

Phase II Bond Release Application
J19 and N11 Coal Resource Areas, Kayenta Mine

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SECTION 3. Phase II Bond Release Supporting Information

Historical Revegetation and Vegetation Sampling

INTRODUCTION

The Phase II Bond Release information in this section includes historical revegetation information and results and analysis of vegetation sampling in support of the application. The Phase I bond release for the Reclaimed Liability Release Areas (RLRAs) included in this application for the N11 Coal Resource Area (CRA) was approved in September 2019. The Phase I bond release for the RLRAs included in the application for the J19 CRA was submitted in June 2020; the application is still pending.

HISTORICAL REVEGETATION

Revegetation activities for J19 and N11 RLRAs included in this application were conducted during the years 1999 through 2019. Details of revegetation procedures and applied seed mixes for initial seeding and reseeded have been previously reported to the regulatory authority in annual monitoring reports. This information and supporting maps are contained in the Minesoil Reconstruction and Revegetation Activities – Report, Black Mesa and Kayenta Mines for the years 1996 through 1999 as well as in Tab 2 of the Reclamation Status and Monitoring Report, Black Mesa and Kayenta Mines for the years 2000 through 2021. Revegetation procedures are summarized as follows. Upon completion of soil replacement, sites were deep ripped and then contour furrow disked to aid in surface stabilization and prepare the seedbed. The sites were then seeded during the next available seeding season using the approved permanent seed mix and seeding practices. Following seeding the sites were mulched with native grass hay at two tons per acre and then crimped to anchor the mulch. Maps 3.1.1 and 3.1.2 shows the permanent program revegetation areas by year of seeding included in this Phase II application.

PHASE II VEGETATION SAMPLING

The sampling methods and results presented in the application address the requirements for Phase II bond release. Sampling methods are consistent with approved vegetation baseline and monitoring study methods for the Kayenta Mine as outlined in the AZ-0001F Permit Application Package (PAP), Chapter 9, Attachment 2. These methods have been used for all sampling at Kayenta Mine.

The Guideline to Bond Release Procedures for Permanent Programs Lands, Indian Programs Branch, Western Region, OSMRE (2017) states that the operator must demonstrate for Phase II bond release that “the reclaimed plant community is successfully established in accordance with 30 CFR 816.111 and the approved PAP.” 30 CFR 816.111 states that the vegetative cover must be:

1. Diverse, effective, and permanent;
2. Comprised of species native to the area, or of introduced species where desirable and necessary to achieve the approved postmining land use and approved by the regulatory authority;
3. At least equal in extent of cover to the natural vegetation of the area; and
4. Capable of stabilizing the soil surface from erosion.

This section includes the discussion of the first three requirements. Section 4 of this application includes the discussion of sediment loss and erosion.

Phase II bond release requires statistically valid methods and random sampling of reclaimed and reference areas and comparison of the sampling results for these two areas. For purposes of permanent program vegetative cover evaluations, the J7, N7/8, and N14 sagebrush reference areas (SBRAs) determine the

cover success standard. A minimum of 20 samples were collected in the RLRAs and 15 samples in the SBRA. Sample adequacy was calculated from first-hit foliar vegetation cover sample values using the following formula:

$$N_{min} = \frac{t^2 * s^2}{d^2 * \bar{x}^2}$$

where:

N_{min} = minimum number of samples required

t = one-tailed t-value with n-1 degrees of freedom

s^2 = sample variance (n-1 degrees of freedom)

d = 0.1 (level of precision or desired detectable reduction)

\bar{x} = sample mean

The vegetation sampling locations are shown on Maps 3.2.1 and 3.2.2 (RLRAs) and 3.2.3 (SBRA). The vegetation data included in this application were collected in fall 2020 and fall 2021 in the RLRAs and SBRA. Vegetation cover data from both sampling events in the RLRAs and SBRA were subjected to hypothesis testing as described in the AZ-0001F PAP. Total first-hit live foliar vegetation data minus noxious weeds (Arizona or Navajo Nation A- or B-listed) were used for this evaluation.

VEGETATION DATA SUMMARY

Data summaries for the vegetation monitoring studies supporting this liability release application are presented in this section and summarized in Table 3.1. Noxious weeds (Arizona or Navajo Nation A- or B-listed) were removed from vegetation cover summary data, but not removed from ground cover data used for sediment loss and erosion evaluations discussed in Section 4 of this application. Raw data for all datasets are presented in Appendices 3.1 (2020 and 2021 RLRAs and 3.2 (2020 and 2021 SBRA). The data in each of these appendices is organized by area and year.

Table 3.1: Summary Statistics for the J19 and N11 RLRAs and J7, N7/8, and N14 SBRA

Site ID	Sample Period	Foliar Vegetation Cover*	Ground Cover**	Grass Cover	Shrub/Subshrub Cover	Forb Cover	Total Species Present
Phase II RLRAs							
J19 RLRA	2020	26.0	61.3	9.9	2.4	13.6	27
	2021	26.6	59.5	6.2	4.4	16.1	57
N11 RLRA	2020	20.0	55.9	12.9	4.1	3.0	36
	2021	17.5	54.5	7.6	3.8	6.2	55
Sagebrush Reference Areas							
J7 SBRA	2020	20.9	62.9	7.5	12.2	0.4	24
	2021	11.0	52.7	1.4	8.3	0.7	21
N7/8 SBRA	2020	14.3	59.0	3.8	7.7	0.6	35
	2021	19.7	66.0	5.3	9.9	1.5	37
N14 SBRA	2020	32.1	57.7	13.3	16.3	0.1	16
	2021	27.5	58.1	10.5	15.1	0.5	24

* A- and B-list noxious weed (Arizona or the Navajo Nation) were removed from foliar vegetation totals.

** Ground cover includes all vegetation, standing dead, litter, and rock cover.

Sample Adequacy

A summary of sample adequacy calculations for total vegetation cover in the J19 and N11 RLRA as well as the J7, N7/8, and N14 SBRA is presented in Table 3.2. Adequate samples were obtained in all sample areas during each sampling period within the years sampled.

Table 3.2: Sample Adequacy Calculations for the J19 and N11 RLRA and J7, N7/8, and N14 SBRA

Site ID	Sample Period	Mean	Standard Deviation	t-statistic	Sample Size	Minimum Sample Size
Phase II RLRA						
J19 RLRA	2020	26.0	9.0	1.319	24	21
	2021	26.6	9.6	1.304	39	22
N11 RLRA	2020	20.0	5.1	1.328	20	12
	2021	17.5	6.0	1.319	24	21
Sagebrush Reference Areas						
J7 SBRA	2020	20.9	4.6	1.345	15	9
	2021	11.0	3.1	1.345	15	15
N7/8 SBRA	2020	14.3	3.5	1.345	15	11
	2021	19.7	4.6	1.345	15	10
N14 SBRA	2020	32.1	6.5	1.345	15	8
	2021	27.5	4.2	1.345	15	5

SBRA Cover

Total foliar vegetation cover ranged from 11.0 percent in the J7 SBRA in 2021 to 32.1 percent in the N14 SBRA in 2020 (Table 3.1). Average foliar cover for all three SBRA was 22.4 percent in 2020 and 19.4 percent in 2021. Total ground cover (including live vegetation, standing dead, litter, and rock cover) ranged from a low of 52.7 percent in 2021 in the J7 SBRA to a high of 66.0 percent in the N7/8 SBRA in 2021. Average ground cover for all three SBRA was consistent with 59.9 percent in 2020 and 58.9 percent in 2021.

