Seneca 2W Mine 2023, BRB-6, Sample 31



Photograph 104. Seneca 2W Mine 2023, BRB-6, Sample 32

Photograph 105. Seneca 2W Mine 2023, Aspen ERA, Sample 01



Photograph 106. Seneca 2W Mine 2023, Aspen ERA, Sample 02

Photograph 107. Seneca 2W Mine 2023, Aspen ERA, Sample 03

Photograph 108. Seneca 2W Mine 2023, Aspen ERA, Sample 04

Photograph 109. Seneca 2W Mine 2023, Aspen ERA, Sample 05

Photograph 110. Seneca 2W Mine 2023, Aspen ERA, Sample 06

Photograph 111. Seneca 2W Mine 2023, Aspen ERA, Sample 14

Photograph 112. Seneca 2W Mine 2023, Aspen ERA, Sample 15

Photograph 113. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 01

Photograph 114. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 02

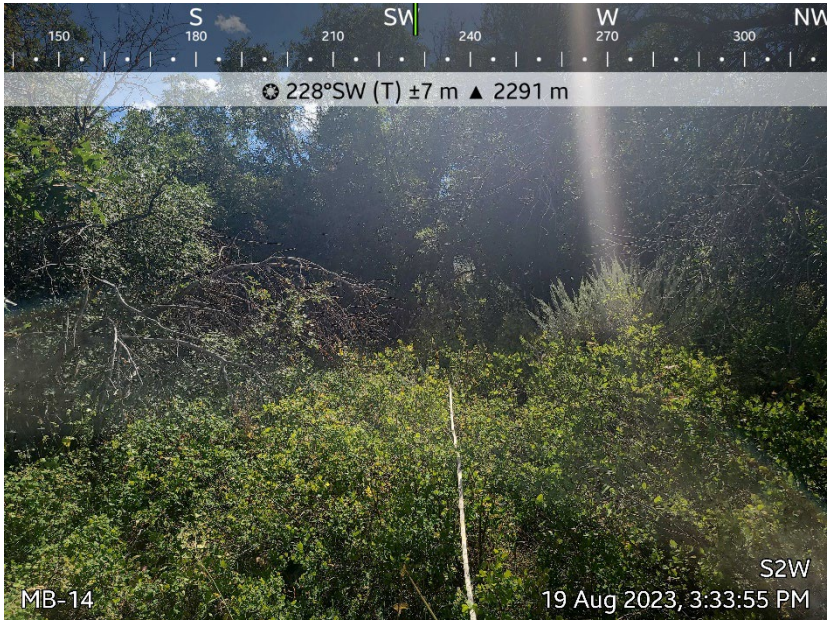
Photograph 115. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 03

Photograph 116. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 04

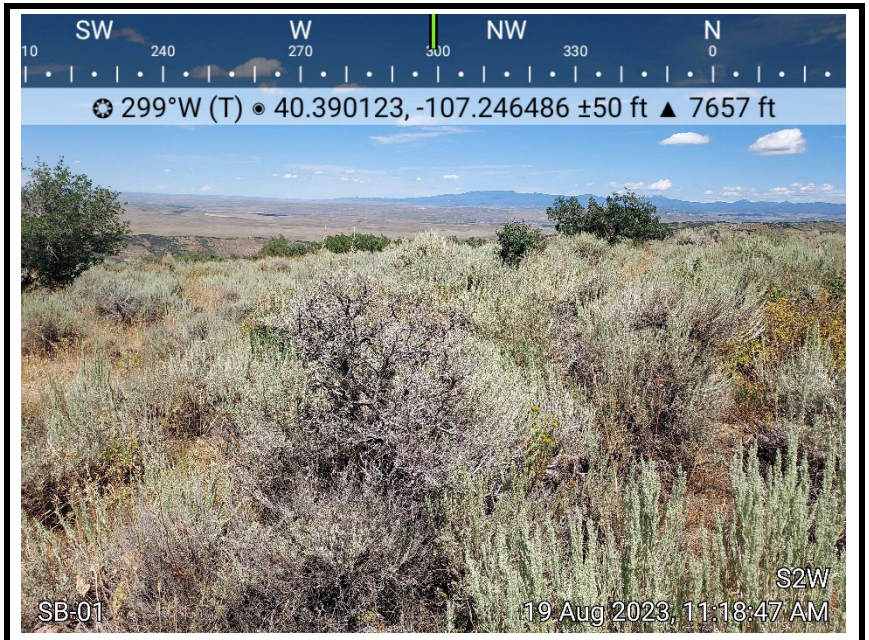
Photograph 117. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 05

Photograph 118. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 06

Photograph 119. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 13

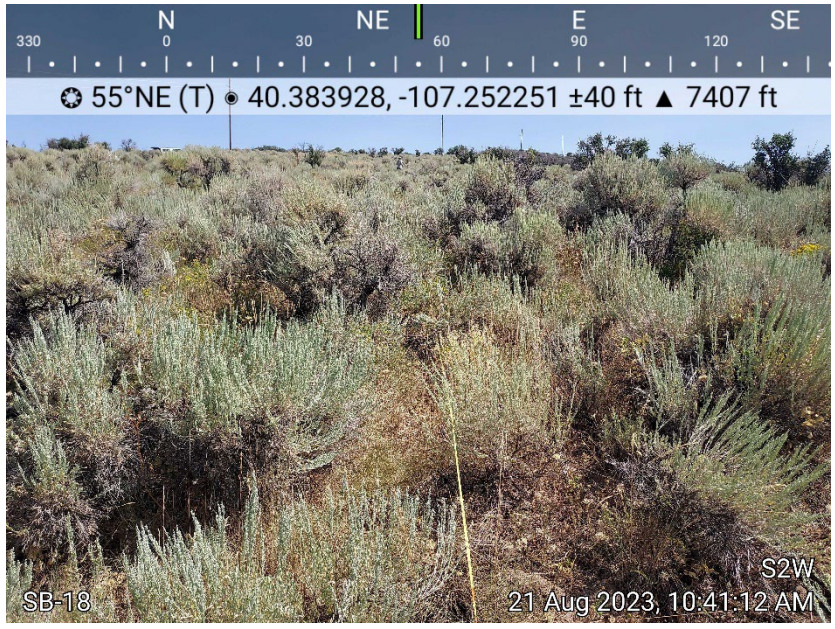


Photograph 120. Seneca 2W Mine 2023, Mountain Brush ERA, Sample 14

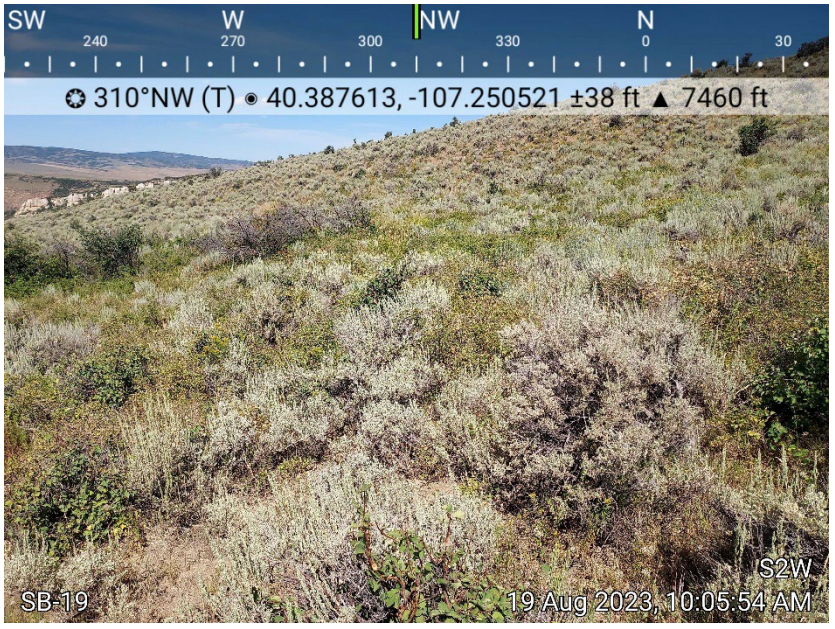


Photograph 121. Seneca 2W Mine 2023, Sagebrush ERA, Sample 01

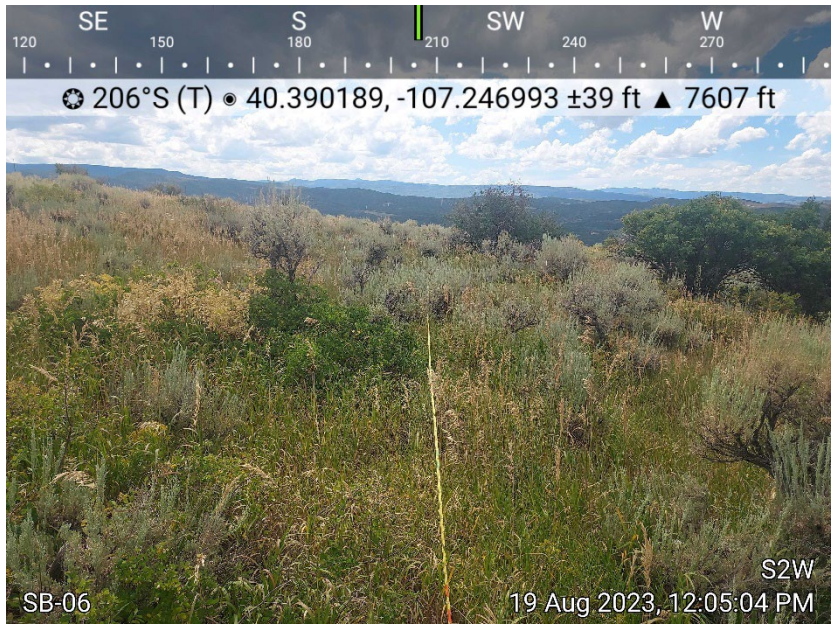
Photograph 122. Seneca 2W Mine 2023, Sagebrush ERA, Sample 02



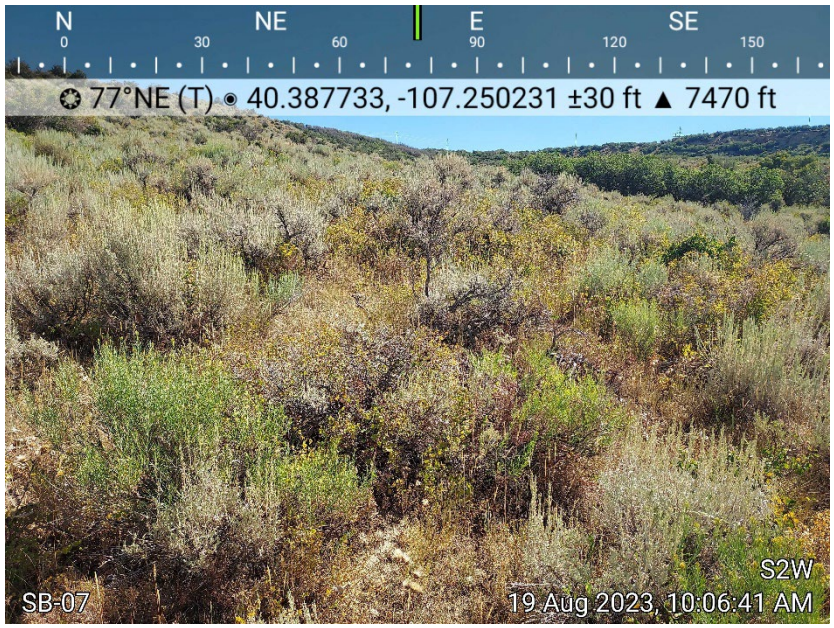
Photograph 123. Seneca 2W Mine 2023, Sagebrush ERA, Sample 03 (mislabeled)



Photograph 124. Seneca 2W Mine 2023, Sagebrush ERA, Sample 05



Photograph 125. Seneca 2W Mine 2023, Sagebrush ERA, Sample 06



Photograph 126. Seneca 2W Mine 2023, Sagebrush ERA, Sample 07

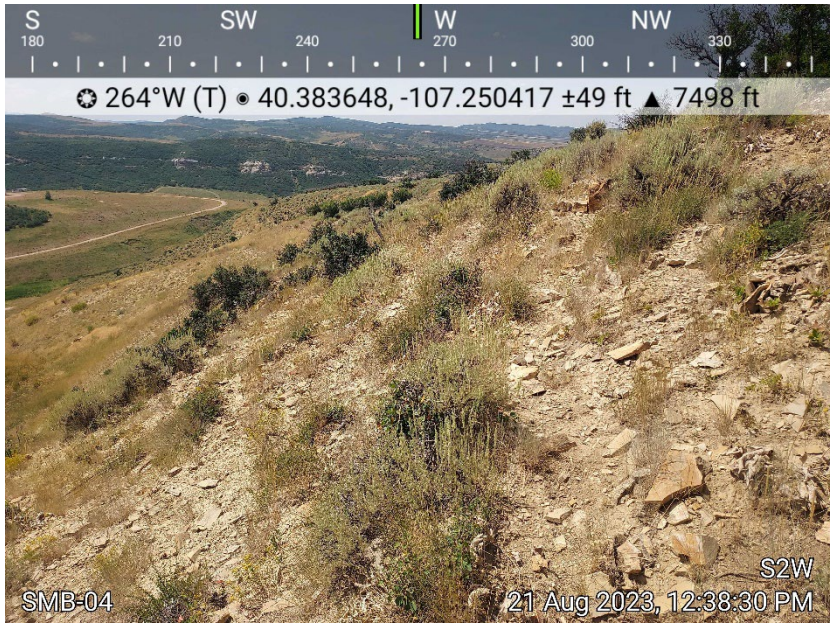
Photograph 127. Seneca 2W Mine 2023, Sagebrush ERA, Sample 13

Photograph 128. Seneca 2W Mine 2023, Sagebrush ERA, Sample 14

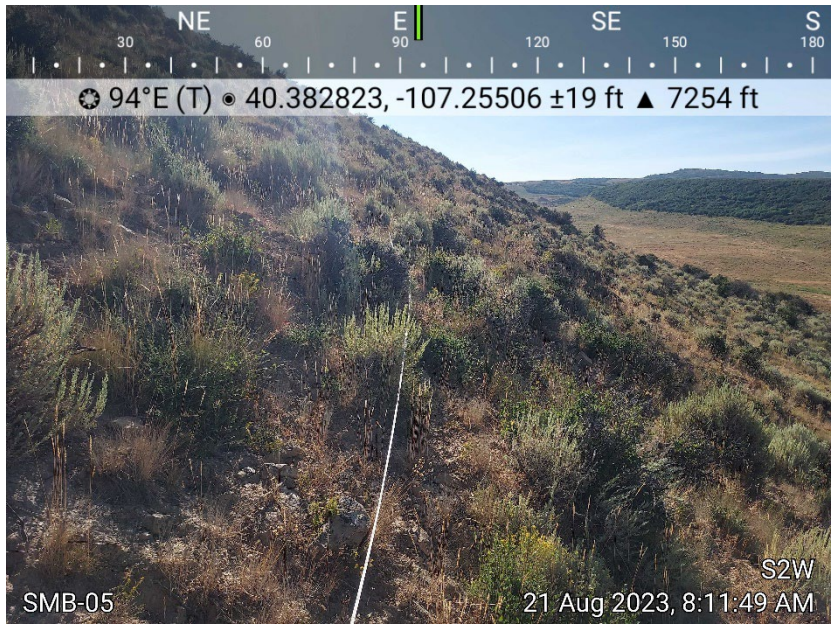
Photograph 129. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 01

Photograph 130. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 02

Photograph 131. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 03



Photograph 132. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 04

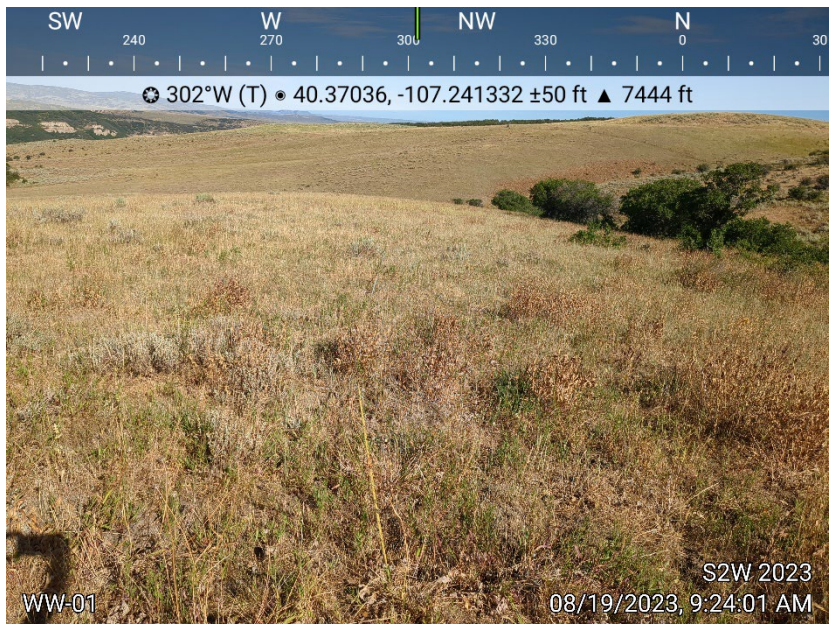


Photograph 133. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 05

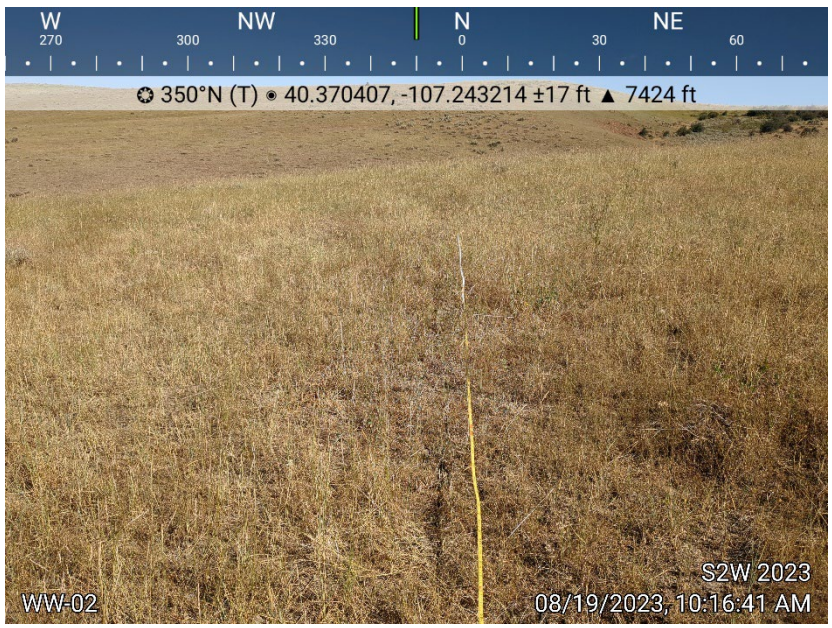
Photograph 134. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 06

Photograph 135. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 13

Photograph 136. Seneca 2W Mine 2023, Steep Mountain Brush ERA, Sample 14



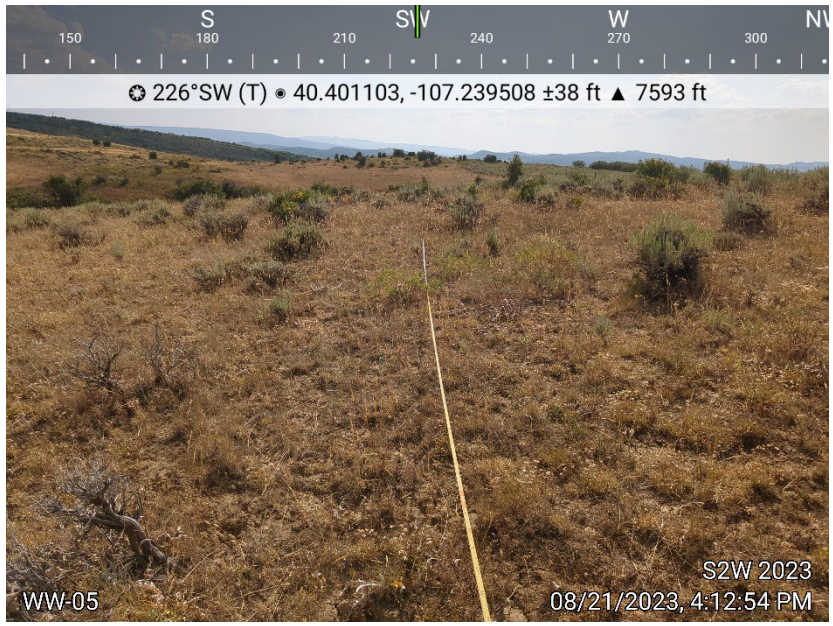
Photograph 137. Seneca 2W Mine 2023, Western Wheat ERA, Sample 01



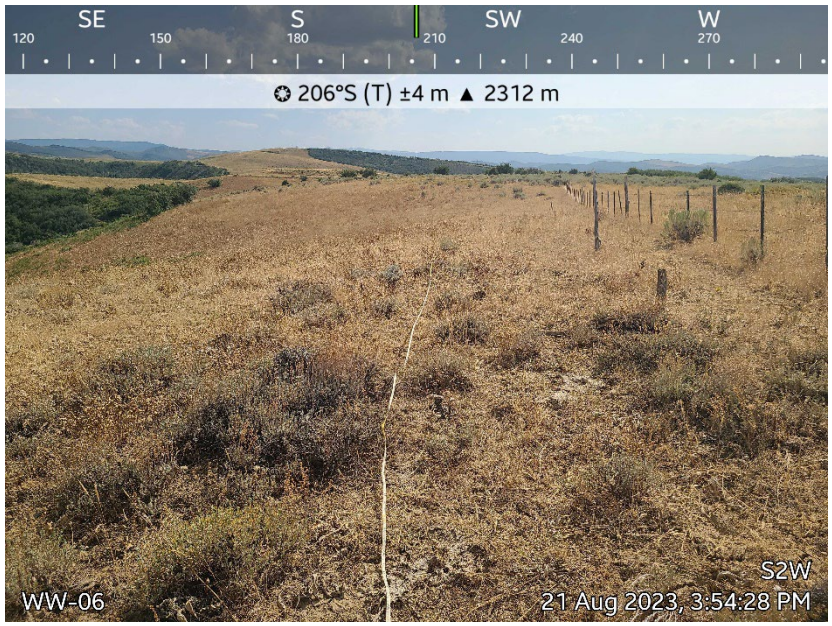
Photograph 138. Seneca 2W Mine 2023, Western Wheat ERA, Sample 02

Photograph 139. Seneca 2W Mine 2023, Western Wheat ERA, Sample 03

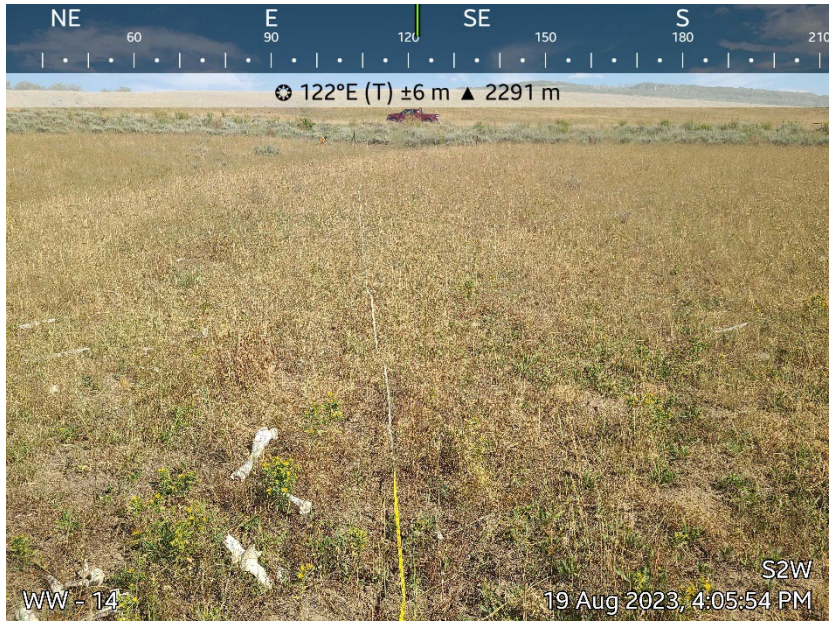
Photograph 140. Seneca 2W Mine 2023, Western Wheat ERA, Sample 04



Photograph 141. Seneca 2W Mine 2023, Western Wheat ERA, Sample 05



Photograph 142. Seneca 2W Mine 2023, Western Wheat ERA, Sample 06



Photograph 143. Seneca 2W Mine 2023, Western Wheat ERA, Sample 14

Photograph 144. Seneca 2W Mine 2023, Western Wheat ERA, Sample 15

Table H-1. Allowable All-Hit Herbaceous Cover Calculations - Example of Calculations from Bond Release Block 6, 2023 Data

Note: Only species involved in subtractions are shown below ; Reference Appendix A for complete list of species.