Litter cover was the greatest component of the ground cover after live vegetation but was variable between the three SBRA. Litter cover ranged from 11.3 percent in the N14 SBRA in 2020 to 25.8 percent in the J7 SBRA in 2021 (Appendix 3.2). Litter cover averaged 20.8 percent over the six SBRA sampling events.

Rock cover was consistently greatest in the N7/8 SBRA ranging from 12.9 percent in 2020 to 18.4 percent in fall 2021. The other SBRA had little or no rock. Values for rock cover averaged 0.1 percent in the N14 SBRA and 2.9 percent in the J7 SBRA.

Shrubs and subshrubs comprised the largest component of the vegetation cover in all six sampling events with an average of 57 percent of the vegetation cover across all datasets. The most common shrub species in all three SBRA was big sagebrush (*Artemisia tridentata*) with a significant contribution from fourwing saltbush (*Atriplex canescens*) and Greene's rabbitbrush (*Chrysothamnus greenei*) in the J7 and N7/8 SBRA. Native perennial grasses were the second largest component in reference areas. Native perennial grasses comprised 30 percent of the vegetation cover on average. Blue grama (*Bouteloua gracilis*) was the most commonly encountered grass species in all three SBRA.

RLRA Cover

J19 RLRA Cover

Total foliar cover was 26.0 percent in 2020 and 26.6 percent in 2021 (Table 3.1 and Appendix 3.1). Total ground cover was 61.3 percent in 2020 and 59.5 percent in 2021. Litter cover was the greatest component of the ground cover after live vegetation and ranged from 33.7 percent in 2020 to 24.4 percent in 2021. Rock cover ranged from 1.2 to 3.8 percent.

Forbs comprised 52 percent and 61 percent of the total vegetation cover in 2020 and 2021, respectively. The dominant species were the annual introduced species kochia (*Kochia scoparia*) and Russian thistle (*Salsola iberica*). While these species are not necessarily desirable, they are common early colonizers that can provide a mulch and nurse effect for the developing perennial species in the community. As the reclamation community develops, these species tend to drop out and are typically minimal after three to five years.

Total grass cover was 9.9 percent in 2020 and 6.2 percent in 2021 (Table 3.1) and comprised 38 percent and 23 percent of the total vegetation cover each year, respectively. The dominant grass species was Russian wildrye (*Elymus junceus*), contributing between 5 and 13 percent of the total vegetation cover each year. Shrubs and subshrubs, primarily fourwing saltbush were the other important species contributing between 9 percent and 16 percent of the total vegetation cover in 2020 and 2021, respectively.

N11 RLRA Cover

Total foliar cover was 20.0 percent in 2020 and 17.5 percent in 2021 (Table 3.1 and Appendix 3.1). Total ground cover was 55.9 percent in 2020 and 54.5 percent in 2021. Litter cover was 23.6 percent in 2020 and 17.6 percent in 2021. Rock cover was 5.8 percent in 2020 and 17.0 percent in 2021.

The grass component comprised most of the total vegetation cover in both years. Total grass cover was 12.9 percent in 2020 and 7.6 percent in 2021 (Table 3.1) and comprised 65 percent and 43 percent of the total vegetation cover, respectively. The dominant species, Russian wildrye, contributed 37 percent and 23 percent of the total vegetation cover in 2020 and 2021, respectively. Native cool season perennial wheatgrasses (*Agropyron* spp.) also contributed substantially. Shrubs and subshrubs, primarily fourwing saltbush, contributed 21 percent of the total vegetation cover each year. Forbs, primarily kochia and Russian thistle, contributed 15 percent and 35 percent of the total vegetation cover in 2020 and 2021, respectively.

Species Diversity

Species diversity is measured by recording all species occurring within one meter on either side of each vegetation cover transect. The total number of non-noxious species observed along all RLRA transects was lowest in the 2020 sampling of the J19 RLRA with only 27 species and highest in the J19 RLRA in 2021 with 57 species observed. The J19 RLRA averaged 42 species across the two sampling events and the N11 RLRA averaged 46 species across the two sampling events. In the SBRAs, the lowest species diversity was found in the N14 SBRA which ranged from 16 to 24 species across the two sampling events and the highest diversity was in the N7/8 SBRA which ranged from 35 to 37 species across the two sampling events. The J7 SBRA ranged from 21 to 24 species across the two sampling events.

RLRA REVEGETATION SUCCESS CHARACTERIZATION

The data collected in the J19 and N11 RLRA demonstrates that they have developed vegetation cover that meets the requirements for Phase II bond release. An effective, diverse, and permanent vegetative cover has been established that is consistent with the post-mining land use. The vegetation cover on the RLRA is comparable to that observed on the SBRA and it is anticipated that these RLRA are on their way to achieving the goals of final bond release when they reach that stage of maturity.

Vegetation Cover

Total vegetation cover in the J19 RLRA was greater than that observed in the J7 and N7/8 SBRA and less than that observed in the N14 SBRA in both years (Figure 3.1). Total vegetation cover in the N11 RLRA was greater than the N7/8 SBRA in 2020 and the J7 SBRA in 2021 (Figure 3.1). It was comparable to the J7 SBRA in 2020 and the N7/8 SBRA in 2021 and less than that observed in the N14 SBRA in both years. Total vegetation cover from all four RLRA datasets was greater than 90% of the average SBRA when subjected to hypothesis testing per the AZ-0001F PAP Table 3.3.

Figure 3.1: Total Foliar Vegetation Cover (Mean + Standard Error) in the RLRA and SBRA

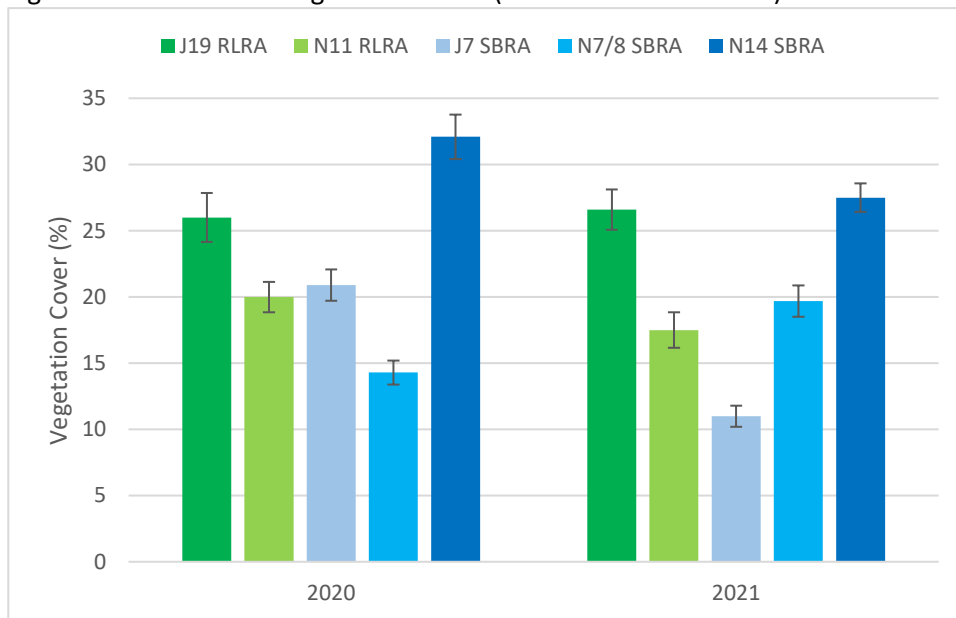


Table 3.1: Hypothesis Testing Results for J19 and N11 RLRA

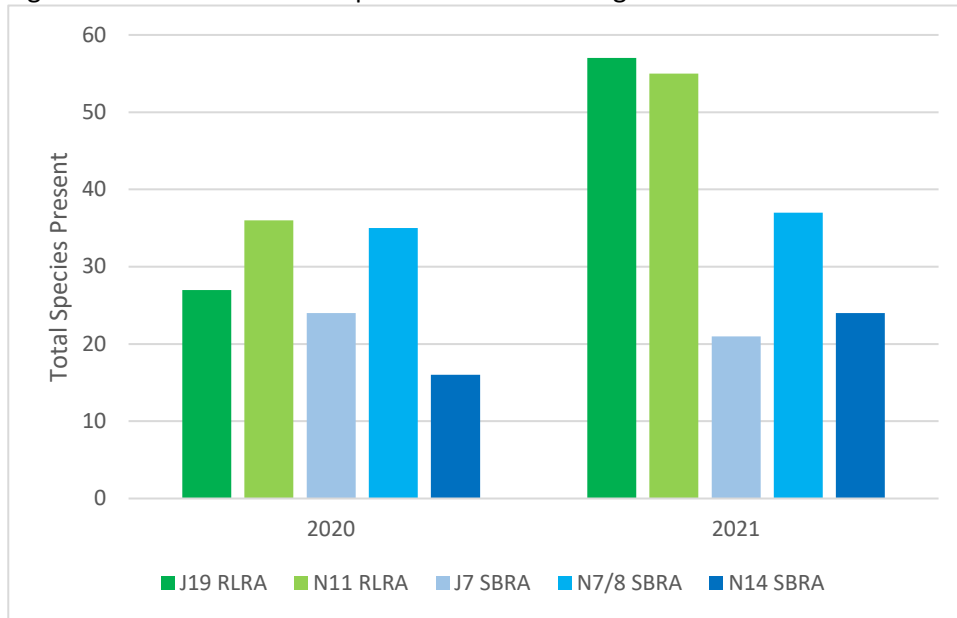
Site ID	Sample Period	RLRA Mean	90% SBRA Mean	t-statistic	t-test value	Reclamation Pass?
J19 RLRA	2020	26.0	20.2	-1.294	3.58	Yes
	2021	26.6	17.5	-1.292	5.98	Yes
N11 RLRA	2020	20.0	20.2	-1.295	-0.10	Yes
	2021	17.5	17.5	-1.294	0.03	Yes

Species Diversity

The total species diversity in both RLRA was greater than the J7 and N14 SBRA in every sampling event (Figure 3.3). The N11 RLRA was also greater than the N 7/8 SBRA in both years and the J19 RLRA was greater than the N 7/8 SBRA in 2021. As with the vegetation cover data, the species composition of the

RLRAs included more grasses and the SBRAs included more woody species. Given that these RLRAs are only at the Phase II stage of bond release, there is ample evidence to suggest that the RLRAs will meet Phase III standards in the future.

Figure 3.2: Total Number of Species Observed Along Transects



Utility for Post-Mining Land Use

Much of the vegetation cover observed in the J19 and N11 RLRAs reflects approved seed mixes (36 percent on average of the relative cover in J19 and 70 percent in N11). Seed mixes were formulated to provide good forage production and nutrient levels and palatability for all classes of livestock and a variety of wildlife. While no production data were collected as a part of Phase II sampling, an average of 64 percent of the relative vegetation cover across both RLRAs was species known to have high palatability for livestock, with another 11 percent of the cover made up of species with medium forage palatability.

Russian wildrye was a primary species throughout all three RLRAs contributing an average of 19 percent of the relative cover. This species has a very long season of use and high digestibility through much of the year. It retains good nutrient qualities as standing hay in the winter. Russian wildrye also exhibits good regrowth and recovery after grazing and when spring moisture and summer rains are likely. These qualities make this grass a valuable species throughout the year and compliment the other reclamation species in the PWCC grazing management program.