	AVERAGE COVER (%)	FIRST HIT RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	ALL HIT RELATIVE VEGETATION COVER (%)	FREQUENCY (%)	Percent Foliar Cover ---Sample Number--- 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TOTAL NATIVE ANNUAL AND BIENNIAL FORBS	1.1	1.9	1.1	1.8	78.1	P	P		P	2			P	10(1)	2	P	1	1	P	1	P	P	6	P	1	P	2	P			P	2		1	5		1
				ALL-HIT		0	0	0	0	2	0	0	0	11	2	0	1	1	0	1	0	0	6	0	1	0	2	0	0	0	0	2	0	1	5	0	1
INTRODUCED ANNUAL AND BIENNIAL FORBS																																					
Cynoglossum officinale	0.06	0.11	0.06	0.10	34.4			P					P			P					P			1		P	P				P		1	P		P
				ALL-HIT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
TOTAL INTRODUCED ANNUAL AND BIENNIAL FORBS	7.4	12.6	8.3	13.0	100.0	4	1	3	1	1	16	6(1)	10(1)	9(3)	14(3)	4(3)	P	6	16(3)	2(1)	11(2)	20	6	10	6	(1)	1	1	20	15	2	7	3	15(3)	12	9(2)	5(1)
				ALL-HIT		4	1	3	1	1	20	7	11	12	17	7	0	6	19	3	13	20	6	10	6	1	1	1	20	15	2	7	3	18	12	11	6
INTRODUCED ANNUAL GRASSES																																					
Poa bulbosa	0.31	0.54	0.38	0.59	15.6																		5	1(1)			4	P									(1)
				ALL-HIT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	4	0	0	0	0	0	0	0	0	0	1
TOTAL INTRODUCED ANNUAL GRASSES	2.0	3.5	2.3	3.6	68.8	7	3			1	4		4	11	5(1)	2	1	1(1)	4(1)	5(2)	P	2	5	1(1)				4	P		2	1					1	1(1)
				ALL-HIT		7	3	0	0	1	4	0	4	11	6	2	1	2	5	7	0	2	5	2	0	0	4	0	0	2	1	0	0	0	0	1	2
TOTAL NATIVE PERENNIAL FORBS	2.8	4.8	3.2	5.1	93.8	5(1)	P	2(1)	20(3)	P	2	(1)	2	1	9(2)		P	1(1)	2(1)	5	1		3	3	4	2	3(1)	7(1)	4	7(2)	P	1	1	P	P	P	4
INTRODUCED PERENNIAL FORBS																																					
Cirsium arvense	0.00	0.00	0.03	0.05	6.3			(1)																							P						
Convolvulus arvensis	0.03	0.05	0.03	0.05	3.1																		1														
				ALL-HIT		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INTRODUCED PERENNIAL FORBS	7.1	12.2	7.6	12.0	84.375	8		(1)		3	19			2	2	7	3	30	4(1)	36(2)	7	2	2	10	9(2)	18(3)		9	10(1)	10	1	1	13	1	P	P	21(2)
TOTAL NATIVE PERENNIAL GRASSES (c)	15.2	25.9	15.8	25.0	100	8	26	5	15	46	8	7	18	14(1)	24	12	9	11(4)	18(2)	7(1)	16(1)	12(1)	24(2)	3(1)	13	3	17(2)	4	3	8(1)	28	47	1	10(2)	27(1)	30(1)	11(1)
TOTAL INTRODUCED PERENNIAL GRASSES (c)	19.9	34.1	21.9	34.6	100	18	31	44(1)	17	3	7	53(2)	13	2	7	39(3)	20(3)	3(1)	5(2)	2(1)	19(3)	14(1)	16	24(2)	30(8)	55(9)	22(1)	27(8)	9(1)	1	34	5	39(4)	33	1	26(1)	18(12)
TOTAL NATIVE SHRUBS	2.9	5.0	3.1	4.9	68.75	P			7	2	1	14		1	2	2	21	(2)	3	4	2		P	4	3		P	P	12(1)	7(2)			7		1	
				ALL-HIT		0	0	0	7	2	2	14	0	1	2	2	21	2	3	4	2	0	0	4	3	0	0	0	13	9	0	0	0	7	0	1	0
Moss	0.03	0.05	0.03	0.05	6.25										1												P									
TOTAL BRYOPHYTES	0.0	0.1	0.0	0.0	6.25										1												P									
				ALL-HIT		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standing Dead	1.28		1.28			2					3	5	6	2		2	6		2	3	1		1						4			2	2				
Litter	26.19		26.19			35	37	40	33	30	26	15	22	25	17	28	27	23	18	26	26	30	17	26	22	16	27	30	30	27	34	29	33	21	29	23	16
Bare Ground (Soil)	11.44		11.44			5	2	6	7	12	12		23	21	12	4	2	23	17	8	11	15	20	9	8	6	24	21	11	10		8	5	9	26	9	20
Rock	2.69		2.69			8					2		2	2	5		10	1	11	1	6	5		10	4			1	1	9			3	1		1	3
TOTALS	100		105			100(1)	100	100(3)	100(3)	100	100	100(4)	100(1)	100(5)	100(6)	100(6)	100(3)	100(9)	100(10)	100(7)	100(6)	100(2)	100(2)	100(4)	100(10)	100(13)	100(4)	100(9)	100(3)	100(5)	100	100	100(4)	100(5)	100(1)	100(4)	100(17)
TOTAL VEGETATION COVER	58.4		63.3			50(1)	61	54(3)	60(3)	58	57	80(4)	47(1)	50(5)	66(6)	66(6)	55(3)	53(9)	52(10)	62(7)	56(6)	50(2)	62(2)	55(4)	66(10)	78(13)	49(4)	48(9)	58(3)	50(5)	66	63	57(4)	67(5)	45(1)	67(4)	61(17)
Standard Deviation	*8.431*		*10.055*																																		
GROUND COVER (Litter+Rock+Veg+St.Dead)	88.6		93.4			95(1)	98	94(3)	93(3)	88	88	100(4)	77(1)	79(5)	88(6)	96(6)	98(3)	77(9)	83(10)	92(7)	89(6)	85(2)	80(2)	91(4)	92(10)	94(13)	76(4)	79(9)	89(3)	90(5)	100	92	95(4)	91(5)	74(1)	91(4)	80(17)
Standard Deviation	*7.457*		*7.674*																																		
SPECIES DENSITY (# of species/100 sq.m.)	18.2					19	19	20	27	23	12	12	12	16	24	12	17	13	19	13	20	12	30	21	21	16	24	23	13	16	14	25	10	19	21	12	28
Standard Deviation																																					
TOTAL ALL HIT VEGETATION COVER						51	61	57	63	58	65	84	48	55	72	72	58	62	62	69	62	52	64	59	76	91	53	57	61	55	66	63	61	72	46	71	78
Annual / biennial non-noxious cover						11	4	3	1	4	24	7	15	34	25	9	2	9	24	11	13	22	12	9	7	1	3	1	20	17	3	9	3	18	17	12	8
10% of non-noxious cover that can be annual/biennial						5.1	6.1	5.6	6.3	5.8	6.5	8.4	4.8	5.5	7.2	7.2	5.8	6.2	6.2	6.9	6.2	5.2	5.8	5.6	7.6	9.1	4.9	5.7	6.1	5.5	6.6	6.3	6.1	7.1	4.6	7.1	7.7
Annual/Biennial subtraction factor						5.9	0	0	0	0	17.5	0	10.2	28.5	17.8	1.8	0	2.8	17.8	4.1	6.8	16.8	6.2	3.4	0	0	0	0	13.9	11.5	0	2.7	0	10.9	12.4	4.9	0.3
ALL HIT Non-Herbaceous cover subtraction (Shrubs, Trees, Non-vascular)						0.0	0.0	0.0	7.0	2.0	2.0	14.0	0.0	1.0	3.0	2.0	21.0	2.0	3.0	4.0	2.0	0.0	0.0	4.0	3.0	0.0	0.0	0.0	13.0	9.0	0.0	0.0	0.0	7.0	0.0	1.0	0.0
ALL HIT Noxious weed subtraction						0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	3.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
Total deduction per transect						5.9	0.0	1.0	7.0	2.0	19.5	14.0	10.2	29.5	20.8	3.8	21.0	4.8	20.8	8.1	8.8	16.8	12.2	10.4	3.0	0.0	4.0	0.0	26.9	20.5	0.0	2.7	0.0	18.9	12.4	5.9	1.3
ALL HIT MEAN ALLOWABLE HERBACEOUS	**53.49**					45.1	61.0	56.0	56.0	56.0	45.5	70.0	37.8	25.5	51.2	68.2	37.0	57.2	41.2	60.9	53.2	35.2	51.8	48.6	73.0	91.0	49.0	57.0	34.1	34.5	66.0	60.3	61.0	53.1	33.6	65.1	76.7

Standard Deviation	14.45
N	32
t	1.309
Nmin	**13.0**

Table H-2. Allowable All-Hit Cover Calculations with Upwards Adjustment of Mean - Example of Calculations from Steep Mountain Brush ERA, 2023 Data

Note: Only species involved in subtractions are shown below; Reference Appendix A for complete list of species.	AVERAGE COVER (%)	FIRST HIT RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	ALL HIT RELATIVE VEGETATION COVER (%)	FREQUENCY (%)	Percent Foliar Cover ---Sample Number--- 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
TOTAL NATIVE ANNUAL AND BIENNIAL FORBS	0.2	0.4	0.2	0.3	46.7					P			1		P		1	P	1	P
				ALL-HIT		0	0	0	0	0	0	0	1	0	0	0	1	0	1	0
TOTAL INTRODUCED ANNUAL AND BIENNIAL FORBS	4.5	8.2	5.2	8.6	80.0	21(5)	1		3		9(1)		9(1)	4	6(3)	1	2	3	6	3
				ALL-HIT		26	1	0	3	0	10	0	10	4	9	1	2	3	6	3
INTRODUCED ANNUAL GRASSES																				
Bromus tectorum	0.67	1.21	0.80	1.33	26.7	6(2)							0	1	3					
				ALL-HIT		8	0	0	0	0	0	0	0	1	3	0	0	0	0	0
TOTAL INTRODUCED ANNUAL GRASSES	6.3	11.5	7.1	11.8	100.0	16(2)	5(1)	1(2)	3	7	7	4	11(1)	8(2)	11(1)	3	6(1)	7(2)	2	4
				ALL-HIT		18	6	3	3	7	7	4	12	10	12	3	7	9	2	4
TOTAL NATIVE PERENNIAL FORBS	4.7	8.6	5.3	8.8	100.0	1	7	2	2(3)	7(2)	2	2(1)	7	2	12(2)	7(1)	3	3	10	4
TOTAL INTRODUCED PERENNIAL FORBS	0.0	0.0	0.0	0.0	6.7											P				
TOTAL NATIVE PERENNIAL GRASSES (c)	16.5	30.1	18.5	30.8	100.0	8	11(8)	17	44(2)	12(1)	12	22(4)	27(1)	10(2)	15(2)	21(3)	22(2)	9(1)	7(3)	11(1)
TOTAL INTRODUCED PERENNIAL GRASSES (c)	0.6	1.1	0.6	1.0	40.0	P	2	P	P	2							5			
TOTAL NATIVE SUB-SHRUBS	0.4	0.7	0.4	0.7	20.0					3		2					1			
				ALL-HIT		0	0	0	0	3	0	2	0	0	0	0	1	0	0	0
TOTAL NATIVE SHRUBS	21.7	39.4	22.9	37.9	100.0	26	31(1)	19(1)	19(3)	15(3)	15(1)	20	10(1)	31(1)	16(1)	31(4)	15(1)	24	30	23(1)
				ALL-HIT		26	32	20	22	18	16	20	11	32	17	35	16	24	30	24
Standing Dead	1.67		1.67				2	5	3	1	2	2	1		1		3	3	2	
Litter	14.93		14.93			5	14	12	10	14	7	9	14	19	16	19	16	12	21	36
Bare Ground (Soil)	19.87		19.87			14	12	36	16	21	35	19	16	14	18	15	17	30	17	18
Rock	8.53		8.53			9	15	8		18	11	20	4	12	5	3	9	9	4	1
TOTALS	100		105			100(7)	100(10)	100(3)	100(8)	100(6)	100(2)	100(5)	100(4)	100(5)	100(9)	100(8)	100(4)	100(3)	100(3)	100(2)
TOTAL VEGETATION COVER	55.0		60.3			72(7)	57(10)	39(3)	71(8)	46(6)	45(2)	50(5)	65(4)	55(5)	60(9)	63(8)	55(4)	46(3)	56(3)	45(2)
Standard Deviation	*9.936*		*11.732*																	
GROUND COVER (Litter+Rock+Veg+St.Dead)	80.1		85.4			86(7)	88(10)	64(3)	84(8)	79(6)	65(2)	81(5)	84(4)	86(5)	82(9)	85(8)	83(4)	70(3)	83(3)	82(2)
Standard Deviation	*7.567*		*9.349*																	
SPECIES DENSITY (# of species/100 sq.m.)	18.2					16	21	11	28	19	13	11	17	14	20	20	18	18	23	24
Standard Deviation	4.799																			
TOTAL ALL HIT VEGETATION COVER						79	67	42	79	52	47	55	69	60	69	71	59	49	59	47
Annual / biennial non-noxious cover						36	7	3	6	7	17	4	23	13	18	4	10	12	9	7
10% of non-noxious cover that can be annual/biennial						7.1	6.7	4.2	7.9	5.2	4.7	5.5	6.9	5.9	6.6	7.1	5.9	4.9	5.9	4.7
Annual/Biennial subtraction factor						28.9	0.3	0	0	1.8	12.3	0	16.1	7.1	11.4	0	4.1	7.1	3.1	2.3
ALL HIT Non-Herbaceous cover subtraction (Shrubs, Trees, Non-vascular)						26.0	32.0	20.0	22.0	21.0	16.0	22.0	11.0	32.0	17.0	35.0	17.0	24.0	30.0	24.0
ALL HIT Noxious weed subtraction					Upward Adj. of Mean	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
Total deduction per transect						62.9	32.3	20.0	22.0	22.8	28.3	22.0	27.1	40.1	31.4	35.0	21.1	31.1	33.1	26.3
ALL HIT MEAN ALLOWABLE HERBACEOUS	**29.90**				**33.83**	16.1	34.7	22.0	57.0	29.2	18.7	33.0	41.9	19.9	37.6	36.0	37.9	17.9	25.9	20.7
Standard Deviation	11.32																			
N	15																			
t	1.345				C.I.															
Nmin	**26.0**				3.93															

Adj. Sample Adequacy Expression (d)	0.132
Upward Adjustment of Mean	**33.83**

Table I-1. Allowable Herbaceous Production Calculations - Example of Calculations from Bond Release Block 6, 2023 Data

PLANT SPECIES	AVERAGE PRODUCTION (gms/0.5m²)	AVERAGE PRODUCTION (lb/acre)	FREQUENCY (%)	Production (gm/0.5 m²) ---Sample Number--- 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TOTAL NATIVE ANNUAL AND BIENNIAL FORBS	0.7	13.1	31.3	10.9	1	1.8	T	3.6				2.2								T										0.6			3.3		T
TOTAL INTRODUCED ANNUAL AND BIENNIAL FORBS	6.4	114.6	71.9	T		1.7		1.3	50.6		T	T	2.1	1.5	30.3	3	10	T	14.1	14.3		0.6				7.8		45.4		1.9	T	14	1.3	4	1.6
TOTAL ANNUAL GRASSES	0.2	2.7	15.6			1.5		3.3				T	T	T																					
TOTAL NATIVE PERENNIAL FORBS	2.0	36.5	37.5		1.8	6.1	1						T		8.9	26.1		T			1.8			0.4			T		0.8				18.5	
TOTAL INTRODUCED PERENNIAL FORBS	4.6	82.0	28.1					6..2	T									87.6		7.4	T		2.2		23.2	8.1	T		18.6					
TOTAL NATIVE PERENNIAL GRASSES (c)	14.5	259.0	56.3	7.5	86.6		2	14.4			48.3	30.1	15.3	30.2	26.7	2.8		13.1		22						4.4		8	28.4	53			27.3		44.4
TOTAL INTRODUCED PERENNIAL GRASSES (c)	63.5	1,133.3	68.8	28.8		36.8	75		54.9	135.9			188.3	46.1	9.7		56.7		27.8		233.3	192.1	99.7	189	151.8	27.9	50		125.5		77.2	85.5	3	137.4	
TOTAL PRODUCTION	92.0	1,641.2		47.2	89.4	47.9	78.0	22.6	105.5	135.9	48.3	32.3	205.7	77.8	75.6	31.9	66.7	100.7	41.9	43.7	235.1	192.7	101.9	189.4	175.0	48.2	50.0	53.4	173.3	55.5	77.2	99.5	34.9	159.9	46.0
Standard Deviation	*59.457*	*1060.947*																																	
Annual / biennial production	7.31			10.91	1.00	5.00	0.01	8.20	50.60	0.00	0.01	2.22	2.11	1.51	30.30	3.00	10.00	0.01	14.10	14.31	0.00	0.60	0.00	0.00	0.00	7.80	0.00	45.40	0.00	2.50	0.01	14.00	4.60	4.00	1.61
10% of non-noxious producation that can be annual/biennial	9.20			4.72	8.94	4.79	7.80	2.26	10.55	13.59	4.83	3.23	20.57	7.78	7.56	3.19	6.67	10.07	4.19	4.37	23.51	19.27	10.19	18.94	17.50	4.82	5.00	5.34	17.33	5.55	7.72	9.95	3.49	15.99	4.60
Annual/Biennial subtraction factor (No subtraction is made if value is negative)	-1.89			6.19	0	0.21	0	5.94	40.05	0	0	0	0	0	22.74	0	3.33	0	9.91	9.94	0	0	0	0	0	2.98	0	40.06	0	0	0	4.05	1.11	0	0
Allowable herbaceous production	87.40	1559.53	gms/0.5m²	41.02	89.40	47.69	78.01	16.66	65.46	135.90	48.31	32.32	205.72	77.81	52.86	31.90	63.37	100.72	31.99	33.77	235.11	192.70	101.90	189.40	175.00	45.22	50.02	13.34	173.30	55.50	77.21	95.45	33.79	159.90	46.01
Standard Deviation	62.10	1108.10	lbs/acre	732.0	1595.2	851.0	1392.0	297.3	1168.1	2425.0	862.0	576.7	3670.8	1388.4	943.2	569.2	1130.8	1797.2	570.8	602.6	4195.3	3438.5	1818.3	3379.6	3122.7	806.9	892.5	238.0	3092.3	990.3	1377.7	1703.2	602.9	2853.2	821.0
N	32	32																																	
t	1.309	1.309																																	
Nmin	87	87																																	

PLANT SPECIES	AVERAGE PRODUCTION (gms/0.5m^2)	AVERAGE PRODUCTION (lb/acre)	FREQUENCY (%)	Production (gm/0.5 m^2) ---Sample Number--- 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TOTAL NATIVE ANNUAL AND BIENNIAL FORBS	0.0	0.4	46.9	T			T	0.6	T		T			T	T				T	T		T			T	T			T			T	T		
TOTAL INTRODUCED ANNUAL AND BIENNIAL FORBS	1.9	34.5	43.8	1.7		T	T	T	31.1	1			0.4	0.6				25									T	T		2		T	T		
TOTAL ANNUAL GRASSES	0.7	12.7	53.1	9.2	T	T	T	T		T		T		3.3		T			T	T					T		T	T		6.1		T	4.1		
TOTAL NATIVE PERENNIAL FORBS	6.0	107.9	84.4	11.5	2.8		4.5		13.7		3.3	1.5	20.2	37.3	17.9		3.2	21.1	1.1	6.5	T	1	T	10.5	T		1.6	16	0.7	T	2.3	2.5	10.9	T	3.3
TOTAL NATIVE PERENNIAL GRASSES (c)	28.6	510.6	96.9	0.9	31.5	244.9	56.1	26.1		15	28.8	35.3	10.9	6.3	17.7	8.6	12.5	3.9	45.7	16	34.2	23.5	53.6	3.3	81.1	16.6	9.2	23	11.6	5.1	10.7	30.5	16.2	28.9	8
TOTAL INTRODUCED PERENNIAL GRASSES (c)	0.0	0.7	3.1						1.2																										
TOTAL PRODUCTION	37.4	666.8		23.3	34.3	244.9	60.6	26.7	46.0	16.0	32.1	36.8	31.5	47.5	35.6	8.6	15.7	50.0	46.8	22.5	34.2	24.5	53.6	13.8	81.1	16.6	10.8	39.0	12.3	13.2	13.0	33.0	31.2	28.9	11.3
Standard Deviation	*41.374*	*738.266*																																	
Annual / biennial production	2.67			10.91	0.01	0.02	0.03	0.62	31.11	1.01	0.01	0.01	0.40	3.91	0.01	0.01	0.00	25.00	0.02	0.02	0.00	0.01	0.00	0.00	0.02	0.01	0.02	0.02	0.01	8.10	0.00	0.03	4.12	0.00	0.00
10% of non-noxious producation that can be annual/biennial	3.74			2.33	3.43	24.49	6.06	2.67	4.60	1.60	3.21	3.68	3.15	4.75	3.56	0.86	1.57	5.00	4.68	2.25	3.42	2.45	5.36	1.38	8.11	1.66	1.08	3.90	1.23	1.32	1.30	3.30	3.12	2.89	1.13
Annual/Biennial subtraction factor (No subtraction is made if value is negative)	-1.07			8.58	0	0	0	0	26.51	0	0	0	0	0	0	0	0	20.00	0	0	0	0	0	0	0	0	0	0	0	6.78	0	0	1.00	0	0
Allowable herbaceous production	35.40	631.74	gms/0.5m^2	14.73	34.31	244.92	60.63	26.72	19.50	16.01	32.11	36.81	31.50	47.51	35.61	8.61	15.70	30.00	46.82	22.52	34.21	24.51	53.61	13.80	81.13	16.61	10.82	39.02	12.31	6.43	13.00	33.03	30.22	28.91	11.30
Standard Deviation	41.65	743.24	lbs/acre	262.9	612.2	4370.3	1081.9	476.8	348.0	285.7	573.0	656.8	562.1	847.8	635.4	153.6	280.1	535.3	835.4	401.8	610.4	437.4	956.6	246.2	1447.7	296.4	193.1	696.3	219.7	114.8	232.0	589.4	539.3	515.9	201.6
N	32	32																																	
t	1.309	1.309																																	
Nmin	238	238																																	

Table J-1. Species Diversity Test A- Phase III Bond Release Block 6, Seneca 2W Mine, SPL, Routt Co., CO - 2022-2023

2022 Mandatory Test A):	***No Overwhelming Dominant***	PASS?
	No single plant species may exceed 60% relative cover.	YES

A determination of PASS was made because the species with the greatest (all hit) relative cover (Medicago sativa) had 18.10 % relative cover (far less than the 60 % limit).