Appendix 3.1

RLRA Raw Data

J19 RLRA

2020

2021

N11 RLRA

2020

2021

J19 RLRA - 2021

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER		RELATIVE VEGETATION COVER-ALL		Percent Foliar Cover																								
			COVER (%)	COVER (%)	COVER-ALL (%)	COVER-ALL (%)																									
			1 st	2 nd	1 st	2 nd	1 st	2 nd	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
NATIVE ANNUAL & BIENNIAL FORBS																															
Amaranthus retroflexus	0.00	12.82	0.00	0.00	0.00												P														
Chenopodium berlandieri	0.03	20.51	0.09	0.03	0.09												P	P													
Chenopodium graveolens	0.00	2.56	0.00	0.00	0.00																										
Chenopodium leptophyllum	0.00	2.56	0.00	0.00	0.00																										
Cleome serrulata	0.00	2.56	0.00	0.00	0.00																										
Euphorbia glyptosperma	0.00	15.38	0.00	0.00	0.00																										
Lappula redow skii	0.00	2.56	0.00	0.00	0.00																										
Machaeranthera canescens	0.00	5.13	0.00	0.00	0.00																										
Verbesina encelioides	0.00	2.56	0.00	0.00	0.00																										
TOTAL NATIVE ANN. & BIEN. FORBS	0.03	48.72	0.09	0.03	0.09				P		P	P	P				P														
INTRODUCED ANNUAL & BIENNIAL FORBS																															
Amaranthus graecizans	0.03	7.69	0.09	0.03	0.09																										
Halogeton glomeratus	0.41	51.28	1.52	0.41	1.51	P		12	P	P	P									P	P										
Kochia scoparia	4.46	89.74	16.49	4.49	16.50	3	2	1		P	P	P	P							P	P										
Melilotus officinalis	0.00	7.69	0.00	0.00	0.00																										
Portulaca oleracea	0.13	10.26	0.47	0.15	0.57																										
Salsola iberica	11.31	100.00	41.80	11.38	41.86	28	40	14	16	1	26	41	6	30	25	12	14	10	4	20	1	12	42	36	1	20	23	11	4	P	
Sisymbrium altissimum	0.00	7.69	0.00	0.00	0.00						P																				
Tragopogon dubius	0.00	2.56	0.00	0.00	0.00																P										
Tribulus terrestris	0.03	2.56	0.09	0.03	0.09																										
TOTAL INTRO. ANN. & BIEN. FORBS	16.36	100.00	60.47	16.49	60.61	31	42	27	16	1	27	41	6	30	25	12	14	10	4	23	1	12	42	38	1	20	1	27	11	6	1
NATIVE ANNUAL GRASSES																															
Monroa squarrosa	0.03	7.69	0.09	0.03	0.09																										
TOTAL NATIVE ANNUAL GRASSES	0.03	7.69	0.09	0.03	0.09																										
INTRODUCED ANNUAL GRASSES																															
Bromus tectorum	0.00	10.26	0.00	0.00	0.00																										
Eragrostis cilianensis	0.00	2.56	0.00	0.00	0.00																										
TOTAL INTRODUCED ANNUAL GRASSES	0.00	12.82	0.00	0.00	0.00																										
NATIVE PERENNIAL FORBS																															
Leucelene ericoides	0.03	2.56	0.09	0.03	0.09																										
Linum lewisii	0.00	2.56	0.00	0.00	0.00																										
Mirabilis multiflora	0.00	2.56	0.00	0.00	0.00																										
Penstemon palmeri	0.00	5.13	0.00	0.00	0.00																										
Ratibida columnaris	0.00	2.56	0.00	0.00	0.00																										
Sphaeralcea coccinea	0.00	12.82	0.00	0.00	0.00																										
TOTAL NATIVE PERENNIAL FORBS	0.03	23.08	0.09	0.03	0.09				P		P									P											
INTRODUCED PERENNIAL FORBS																															
Astragalus cicer	0.00	2.56	0.00	0.00	0.00																										
Medicago sativa	0.00	2.56	0.00	0.00	0.00																										
Onobrychis vicifolia	0.05	20.51	0.19	0.05	0.19	P																									
Rumex crispus	0.00	2.56	0.00	0.00	0.00																										
Sanguisorba minor	0.00	5.13	0.00	0.00	0.00																										
TOTAL INTRO. PERENNIAL FORBS	0.05	28.21	0.19	0.05	0.19	P																									
NATIVE PERENNIAL GRASSES (cool)																															
Agropyron dasystachyum	0.31	28.21	1.14	0.31	1.13																										
Agropyron smithii	1.59	94.87	5.88	1.62	5.94	1	2	2		P	1	6	1	3	3	4															
Agropyron spicatum	0.59	53.85	2.18	0.64	2.36																										

J19 RLRA - 2021 (Continued)

PLANT SPECIES	Percent Foliar Cover																																																						
	23		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39																						
	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd																							
NATIVE ANNUAL & BIENNIAL FORBS																																																							
Amaranthus retroflexus				P														P	P																																				
Chenopodium berlandieri	1																																																						
Chenopodium graveolens																																																							
Chenopodium leptophyllum																																																							
Cleome serrulata																																																							
Euphorbia glyptosperma				P																																																			
Lappula redow skii																																																							
Machaeranthera canescens																																																							
Verbesina encelioides																																																							
TOTAL NATIVE ANN. & BIEN. FORBS	1		P	P														P	P	P	P					P										P																			
INTRODUCED ANNUAL & BIENNIAL FORBS																																																							
Amaranthus graecizans	P																																																						
Halogeton glomeratus	1			P	1	1																																																	
Kochia scoparia	10	4	10	16	9	2	31	1	P	10	1	15	P	7	17	21	4																																						
Melilotus officinalis																																																							
Portulaca oleracea					5	1																																																	
Salsola iberica	P	P	P	P	2	P	P	P	P	1	P	1	P	P	2	1																																							
Sisymbrium altissimum	P																																																						
Tragopogon dubius																																																							
Tribulus terrestris																																																							
TOTAL INTRO. ANN. & BIEN. FORBS	11	4	10	17	17	1	2	31	1	P	11	1	16	P	7	17	23	5																																					
NATIVE ANNUAL GRASSES																																																							
Monroa squarrosa																																																							
TOTAL NATIVE ANNUAL GRASSES																																																							
INTRODUCED ANNUAL GRASSES																																																							
Bromus tectorum																																																							
Eragrostis cilianensis																																																							
TOTAL INTRODUCED ANNUAL GRASSES																																																							
NATIVE PERENNIAL FORBS																																																							
Leucelene ericoides																																																							
Linum lewisii																																																							
Mirabilis multiflora																																																							
Penstemon palmeri																																																							
Ratibida columnaris																																																							
Sphaeralcea coccinea																																																							
TOTAL NATIVE PERENNIAL FORBS																																																							
INTRODUCED PERENNIAL FORBS																																																							
Astragalus cicer																																																							
Medicago sativa																																																							
Onobrychis vicifolia																																																							
Rumex crispus																																																							
Sanguisorba minor																																																							
TOTAL INTRO. PERENNIAL FORBS																																																							
NATIVE PERENNIAL GRASSES (cool)																																																							
Agropyron dasystachyum																																																							
Agropyron smithii	P	1	1	P	1	2	P	P	1	1	P	1	3	P	1	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3																		
Agropyron spicatum																																																							

J19 RLRA - 2021 (Continued)