PLANT SPECIES	ALL HIT RELATIVE VEGETATION COVER-ALL[e] (%)
NATIVE ANNUAL AND BIENNIAL FORBS	
Collinsia parviflora	0.77
Collomia linearis	0.06
Descurainia pinnata	0.00
Epilobium brachycarpum	1.84
Erigeron divergens	0.00
Grindelia squarrosa	1.84
Lupinus brevicaulis	0.00
Microsteris gracilis ssp. humilis	0.06
Orthocarpus luteus	0.06
Plantago elongata	0.00
TOTAL NATIVE ANNUAL AND BIENNIAL FORBS	4.6
INTRODUCED ANNUAL AND BIENNIAL FORBS	
Alyssum alyssoides	0.47
Alyssum desertorum	0.36
Alyssum parviflorum	0.18
Bassia sieversiana	0.00
Camelina microcarpa	0.18
Carduus nutans ssp. macrolepis	0.00
Cynoglossum officinale	0.89
Lactuca serriola	3.15
Lappula redowskii	0.00
Lepidium perfoliatum	0.06
Madia glomerata	0.12
Melilotus officinalis	1.60
Pocilla biloba	0.77
Sisymbrium altissimum	0.00
Thlaspi arvense	0.00
Tragopogon dubius ssp. major	2.08
TOTAL INTRODUCED ANNUAL AND BIENNIAL FORBS	9.9
INTRODUCED ANNUAL GRASSES	
Bromus arvensis	2.37
Bromus tectorum	0.06
Poa bulbosa	0.95
TOTAL ANNUAL GRASSES	3.4

PLANT SPECIES	ALL HIT RELATIVE VEGETATION COVER-ALL[e] (%)
NATIVE PERENNIAL FORBS	
Achillea millefolium	2.91
Agoseris glauca	2.79
Allium textile	0.00
Artemisia ludoviciana	0.00
Astragalus bisulcatus	0.00
Astragalus miser var. oblongifolius	0.24
Balsamorhiza sagittata	0.18
Cirsium eatonii	0.00
Gaura coccinea	0.00
Helianthella uniflora	0.00
Heliomeris multiflora	0.06
Heterotheca villosa	0.00
Linum lewisii	0.30
Lithospermum ruderale	0.00
Lupinus argenteus	0.00
Lupinus caudatus	0.00
Machaeranthera canescens	0.00
Penstemon sp.	0.12
Penstemon strictus	0.00
Perideridia gairdneri ssp. borealis	0.12
Phlox longifolia	0.06
Senecio sp.	0.00
Symphyotrichum ascendens	1.60
Vicia americana	0.06
Virgulus falcatus	0.00
Wyethia amplexicaulis	0.06
TOTAL NATIVE PERENNIAL FORBS	8.5
INTRODUCED PERENNIAL FORBS	
Astragalus cicer	0.47
Cirsium arvense	0.30
Convolvulus arvensis	0.42
Medicago sativa	18.10
Rumex crispus	0.00
Taraxacum officinale	0.30
TOTAL INTRODUCED PERENNIAL FORBS	19.6

PLANT SPECIES	ALL HIT RELATIVE VEGETATION COVER-ALL[e] (%)
NATIVE PERENNIAL GRASSES (cool)	
Achnatherum lettermanii	0.06
Bromelica bulbosa	0.06
Bromus carinatus var. marginatus	0.06
Elymus elymoides	0.00
Elymus glaucus	0.00
Elymus lanceolatus sp. lanceolatus	1.42
Elymus lanceolatus fm. albicans	0.00
Elymus trachycaulus	0.00
Koeleria macrantha	0.12
Leymus cinereus	1.19
Nassella viridula	0.42
Pascopyrum smithii	17.33
Poa compressa	0.12
Poa secunda	0.24
Poa secunda ssp. juncifolia	0.06
Pseudoroegneria spicata ssp. inermis	1.01
Pseudoroegneria spicata ssp. spicata	0.47
TOTAL NATIVE PERENNIAL GRASSES (c)	22.6
INTRODUCED PERENNIAL GRASSES (c)	
Agrostis gigantea	0.00
Alopecurus pratensis	0.12
Bromopsis inermis	4.75
Dactylis glomerata	0.12
Festuca ovina	2.31
Phleum pratense	0.00
Poa pratensis ssp. pratensis	0.30
Thinopyrum intermedium	15.01
TOTAL INTRODUCED PERENNIAL GRASSES (c)	22.6
NATIVE SHRUBS	
Artemisia cana	1.25
Artemisia tridentata	2.61
Chrysothamnus viscidiflorus	0.00
Ericameria nauseosa	4.75
Purshia tridentata	0.24
Rosa woodsii	0.00
Symphoricarpos rotundifolius	0.06
TOTAL NATIVE SHRUBS	8.9

2023 Mandatory Test A):	***No Overwhelming Dominant***	PASS?
	No single plant species may exceed 60% relative cover.	YES

A determination of PASS was made because the species with the greatest (all hit) relative cover (Thinopyrum intermedium) had 20.7 % relative cover (far less than the 60 % limit).

PLANT SPECIES	ALL HIT RELATIVE VEGETATION COVER-ALL[e] (%)
NATIVE ANNUAL AND BIENNIAL FORBS	
Collinsia parviflora	0.05
Collomia grandiflora	0.15
Collomia linearis	0.20
Epilobium brachycarpum	0.49
Grindelia squarrosa	0.89
Helianthus annuus	0.00
Polygonum douglasii	0.00
Native Annual/Biennial Forb	0.00
TOTAL NATIVE ANNUAL AND BIENNIAL FORBS	1.8
Alyssum alyssoides	0.05
Alyssum desertorum	0.05
Alyssum parviflorum	0.79
Bassia sieversiana	0.00
Cynoglossum officinale	0.10
Lactuca serriola	2.03
Lepidium perfoliatum	0.35
Madia glomerata	0.00
Medicago lupulina	0.05
Melilotus officinalis	6.08
Pocilla biloba	2.72
Polygonum arenastrum	0.10
Scorzonera laciniata	0.15
Sisymbrium altissimum	0.10
Thlaspi arvense	0.00
Tragopogon dubius ssp. major	0.49
TOTAL INTRODUCED ANNUAL AND BIENNIAL FORBS	13.0
Bromus arvensis	2.96
Poa bulbosa	0.59
TOTAL ANNUAL GRASSES	3.6

PLANT SPECIES	ALL HIT RELATIVE VEGETATION COVER-ALL[e] (%)
NATIVE PERENNIAL FORBS	
Achillea millefolium	2.12
Allium textile	0.20
Aster lanceolatus ssp. hesperius	0.00
Astragalus miser var. oblongifolius	0.05
Astragalus sp.	0.00
Balsamorhiza sagittata	0.44
Calochortus nuttallii	0.00
Cirsium sp.	0.05
Crepis occidentalis	0.15
Eriogonum umbellatum	0.00
Galium aparine	0.05
Gayophytum diffusum ssp. parviflorum	0.25
Helianthella uniflora	0.05
Heliomeris multiflora	0.00
Heterotheca villosa	0.00
Linum lewisii	0.49
Lotus corniculatus	0.05
Lupinus argenteus	0.10
Machaeranthera canescens	0.00
Microseris nutans	0.05
Nothocalais sp.	0.20
Oxybaphus linearis	0.00
Penstemon sp.	0.25
Perideridia gairdneri ssp. borealis	0.10
Phlox longifolia	0.00
Physaria acutifolia	0.00
Senecio integerrimus	0.00
Symphyotrichum ascendens	0.44
Vicia americana	0.05
TOTAL NATIVE PERENNIAL FORBS	5.1
INTRODUCED PERENNIAL FORBS	
Astragalus cicer	0.59
Cirsium arvense	0.05
Convolvulus arvensis	0.05
Medicago sativa	11.22
Rumex crispus	0.05
TOTAL INTRODUCED PERENNIAL FORBS	12.0

PLANT SPECIES	ALL HIT RELATIVE VEGETATION COVER-ALL[e] (%)
NATIVE PERENNIAL GRASSES (c)	
Achnatherum lettermanii	0.40
Agrostis scabra	0.05
Bromelica bulbosa	0.00
Bromus carinatus var. marginatus	0.00
Elymus elymoides	0.00
Elymus lanceolatus sp. lanceolatus	3.36
Elymus trachycaulus	0.15
Koeleria macrantha	0.30
Leymus cinereus	2.22
Nassella viridula	0.10
Pascopyrum smithii	16.25
Phalaroides arundinacea	0.59
Poa compressa	0.10
Poa secunda	0.25
Pseudoroegneria spicata ssp. inermis	0.59
Pseudoroegneria spicata ssp. spicata	0.64
TOTAL NATIVE PERENNIAL GRASSES (c)	25.0
INTRODUCED PERENNIAL GRASSES (c)	
Agropyron cristatum	0.05
Alopecurus pratensis	0.05
Bromopsis inermis	8.05
Dactylis glomerata	0.10
Festuca ovina	4.05
Phleum pratense	0.10
Poa pratensis ssp. pratensis	1.58
Thinopyrum intermedium	20.65
TOTAL INTRODUCED PERENNIAL GRASSES (c)	34.6
NATIVE SUB-SHRUBS	
Gutierrezia sarothrae	0.00
TOTAL NATIVE SUB-SHRUBS	0.0
NATIVE SHRUBS	
Amelanchier alnifolia	0.05
Artemisia cana	0.49
Artemisia tridentata	1.73
Ericameria nauseosa	2.22
Purshia tridentata	0.40
Symphoricarpos rotundifolius	0.00
TOTAL NATIVE SHRUBS	4.9
BRYOPHYTES	
Moss	0.05
TOTAL BRYOPHYTES	0.0

2022 Alternative Test B):	***Total Species Density Test (this test does not include noxious weeds)***	PASS?
	The bond release block must exceed the probability-adjusted density standard standard.	YES

Probability-adjusted density standard = 20.64
Phase III Bond Release Block 6 Species Density = 22.4 +/- 0.97
Since the bond release block number exceeds the standard, a determination of PASS is made.

Area	Species Density mean[1]	Standard Deviation (s)	N[2]	t	N-min (rounded value) [3]	90% ci[4]	
Yoast Phase III Bond Release Block 6	22.4	4.196	**32**	**1.309**	7	**0.97**	**0.97**
Aspen Reference Area	29.8	8.4	17	1.337	15		
Mtn. Brush Reference Area	26.4	5.6	15	1.345	9		
Sagebrush Reference Area	28.2	3.7	18	1.333	4		
Steep Mtn. Brush Reference Area	22.7	6.3	18	1.333	14		
Western Wheatgrass Reference Area	27.1	6.3	24	1.319	10		
Area Weighted Mean of Reference Area	**26.92**	**5.46**	*Percent area of the five vegetation types in the Yoast Reference Area used for area weighted mean calculation: Aspen 0.110, Mountain Brush 0.345, Sagebrush 0.313, Steep Mountain Brush 0.128, and Western Wheatgrass 0.104.*				
Probability-adjusted density standard[5]	**20.64**						

[1]Minus noxious weeds

[2]N = Sample Size

[3]N-min = Minimum sample size necessary to detect a 10% reduction in the mean with 90% confidence using n-1 degrees of freedom

[4]Confidence limits = +/- t(alpha = 0.1, one-tailed, d.f. = n-1) x std error (s / sqrt n)

[5]= (# of species /100 sq.m.) - (1.15)*(Standard Deviation)

2023 Alternative Test B):	***Total Species Density Test (this test does not include noxious weeds)***	PASS?
	The bond release block must exceed the probability-adjusted density standard standard.	NO

Probability-adjusted density standard = 18.2

Phase III Bond Release Block 6 Species Density = 17.0 +/- 1.19

Since the bond release block number exceeds the standard, a determination of PASS is made.