PLANT SPECIES	Percent Foliar Cover																	
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	
NATIVE PERENNIAL GRASSES (cool)																		
Agropyron trachycaulum													P				P	
Oryzopsis hymenoides	P						P						P	P	1	P	1	
Sitanion hystrix																		
Stipa comata																		
TOTAL NATIVE PERENNIAL GRASSES (c)	P	2	1	P	2	2	1	2	1	2	3	P	4	1	6	P	2 2	
NATIVE PERENNIAL GRASSES (w arm)																		
Bouteloua gracilis	P	1	P		2 1	P	1	2	1	2	3	1	3	1	1		3	
Buchloe dactyloides					P	2		P	P		P	P	P				P	
Hilaria jamesii	1	2	P		1	P	P	2	2	P	3 1		4	2	P		P	
Sporobolus airoides		3	1		2	3		P	P				1	4			P	
Sporobolus cryptandrus	P		1		P	P										P		
TOTAL NATIVE PERENNIAL GRASSES (w)	1	6	2		5 1	5	1	4	3	2	6 1	1	8	7	1	P	3	
INTRODUCED PERENNIAL GRASSES (cool)																		
Elymus junceus	P	2	1	3	P	3	3	1	5	2	5	P	2	1	5 1	1	2	
TOTAL INTRO. PERENNIAL GRASSES (c)	P	2	1	3	P	3	3	1	5	2	5	P	2	1	5 1	1	2	
NATIVE SUBSHRUBS																		
Artemisia frigida																		
Ceratoides lanata		P	1		1	P			P				P	P			P	
Chrysothamnus Greenei																		
Gutierrezia sarothrae																		
TOTAL NATIVE SUBSHRUBS		P	1		1	P			P				P	P			P	
INTRODUCED SUBSHRUBS																		
Kochia prostrata			P					P						1	P		P	
TOTAL INTRO. SUBSHRUBS			P					P						1	P		P	
NATIVE SHRUBS																		
Artemisia tridentata																		
Atriplex canescens	1	11	1	P	P	6		18	7	2	7	P	16	16	5		8	
Atriplex confertifolia																		
Atriplex obovata																		
Chrysothamnus nauseosus																		
Ephedra viridis																		
Purshia tridentata																		
TOTAL NATIVE SHRUBS	1	11	1	P	P	6		18	7	2	7	P	16	16	5		8	
AGAVOIDS																		
Yucca baccata		P																
TOTAL NATIVE TREES		P																
Standing dead		1			3	1	1	2	2		1	1	2		2		1	
Litter	27	20	23	23	28	22	32	20	14	23	30	43	26	25	28	27	16	
Bare ground	55	48	59	57	44	59	30	50	67	56	45	38	41	41	33	45	59	
Rock	4	6	2				1	2	1	1	2	1	1	1	3	4	4	
TOTALS	100 0	100 0	100 0	100 0	100 2	100 0	100 0	100 0	100 0	100 0	100 1	100 0	100 0	100 0	100 1	100 0	100 2	
TOTAL VEGETATION COVER	14 0	25 0	16 0	20 0	25 2	18 0	36 0	26 0	16 0	20 0	22 1	17 0	30 0	33 0	34 1	24 0	20 2	
GROUND COVER (Veg+Litter+St.Dead+Rock)	45 0	52 0	41 0	43 0	56 2	41 0	70 0	50 0	33 0	44 0	55 1	62 0	59 0	59 0	67 1	55 0	41 2	
Non-Noxious Foliar Cover	13	25	16	19	25	18	36	26	16	20	22	17	30	33	34	24	20	
SPECIES DENSITY (# of species/100 sq.m.)	13	12	13	6	19	11	9	13	14	18	13	9	20	13	16	7	18	

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																																							
						1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd		
NATIVE ANNUAL & BIENNIAL FORBS																																													
Chenopodium fremontii	0.00	5.00	0.00	0.00	0.00				P																																				
Descurainia pinnata	0.00	20.00	0.00	0.00	0.00	P			P					P																									P						
Machaeranthera canescens	0.00	15.00	0.00	0.00	0.00			P								P																							P						
TOTAL NATIVE ANN. & BIEN. FORBS	0.00	30.00	0.00	0.00	0.00	P		P	P					P		P																						P							
INTRODUCED ANNUAL & BIENNIAL FORBS																																													
Kochia scoparia	2.20	60.00	11.03	2.20	11.03				1	5	P	P	1	2												P	2	14	P	17	2														
Salsola iberica	0.70	45.00	3.51	0.70	3.51		P			10		P	3	P																															
Sisymbrium altissimum	0.00	20.00	0.00	0.00	0.00							P		P												P																			
Tragopogon dubius	0.00	5.00	0.00	0.00	0.00																				P																				
TOTAL INTRO. ANN. & BIEN. FORBS	2.90	70.00	14.54	2.90	14.54		P		1	15	P	P	4	2										P	P	3	14	P	17	2															
INTRODUCED ANNUAL GRASSES																																													
Bromus tectorum	0.35	35.00	1.75	0.35	1.75																					P	P	6												P					
TOTAL INTRODUCED ANNUAL GRASSES	0.35	35.00	1.75	0.35	1.75																					P	P	6												P					
NATIVE PERENNIAL FORBS																																													
Astragalus w ingatanus	0.00	15.00	0.00	0.00	0.00																				P			P	P																
Gaillardia aristata	0.00	5.00	0.00	0.00	0.00																				P																				
Penstemon palmeri	0.00	5.00	0.00	0.00	0.00																				P																				
Ratibida columnaris	0.00	10.00	0.00	0.00	0.00																				P	P																			
Sphaeralcea coccinea	0.00	5.00	0.00	0.00	0.00																				P	P																			
TOTAL NATIVE PERENNIAL FORBS	0.00	25.00	0.00	0.00	0.00				P															P	P	P	P																		
INTRODUCED PERENNIAL FORBS																																													
Sanguisorba minor	0.05	15.00	0.25	0.05	0.25																					1	P		P																
TOTAL INTRO. PERENNIAL FORBS	0.05	15.00	0.25	0.05	0.25																					1	P		P																
NATIVE PERENNIAL GRASSES (cool)																																													
Agropyron smithii	1.35	60.00	6.77	1.35	6.77	1	3																																						
Agropyron spicatum	1.35	40.00	6.77	1.35	6.77		3																																						
Agropyron trachycaulum	1.35	45.00	6.77	1.35	6.77		4	P																																					
Oryzopsis hymenoides	0.35	40.00	1.75	0.35	1.75		P	1	P																																				
Sitanion hystrix	0.00	5.00	0.00	0.00	0.00					P																																			
TOTAL NATIVE PERENNIAL GRASSES (c)	4.40	95.00	22.06	4.40	22.06	1	10	1	P	P	P	2	P																																
NATIVE PERENNIAL GRASSES (w arm)																																													
Bouteloua curtipendula	0.05	5.00	0.25	0.05	0.25																																								
Bouteloua gracilis	0.35	30.00	1.75	0.35	1.75																																								
Buchloe dactyloides	0.00	5.00	0.00	0.00	0.00																																								
Hilaria jamesii	0.15	25.00	0.75	0.15	0.75																																								
Sporobolus airoides	0.00	5.00	0.00	0.00	0.00																																								
Sporobolus cryptandrus	0.15	20.00	0.75	0.15	0.75																																								
TOTAL NATIVE PERENNIAL GRASSES (w)	0.70	50.00	3.51	0.70	3.51				2			3	P																																
INTRODUCED PERENNIAL GRASSES (cool)																																													
Agropyron intermedium	0.10	10.00	0.50	0.10	0.50																																								
Elymus junceus	7.35	90.00	36.84	7.35	36.84	9	13	1	11	2	14	10	16	11	13	1	9	6	7	1	10																								
TOTAL INTRO. PERENNIAL GRASSES (c)	7.45	100.00	37.34	7.45	37.34	9	13	1	11	2	14	10	16	11	13	1	9	6	7	1	10																								

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																																							
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20																				
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd																		
NATIVE SUBSHRUBS																																													
Ceratoides lanata	0.10	45.00	0.50	0.10	0.50				P		P	P	2		P			P		P	P	P																							
Gutierrezia sarothrae	0.00	15.00	0.00	0.00	0.00			P										P		P		P																							
Senecio douglasii var. longilobus	0.00	15.00	0.00	0.00	0.00			P							P		P		P																										
TOTAL NATIVE SUBSHRUBS	0.10	65.00	0.50	0.10	0.50			P	P		P	P	2		P		P	P	P	P	P	P																							
INTRODUCED SUBSHRUBS																																													
Kochia prostrata	1.10	35.00	5.51	1.10	5.51	8	1	7			P		P	6					P																										
TOTAL INTRO. SUBSHRUBS	1.10	35.00	5.51	1.10	5.51	8	1	7			P		P	6					P																										
NATIVE SHRUBS																																													
Artemisia tridentata	0.05	5.00	0.25	0.05	0.25			1																																					
Atriplex canescens	2.65	95.00	13.28	2.65	13.28	1	P	3	6		1	5	2	3	2	2	4	2	2	4	7	P	3	P	6																				
Atriplex confertifolia	0.05	40.00	0.25	0.05	0.25		P		P			P			P		1	P				P	P																						
Chrysothamnus nauseosus	0.10	35.00	0.50	0.10	0.50			P	P						P	P	P		P		2																								
Cowania mexicana	0.05	5.00	0.25	0.05	0.25			1																																					
TOTAL NATIVE SHRUBS	2.90	95.00	14.54	2.90	14.54	1	P	5	6		1	5	2	3	2	2	4	3	2	6	7	P	3	P	6																				
Standing dead	6.65	85.00		6.65		7	4	13	5		1	10	4	6	5	5	6	6	10	14	9		8		20																				
Litter	23.55	100.00		23.55		10	29	16	18	41	31	13	15	17	8	18	16	8	20	23	29	54	12	40	53																				
Bare ground	44.10	100.00		44.10		63	43	27	52	38	43	58	57	51	62	55	42	52	47	24	29	32	60	40	7																				
Rock	5.75	80.00		5.75		1		28	7	4	6	2		4	10	2	4	16	5	17		5	3	1																					
TOTALS	100.00		100.00	100.00	100.00	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0																				
TOTAL VEGETATION COVER	19.95	s=(5.11)		19.95	s=(5.11)	19	0	24	0	16	0	18	0	17	0	19	0	17	0	24	0	22	0	15	0	20	0	32	0	18	0	18	0	22	0	33	0	14	0	15	0	17	0	19	0
GROUND COVER (Veg+Litter+St.Dead+Rock)	55.90	s=(14.69)		55.90	s=(14.69)	37	0	57	0	73	0	48	0	62	0	57	0	42	0	43	0	49	0	38	0	45	0	58	0	48	0	53	0	76	0	71	0	68	0	40	0	60	0	93	0
SPECIES DENSITY (# of species/100 sq.m.)	9.30	s=(3.1)				5	9	16	9	4	9	10	9	7	7	12	14	9	13	12	9	7	12	6	7																				

Appendix 3.2

Sagebrush Reference Area Raw Data

J7 Sagebrush Reference Area

2020

2021

N7/8 Sagebrush Reference Area

2020

2021

N14 Sagebrush Reference Area

2020

2021

J7 SBRA - 2021 (Continued)

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																													
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15															
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd												
BRYOPHYTES																																			
Moss spp.	0.60	66.67	5.45	0.67	5.99			P	1	1	2		1	1			P	1	P	2	1														
TOTAL BRYOPHYTES	0.60	66.67	5.45	0.67	5.99			P	1	1	2		1	1			P	1	P	2	1														
LICHEN/FUNGUS																																			
Lichen spp.	0.33	53.33	3.03	0.33	2.99			P		P	1	P		3		P		1			P														
TOTAL LICHEN	0.33	53.33	3.03	0.33	2.99			P		P	1	P		3		P		1			P														
Standing dead	13.07	100.00		13.07		16	19	8	12	11	14	12	9	15	11	5	22	15	10	17															
Litter	25.80	100.00		25.80		7	1	36	35	17	30	24	35	31	29	16	35	25	37	29															
Bare ground	47.00	100.00		47.00		57	72	42	40	56	41	52	47	41	50	57	34	37	39	40															
Rock	2.80	66.67		2.80		10	2	1	2	5	1	1			4	12		4																	
TOTALS	100.00		103.03	100.13	102.99	100	0	100	0	100	1	100	0	100	0	100	0	100	0	100	0	100	0												
TOTAL VEGETATION COVER	11.00	s=(3.12)		11.13	s=(3.18)	10	0	6	0	13	1	11	0	13	0	11	0	9	0	10	0	6	0	10	0	9	0	18	0	14	0	14	0		
GROUND COVER (Veg+Litter+St.Dead+Rock)	52.67	s=(10.03)		52.80	s=(10.02)	43	0	28	0	58	1	60	0	44	1	58	0	48	0	53	0	56	0	50	0	43	0	66	0	62	0	61	0	60	0
SPECIES DENSITY (# of species/100 sq.m.)	12.27	s=(2.22)				12	13	11	10	16	13	14	10	10	10	12	10	17	13	13															