Area	Species Density mean[1]	Standard Deviation (s)	N[2]	t	N-min (rounded value) [3]	90% ci[4]	
Yoast Phase III Bond Release Block 6	17.0	5.146	**32**	**1.309**	16	**1.19**	**1.19**
Aspen Reference Area	31.4	5.6	18	1.333	6		
Mtn. Brush Reference Area	27.3	4.1	15	1.345	5		
Sagebrush Reference Area	23.2	5.9	17	1.337	12		
Steep Mtn. Brush Reference Area	17.1	4.9	15	1.345	15		
Western Wheatgrass Reference Area	20.6	4.7	16	1.341	10		
Area Weighted Mean of Reference Area	**24.47**	**4.99**	*Percent area of the five vegetation types in the Yoast Reference Area used for area weighted mean calculation: Aspen 0.110, Mountain Brush 0.345, Sagebrush 0.313, Steep Mountain Brush 0.128, and Western Wheatgrass 0.104.*				
Probability-adjusted density standard[5]	**18.72**						

[1]Minus noxious weeds

[2]N = Sample Size

[3]N-min = Minimum sample size necessary to detect a 10% reduction in the mean with 90% confidence using n-1 degrees of freedom

[4]Confidence limits = +/- t(alpha = 0.1, one-tailed, d.f. = n-1) x std error (s / sqrt n)

[5]= (# of species /100 sq.m.) - (1.15)*(Standard Deviation)

2022 Alternative Test C):	***Species Density Distribution Assessment Among Lifeforms***	PASS?
	The bond release block must exceed the similarity of the species density by life form standard.	YES

The similarity of the species density by life form of the Phase III bond release block to that of the weighted reference area mean was 0.81, exceeding the standard of 0.63 and indicating a PASS for this test.

	Yoast Phase III Bond Release Block 6	**Weighted Reference Area Mean[1]**	
	Species Density Average		Lesser of Reclaimed vs. Reference
Ann/ Bien. Forbs	7.6	5.1	5.1
Ann. Grasses	0.8	0.5	0.5
Peren. Forbs	6.2	10.9	6.2
Peren. Grass (cool)	6.2	5.8	5.8
TOTAL	20.8	22.3	
		2c/a+b	**0.81**
90% of standard	**0.63**		**Pass**

[1]Percent area of the five vegetation types in the Reference Area used for area weighted mean calculation: Aspen 0.110, Mountain Brush 0.345, Sagebrush 0.313, Steep Mountain Brush 0.128, and Western Wheatgrass 0.104.

	Yoast Phase III Bond Release Block 6	**Aspen Reference Area**		**Mountain Brush Reference Area**		**Sagebrush Reference Area**		**Steep Mtn. Brush Reference Area**		**Western Wheatgrass Reference Area**	
	Species Density Average	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference
Ann/ Bien. Forbs	7.6	2.3	2.3	4.9	4.9	5.9	5.9	3.7	3.7	7.7	2.3
Ann. Grasses	0.8	0.0	0.0	0.2	0.2	0.7	0.7	1.0	0.8	0.7	0.0
Peren. Forbs	6.2	16.4	6.2	11.4	6.2	10.7	6.2	6.6	6.2	9.7	6.2
Peren. Grass (cool)	6.2	4.2	4.2	5.3	5.3	6.9	6.2	5.4	5.4	6.0	4.2
TOTAL	20.8	22.9		21.9		24.2		16.7		24.0	
		2c/a+b	**0.58**	**2c/a+b**	**0.78**	**2c/a+b**	**0.84**	**2c/a+b**	**0.86**	**2c/a+b**	**0.57**

2023 Alternative Test C):	***Species Density Distribution Assessment Among Lifeforms***	PASS?
	The bond release block must exceed the similarity of the species density by life form standard.	YES

The similarity of the species density by life form of the Phase III bond release block to that of the weighted reference area mean was 0.79, exceeding the standard of 0.63 and indicating a PASS for this test.

	Yoast Phase III Bond Release Block 6	**Weighted Reference Area Mean[1]**	
	Species Density Average		Lesser of Reclaimed vs. Reference
Ann/ Bien. Forbs	5.2	3.4	3.4
Ann. Grasses	0.6	0.4	0.4
Peren. Forbs	4.8	10.4	4.8
Peren. Grass (cool)	5.6	5.7	5.6
TOTAL	16.1	19.9	
		2c/a+b	**0.79**
90% of standard	**0.63**		**Pass**

[1]Percent area of the five vegetation types in the Reference Area used for area weighted mean calculation: Aspen 0.110, Mountain Brush 0.345, Sagebrush 0.313, Steep Mountain Brush 0.128, and Western Wheatgrass 0.104.

	Yoast Phase III Bond Release Block 6	**Aspen Reference Area**		**Mountain Brush Reference Area**		**Sagebrush Reference Area**		**Steep Mtn. Brush Reference Area**		**Western Wheatgrass Reference Area**	
	Species Density Average	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference	Species Density Average	Lesser of Reclaimed vs. Reference
Ann/ Bien. Forbs	5.2	2.3	2.3	4.3	4.3	2.7	2.7	2.1	2.1	4.9	2.3
Ann. Grasses	0.6	0.0	0.0	0.2	0.2	0.5	0.5	1.0	0.6	0.8	0.0
Peren. Forbs	4.8	16.6	4.8	10.8	4.8	10.6	4.8	5.3	4.8	8.3	4.8
Peren. Grass (cool)	5.6	4.9	4.9	6.5	5.6	5.9	5.6	4.2	4.2	5.4	4.9
TOTAL	16.1	23.9		21.7		19.6		12.7		19.3	
		2c/a+b	**0.60**	**2c/a+b**	**0.78**	**2c/a+b**	**0.76**	**2c/a+b**	**0.81**	**2c/a+b**	**0.68**

2022 Alternative Test D):	***Native Species Presence Assessment***	PASS?
	Total cumulative # of native species > or = avg ref area native species density (# species/100 sq.m.)	YES

The weighted average species density of native species per 100 sq.m. from the four extended reference areas is 22.8. The cumulative number of native species in the 7 100 sq.m. samples of the Phase III bond release block that constitute an adequate sample (based on allowable all-hit herbaceous cover) is 31, exceeding 22.8 and indicating a PASS on this test.

Area	**Cumulative Number of NATIVE Species in the minimum adequate number of samples (i.e. 10, based on total cover) minus noxious weeds**	**Cumulative Number of NATIVE Species in the minimum adequate number of samples (i.e. 7, based on species diversity) minus noxious weeds**
Yoast Phase III Bond Release Block 6	37.0	31.0

	Average Reference area native species density (# species/100 sq.m.) minus noxious weeds
Aspen Reference Area	27.59
Mtn. Brush Reference Area	23.13
Sagebrush Reference Area	23.39
Steep Mtn. Brush Reference Area	18.33
Western Wheatgrass Reference Area	20.79
Area Weighted Mean of Reference Area[1]	**22.8**

[1]Percent area of the five vegetation types in the Reference Area used for area weighted mean calculation: Aspen 0.110, Mountain Brush 0.345, Sagebrush 0.313, Steep Mountain Brush 0.128, and Western Wheatgrass 0.104.

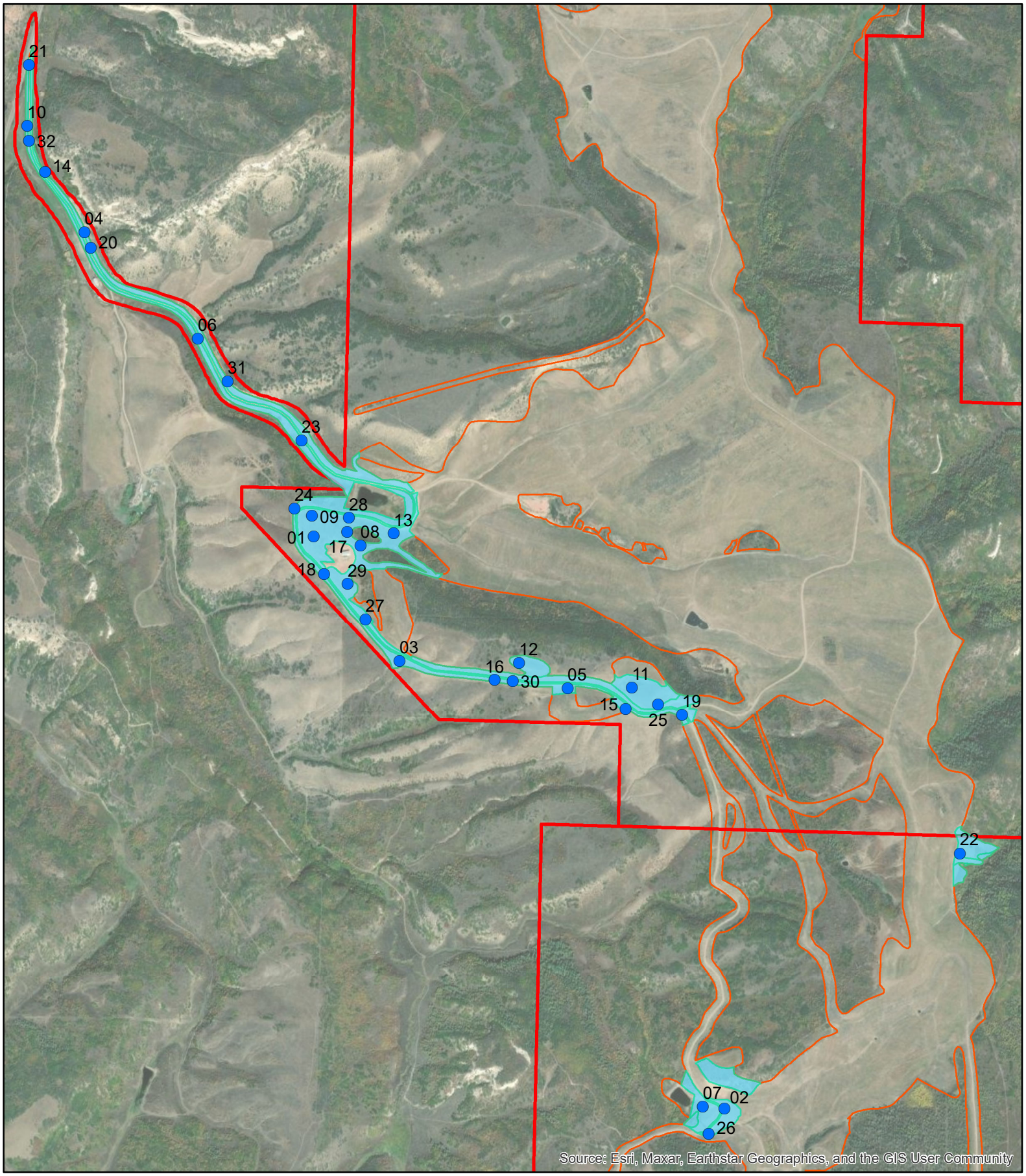
2023 Alternative Test D):	***Native Species Presence Assessment***	PASS?
	Total cumulative # of native species > or = avg ref area native species density (# species/100 sq.m.)	YES

The weighted average species density of native species per 100 sq.m. from the four extended reference areas is 21.9. The cumulative number of native species in the 16 100 sq.m. samples of the Phase III bond release block that constitute an adequate sample (based on species diversity) is 46, exceeding 21.9 and indicating a PASS on this test.

Area	**Cumulative Number of NATIVE Species in the minimum adequate number of samples (i.e. 20, based on total cover) minus noxious weeds**	**Cumulative Number of NATIVE Species in the minimum adequate number of samples (i.e. 16, based on species diversity) minus noxious weeds**
Yoast Phase III Bond Release Block 6	54.0	46.0

	Average Reference area native species density (# species/100 sq.m.) minus noxious weeds
Aspen Reference Area	29.50
Mtn. Brush Reference Area	24.47
Sagebrush Reference Area	21.06
Steep Mtn. Brush Reference Area	14.80
Western Wheatgrass Reference Area	16.50
Area Weighted Mean of Reference Area[1]	**21.9**

[1]Percent area of the five vegetation types in the Reference Area used for area weighted mean calculation: Aspen 0.110, Mountain Brush 0.345, Sagebrush 0.313, Steep Mountain Brush 0.128, and Western Wheatgrass 0.104.



Map 1.
Vegetation Evaluation Locations
2022 Phase III BRB-6

Seneca IIW Mine
Seneca Property, LLC
Routt County, CO

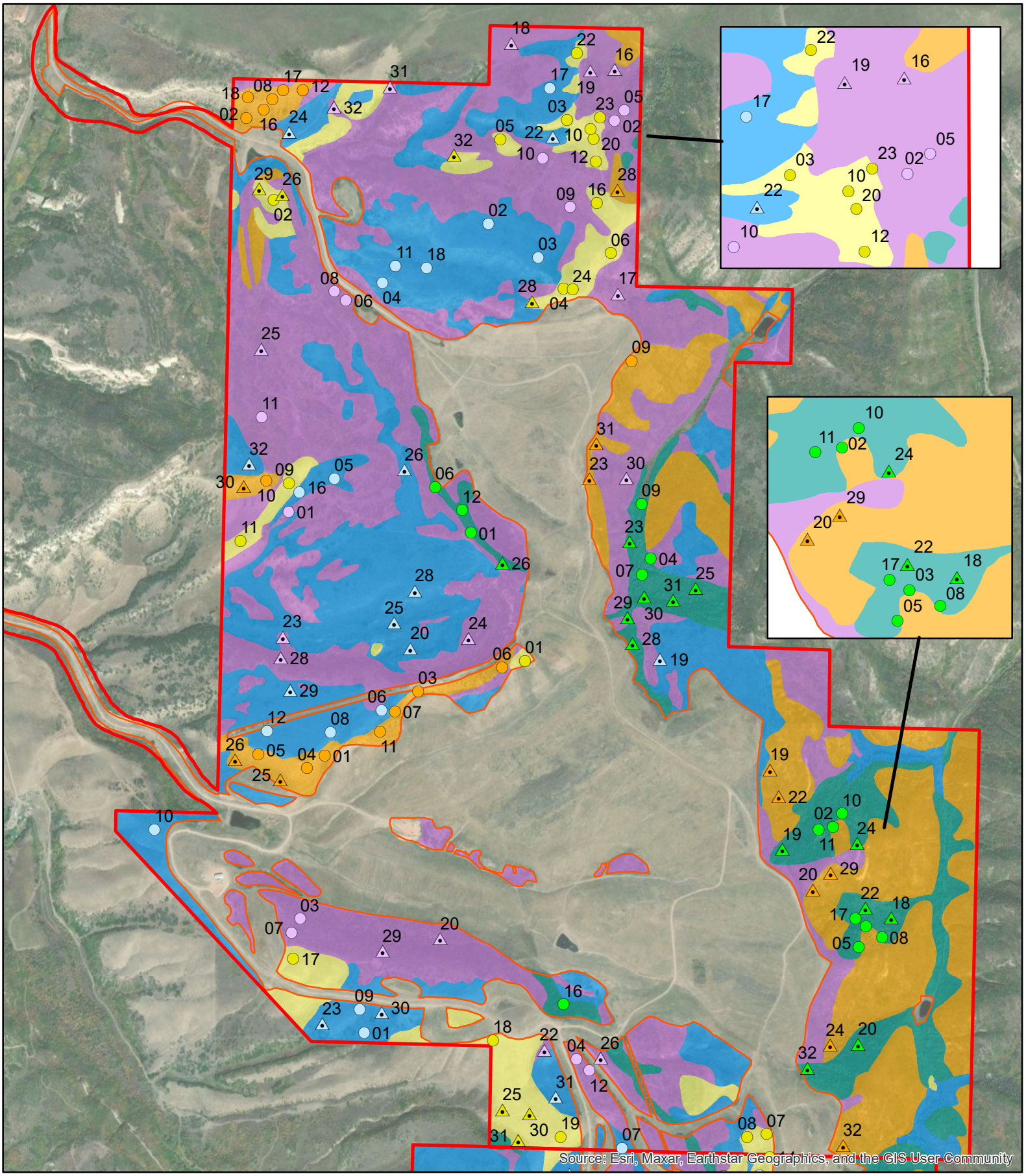
BRB-6 Sample Locations

- Cover, Production, and WPD (1-32)
- BRB-6 (81.1ac)
- Permit Boundary
- Disturbance Boundary

0 190 380 570 Meters

N W E S

CEDAR CREEK ASSOCIATES, INC



Field Map 2a.
Vegetation Evaluation Locations
2022 Combined Extended Reference Areas (Northern Portion)
Seneca IIW Mine
Seneca Property, LLC
Routt County, CO

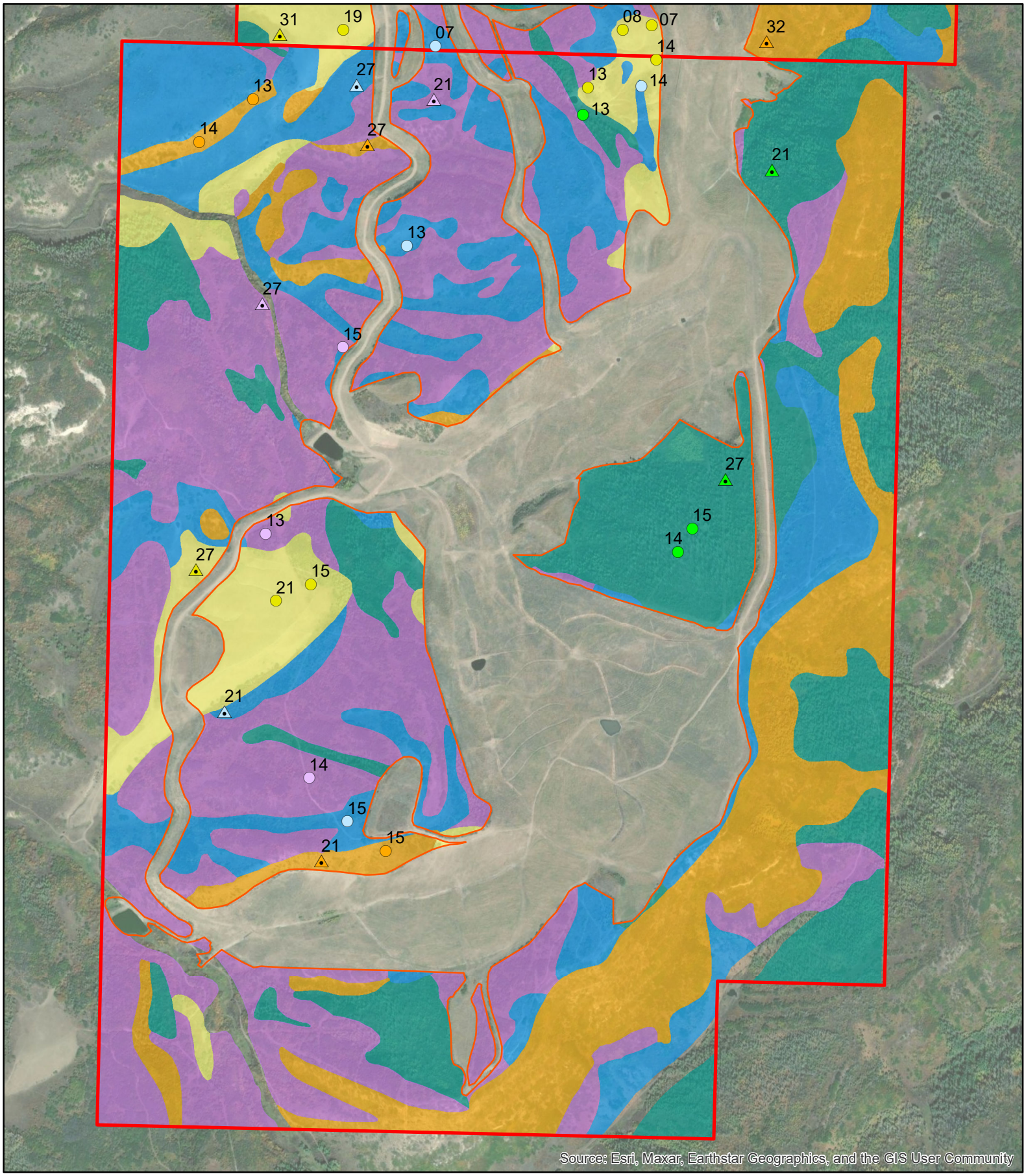
ERA Sample Locations
- Aspen Cover and Production (1-17)
- Aspen Production Only (18-32)
- MB Cover and Production (1-15)
- MB Production Only (16-32)
- SB Cover and Production (1-18)
- SB Production Only (19-32)
- SMB Cover and Production (1-18)
- SMB Production Only (19-32)
- WW Cover and Production (1-24)
- WW Production Only (25-32)

ERA Vegetation Types
- Aspen
- Mountain Brush (MB)
- Sagebrush/Snowberry (SB)
- Steep Mountain Brush (SMB)
- Western Wheat/Alkali Sage (WW)
- Permit Boundary
- Disturbance Boundary

0 190 380 570 Meters

N W E S

CEDAR CREEK ASSOCIATES, INC



Field Map 2b.
Vegetation Evaluation Locations
2022 Combined Extended Reference Areas (Southern Portion)
Seneca IIW Mine
Seneca Property, LLC
Routt County, CO

ERA Sample Locations

- Aspen Cover and Production (1-17)
- Aspen Production Only (18-32)
- MB Cover and Production (1-15)
- MB Production Only (16-32)
- SB Cover and Production (1-18)
- SB Production Only (19-32)
- SMB Cover and Production (1-18)
- SMB Production Only (19-32)
- WW Cover and Production (1-24)
- WW Production Only (25-32)