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st
NATIVE ANNUAL & BIENNIAL FORBS																						
Cordylanthus w rightii	0.00	6.67	0.00	0.00	0.00																	
Descurainia pinnata	0.13	80.00	0.93	0.13	0.93	P	P	P	2	P	P	P	P			P	P	P	P			
Eriogonum cernuum	0.00	13.33	0.00	0.00	0.00			P									P					
Lappula redow skii	0.00	33.33	0.00	0.00	0.00				P	P	P								P	P		
Machaeranthera canescens	0.00	13.33	0.00	0.00	0.00						P									P		
TOTAL NATIVE ANN. & BIEN. FORBS	0.13	80.00	0.93	0.13	0.93	P	P	P	2	P	P	P	P			P	P	P	P			
INTRODUCED ANNUAL & BIENNIAL FORBS																						
Chenopodium album	0.00	53.33	0.00	0.07	0.47			P			P			P	P	P	P	P	1	P		
TOTAL INTRO. ANN. & BIEN. FORBS	0.00	53.33	0.00	0.07	0.47			P			P			P	P	P	P	P	1	P		
NATIVE PERENNIAL FORBS																						
Arabis fendleri	0.00	6.67	0.00	0.00	0.00																P	
Astragalus calycosus var. scaposus	0.00	6.67	0.00	0.00	0.00				P													
Astragalus praelongus	0.00	40.00	0.00	0.00	0.00	P	P		P			P		P							P	
Calochortus nuttallii	0.00	6.67	0.00	0.00	0.00											P						
Euphorbia fendleri	0.00	33.33	0.00	0.00	0.00	P				P		P		P				P				
Leucelene ericoides	0.27	93.33	1.87	0.27	1.86	P	P	P	P	1	P	P	P		1	P	P	P	P	1	1	
Psilostrophe sparsiflora	0.00	6.67	0.00	0.00	0.00	P																
Sphaeralcea coccinea	0.20	73.33	1.40	0.20	1.40	P	P		P	1		P		P	P	P			1	1	P	
Stanleya pinnata	0.00	6.67	0.00	0.00	0.00											P						
TOTAL NATIVE PERENNIAL FORBS	0.47	100.00	3.27	0.47	3.26	P	P	P	P	2	P	P	P	P	1	P	P	P	1	2	1	
NATIVE PERENNIAL GRASSES (cool)																						
Oryzopsis hymenoides	0.27	93.33	1.87	0.27	1.86	P	P		P	P	P	P	P	2	P	P	P	P	P	P	P	2
Sitanion hystrix	0.27	80.00	1.87	0.27	1.86		1	1	P	1	1	P	P		P	P	P	P		P	P	P
TOTAL NATIVE PERENNIAL GRASSES (c)	0.53	100.00	3.74	0.53	3.72	P	1	1	P	1	1	P	P	2	P	P	P	P	P	P	P	2
NATIVE PERENNIAL GRASSES (w arm)																						
Bouteloua gracilis	1.27	93.33	8.88	1.27	8.84	P	P	1		P	P	2	3	1	P	2	2	4	P		4	
Hilaria jamesii	2.00	93.33	14.02	2.00	13.95	2	10		1	1	2	2	1	1	4	4	P	1	1	P		
TOTAL NATIVE PERENNIAL GRASSES (w)	3.27	100.00	22.90	3.27	22.79	2	10	1	1	1	2	4	4	2	4	6	2	5	1	1	4	
NATIVE SUBSHRUBS																						
Ceratoides lanata	0.00	13.33	0.00	0.00	0.00																	
Chrysothamnus greenei	2.67	93.33	18.69	2.67	18.60	6	2	3	3	3	3	3		2	4	1	4	P	3	3		
Gutierrezia sarothrae	0.20	100.00	1.40	0.20	1.40	P	P	P	1	P	P	P	P	P	P	1	P	P	1	P		
TOTAL NATIVE SUBSHRUBS	2.87	100.00	20.09	2.87	20.00	6	2	3	4	3	3	3	P	2	4	2	4	P	4	3		
NATIVE SHRUBS																						
Artemisia tridentata	3.27	100.00	22.90	3.27	22.79	1	P	3	4	P	2	3	3	4	3	4	6	5	1		10	
Atriplex canescens	1.27	80.00	8.88	1.27	8.84	2	P	2	3	P	4		1	4	1	P	5	P	1			
Chrysothamnus nauseosus	0.00	20.00	0.00	0.00	0.00					P												
Chrysothamnus viscidiflorus	0.20	13.33	1.40	0.20	1.40			1				2										
Ephedra viridis	0.00	6.67	0.00	0.00	0.00							P										
Lycium pallidum	0.07	6.67	0.47	0.07	0.47						1											
Tetradymia canescens	0.00	20.00	0.00	0.00	0.00				P	P		P										
TOTAL NATIVE SHRUBS	4.80	100.00	33.64	4.80	33.49	3	P	6	7	P	9	3	4	4	4	4	11	5	2	10		

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER		RELATIVE VEGETATION COVER-ALL		Percent Foliar Cover														
			COVER (%)	COVER-ALL (%)	COVER-ALL (%)																
			1 st	2 nd	1 st	2 nd	3	4	5	6	7	8	9	10	11	12	13	14	15		
NATIVE TREES																					
Juniperus osteosperma	0.13	26.67	0.93	0.13	0.93							P		2	P	P					
Pinus edulis	1.80	73.33	12.62	1.80	12.56	1			3	P		3	3	5	4	P	4	3	1		
TOTAL NATIVE TREES	1.93	80.00	13.55	1.93	13.49	1			3	P		3	3	5	2	4	P	4	3	1	
SUCCULENTS																					
Opuntia phaeacantha	0.07	13.33	0.47	0.07	0.47								P								
Opuntia polyacantha	0.00	6.67	0.00	0.00	0.00		P														
Opuntia w hipplei	0.00	6.67	0.00	0.00	0.00													P			
TOTAL SUCCULENTS	0.07	26.67	0.47	0.07	0.47		P						P					P	1		
BRYOPHYTES																					
Moss spp.	0.13	13.33	0.93	0.13	0.93							1	1								
TOTAL BRYOPHYTES	0.13	13.33	0.93	0.13	0.93							1	1								
LICHEN/FUNGUS																					
Lichen spp.	0.07	6.67	0.47	0.07	0.47		1														
TOTAL LICHEN	0.07	6.67	0.47	0.07	0.47		1														
Standing dead	12.20	100.00		12.20		6	13	20	18	9	24	7	3	9	11	21	12	7	12	11	
Litter	19.60	100.00		19.60		18	11	23	22	20	20	17	39	16	27	20	17	15	13	16	
Bare ground	41.07	100.00		41.07		48	44	36	37	48	29	56	36	53	34	29	38	33	46	49	
Rock	12.93	100.00		12.93		16	19	10	6	16	12	7	11	6	12	14	16	30	17	2	
TOTALS	100.07		100.00	100.13	100.00	100 0	101 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 1	100 0	100 0	
TOTAL VEGETATION COVER	14.27	s=(3.49)		14.33	s=(3.52)	12 0	14 0	11 0	17 0	7 0	15 0	13 0	11 0	16 0	16 0	16 0	17 0	15 1	12 0	22 0	
GROUND COVER (Veg+Litter+St.Dead+Rock)	59.00	s=(8.6)		59.07	s=(8.67)	52 0	57 0	64 0	63 0	52 0	71 0	44 0	64 0	47 0	66 0	71 0	62 0	67 1	54 0	51 0	
SPECIES DENSITY (# of species/100 sq.m.)	14.33	s=(2.06)				14	14	12	16	17	15	15	12	12	13	16	16	14	18	11	