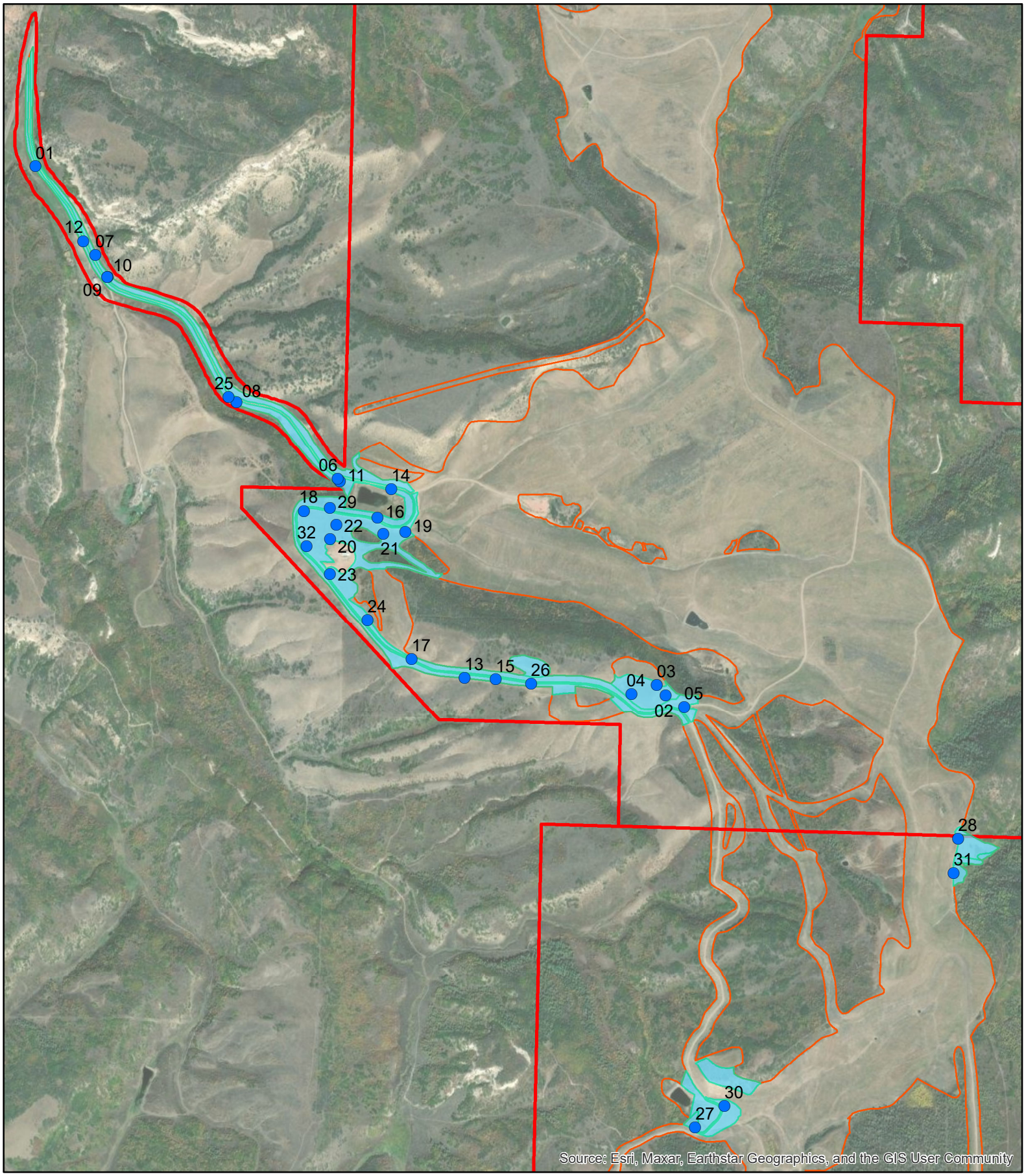
ERA Vegetation Types

- Aspen
- Mountain Brush (MB)
- Sagebrush/Snowberry (SB)
- Steep Mountain Brush (SMB)
- Western Wheat/Alkali Sage (WW)
- Permit Boundary
- Disturbance Boundary

0 125 250 375 Meters

N W E S

CEDAR CREEK ASSOCIATES, INC



Map 3.
Vegetation Evaluation Locations
2023 Phase III BRB-6

Seneca IIW Mine
Seneca Property, LLC
Routt County, CO

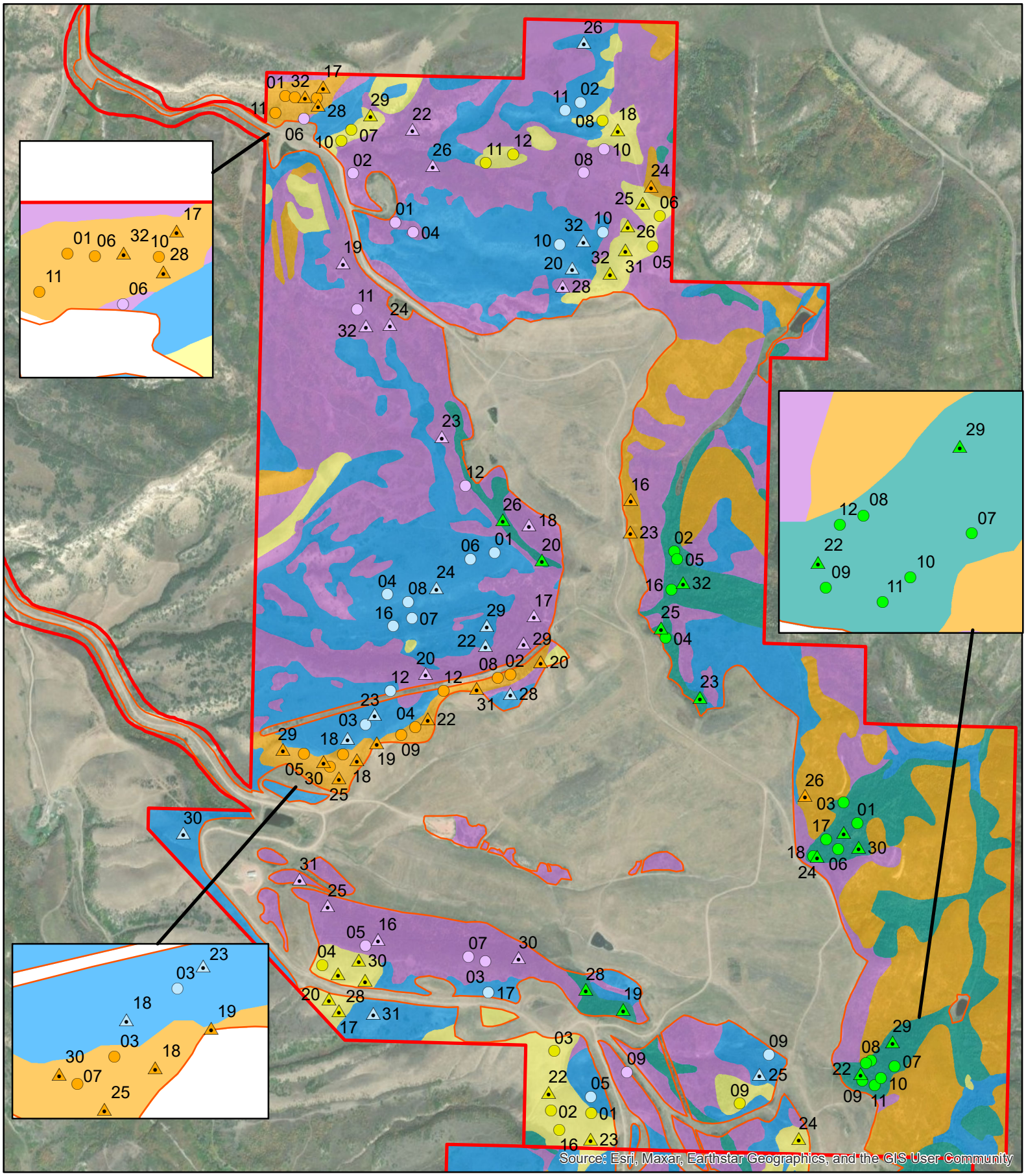
BRB-6 Sample Locations

- Cover, Production, and WPD (1-32)
- BRB-6 (81.1ac)
- Permit Boundary
- Disturbance Boundary

0 190 380 570 Meters

N W E S

CEDAR CREEK ASSOCIATES, INC.



Field Map 4a.
Vegetation Evaluation Locations
2023 Combined Extended Reference Areas (Northern Portion)
Seneca IIW Mine
Seneca Property, LLC
Routt County, CO

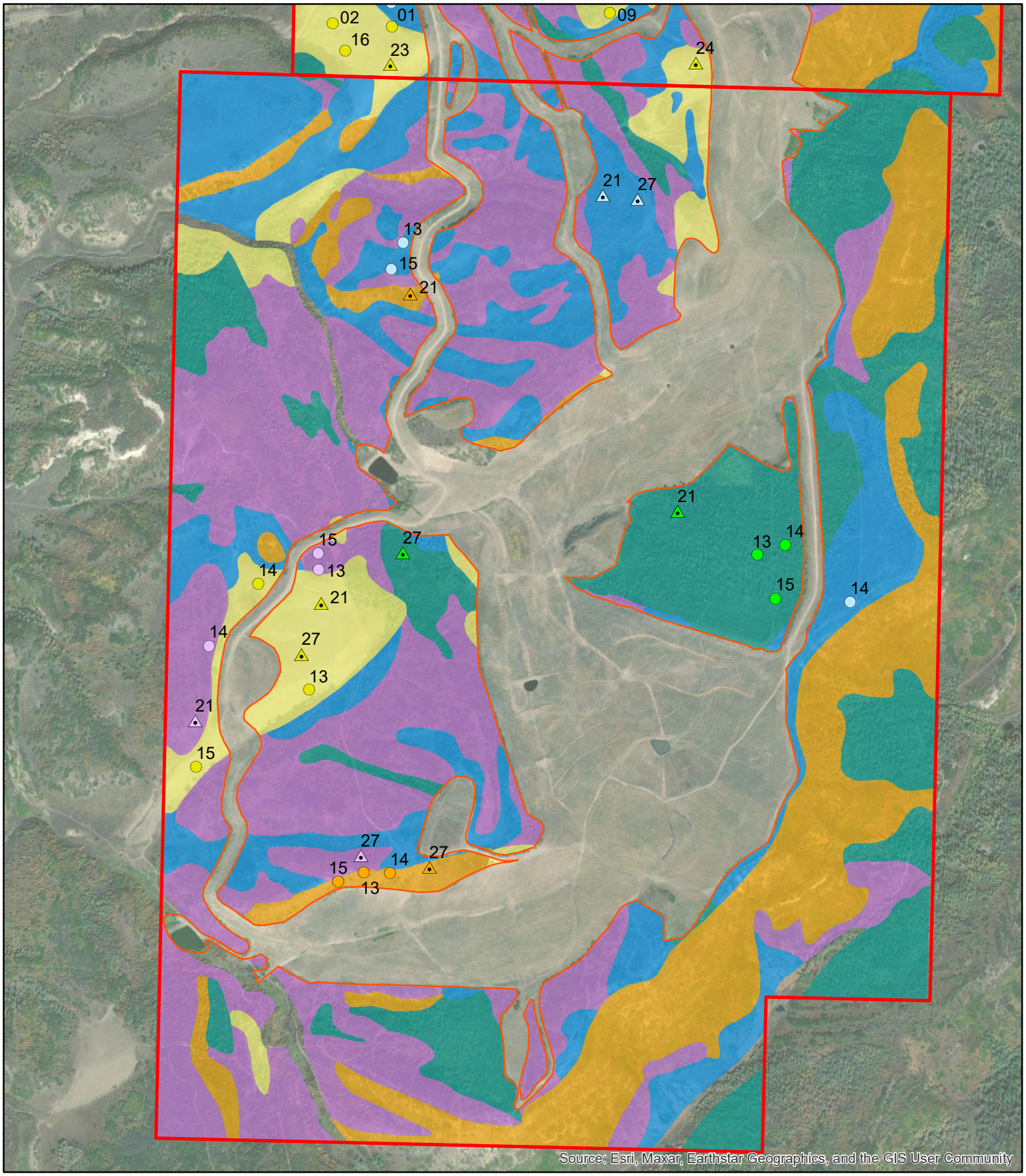
ERA Sample Locations
- Aspen Cover and Production (1-18)
- AspenProduction Only (19-32)
- MB Cover and Production (1-15)
- MB Production Only (16-32)
- SB Cover and Production (1-17)
- SB Production Only (18-32)
- SMB Cover and Production (1-15)
- SMB Production Only (16-32)
- WW Cover and Production (1-16)
- WW Production Only (17-32)

ERA Vegetation Types
- Aspen
- Mountain Brush (MB)
- Sagebrush/Snowberry (SB)
- Steep Mountain Brush (SMB)
- Western Wheat/Alkali Sage (WW)
- Permit Boundary
- Disturbance Boundary

0 190 380 570 Meters

N W E S

CEDAR CREEK ASSOCIATES, INC



Field Map 4b.
Vegetation Evaluation Locations
2023 Combined Extended Reference Areas (Southern Portion)
Seneca IIW Mine
Seneca Property, LLC
Routt County, CO

ERA Sample Locations

- Aspen Cover and Production (1-18)
- AspenProduction Only (19-32)
- MB Cover and Production (1-15)
- MB Production Only (16-32)
- SB Cover and Production (1-17)
- SB Production Only (18-32)
- SMB Cover and Production (1-15)
- SMB Production Only (16-32)
- WW Cover and Production (1-16)
- WW Production Only (17-32)

ERA Vegetation Types

- Aspen
- Mountain Brush (MB)
- Sagebrush/Snowberry (SB)
- Steep Mountain Brush (SMB)
- Western Wheat/Alkali Sage (WW)
- Permit Boundary
- Disturbance Boundary

0 130 260 390 Meters

N W E S

CEDAR CREEK ASSOCIATES, INC