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st
NATIVE ANNUAL & BIENNIAL FORBS																						
Chenopodium berlandieri	0.00	13.33	0.00	0.00	0.00		P												P			
Chenopodium fremontii	0.00	20.00	0.00	0.07	0.33				P 1					P							P	
Chenopodium graveolens	0.00	33.33	0.00	0.00	0.00		P		P			P		P					P			
Chenopodium leptophyllum	0.00	13.33	0.00	0.00	0.00	P								P								
Euphorbia glyptosperma	0.33	73.33	1.69	0.33	1.66	1	P		P		P	1		P	P		1	P	2		P	
Lappula redow skii	0.07	73.33	0.34	0.07	0.33	P	P		1	P	P	P		P	P		P	P	P			
TOTAL NATIVE ANN. & BIEN. FORBS	0.40	80.00	2.03	0.47	2.32	1	P		1 1	P	P	1		P	P		1	P	2		P	
INTRODUCED ANNUAL & BIENNIAL FORBS																						
Portulaca oleracea	0.27	46.67	1.36	0.27	1.32	3	P		P					P	P		1				P	
TOTAL INTRO. ANN. & BIEN. FORBS	0.27	46.67	1.36	0.27	1.32	3	P		P					P	P		1				P	
NATIVE ANNUAL GRASSES																						
Monroa squarrosa	0.00	6.67	0.00	0.00	0.00														P			
TOTAL NATIVE ANNUAL GRASSES	0.00	6.67	0.00	0.00	0.00														P			
NATIVE PERENNIAL FORBS																						
Astragalus calycosus var. scaposus	0.00	20.00	0.00	0.00	0.00	P									P				P			
Astragalus w ingatanus	0.00	40.00	0.00	0.00	0.00				P		P	P							P	P	P	
Leucelene ericoides	0.47	100.00	2.37	0.47	2.32	2	2	P	P	1	P	P	P	1	P	P	P	P	P	1	P	
Mirabilis multiflora	0.00	6.67	0.00	0.00	0.00														P			
Mirabilis oxybaphoides	0.00	6.67	0.00	0.00	0.00														P			
Psilostrophe sparsiflora	0.13	6.67	0.68	0.13	0.66								2									
Sphaeralcea coccinea	0.20	100.00	1.02	0.20	0.99	1	P	P	P	P	1	P	P	1	P	P	P	P	P	P	P	
Stanleya pinnata	0.00	20.00	0.00	0.00	0.00		P			P		P										
TOTAL NATIVE PERENNIAL FORBS	0.80	100.00	4.07	0.80	3.97	3	2	P	P	1	1	P	2	2	P	P	P	P	P	1	P	
NATIVE PERENNIAL GRASSES (cool)																						
Agropyron smithii	0.00	6.67	0.00	0.00	0.00														P			
Oryzopsis hymenoides	0.60	93.33	3.05	0.60	2.98		1	P	1	P	P	1	2	P	P	1	1	P	P		2	
Sitanion hystrix	0.33	66.67	1.69	0.53	2.65	P	P	3	P				P	1		P	3			P	1	
Stipa comata	0.00	6.67	0.00	0.00	0.00							P										
TOTAL NATIVE PERENNIAL GRASSES (c)	0.93	100.00	4.75	1.13	5.63	P	1	3	P	1	P	P	1	2	1	P	1	4	P	P	3	
NATIVE PERENNIAL GRASSES (w arm)																						
Bouteloua gracilis	1.80	100.00	9.15	1.87	9.27	4	1	4	P	3	P	1	P	P	P	1	3	6	P	2	3	
Hilaria jamesii	2.47	93.33	12.54	2.60	12.91	1	3	1	3	3	3	8	1	8	1	1	3		P	1	1	
Sporobolus cryptandrus	0.07	13.33	0.34	0.07	0.33			1							P							
TOTAL NATIVE PERENNIAL GRASSES (w)	4.33	100.00	22.03	4.53	22.52	5	1	8	1	6	3	4	8	1	8	1	2	6	6	P	3	
NATIVE SUBSHRUBS																						
Chrysothamnus depressus	0.00	13.33	0.00	0.00	0.00			P											P			
Chrysothamnus greenei	2.33	100.00	11.86	2.33	11.59	P	P	4	P	4	1	P	1	3	2	8	2	2	2	2	6	
Eriogonum microthecum	0.00	6.67	0.00	0.00	0.00															P		
Gutierrezia sarothrae	0.27	100.00	1.36	0.27	1.32	2	P	P	P	P	P	P	P	P	1	P	P	P	P	P	1	
TOTAL NATIVE SUBSHRUBS	2.60	100.00	13.22	2.60	12.91	2	P	4	P	4	1	P	1	3	3	8	2	2	2	2	7	

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																													
						1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
NATIVE SHRUBS																																			
Artemisia tridentata	5.53	100.00	28.14	5.53	27.48	10	7	5	2	5	4	2	6	3	8	7	1	5	8	10															
Atriplex canescens	1.73	93.33	8.81	1.73	8.61	2	3	1	1	2	2	3	3	2	1	P	5	1		P															
TOTAL NATIVE SHRUBS	7.27	100.00	36.95	7.27	36.09	12	10	6	3	7	6	5	9	5	9	7	6	6	8	10															
NATIVE TREES																																			
Juniperus osteosperma	0.47	33.33	2.37	0.47	2.32				2	1		1	1	2																					
Pinus edulis	2.53	93.33	12.88	2.53	12.58	2	4	2	1	2	4	2	P	2	1	P	9	6	3																
TOTAL NATIVE TREES	3.00	100.00	15.25	3.00	14.90	2	4	2	3	3	4	3	1	2	2	1	P	9	6	3															
SUCCULENTS																																			
Coryphantha vivipara	0.00	13.33	0.00	0.00	0.00	P		P																											
Opuntia fragilis var. fragilis	0.00	6.67	0.00	0.00	0.00					P																									
Opuntia phaeacantha	0.00	13.33	0.00	0.00	0.00							P		P																					
Opuntia polyacantha	0.00	20.00	0.00	0.00	0.00				P					P						P															
Opuntia w hipplei	0.00	6.67	0.00	0.00	0.00															P															
Sclerocactus parviflorus	0.00	13.33	0.00	0.00	0.00			P				P								P															
TOTAL SUCCULENTS	0.00	46.67	0.00	0.00	0.00	P		P	P	P		P		P						P															
BRYOPHYTES																																			
Moss spp.	0.07	26.67	0.34	0.07	0.33		P								1			P	P																
TOTAL BRYOPHYTES	0.07	26.67	0.34	0.07	0.33		P								1			P	P																
LICHEN/FUNGUS																																			
Lichen spp.	0.00	20.00	0.00	0.00	0.00		P											P	P																
TOTAL LICHEN	0.00	20.00	0.00	0.00	0.00		P											P	P																
Standing dead	8.00	100.00		8.00		9	10	9	9	6	11	12	2	12	6	8	12	2	5	7															
Litter	19.93	100.00		19.93		15	20	24	15	27	9	21	14	16	18	9	28	27	32	24															
Bare ground	34.00	100.00		34.00		12	32	26	53	23	49	44	29	44	31	55	20	28	31	33															
Rock	18.40	100.00		18.40		36	13	28	9	26	15	5	39	7	28	5	20	26	10	9															
TOTALS	100.00		100.00	100.47	100.00	100	1	100	0	100	0	100	0	100	0	100	0	100	0	100	1														
TOTAL VEGETATION COVER	19.67	s=(4.58)		20.13	s=(5.05)	28	1	25	3	13	0	14	1	18	0	16	0	17	0	21	1														
GROUND COVER (Veg+Litter+St.Dead+Rock)	66.00	s=(12.47)		66.47	s=(12.49)	88	1	68	3	74	0	47	1	77	0	51	0	56	0	71	0														
SPECIES DENSITY (# of species/100 sq.m.)	16.20	s=(2.73)				16	21	13	18	15	13	17	14	21	15	12	16	19	16	17															

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																													
						1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
NATIVE ANNUAL & BIENNIAL FORBS																																			
Lappula redow skii	0.00	13.33	0.00	0.00	0.00											P														P					
TOTAL NATIVE ANN. & BIEN. FORBS	0.00	13.33	0.00	0.00	0.00											P													P						
NATIVE PERENNIAL FORBS																																			
Arabis fendleri	0.00	20.00	0.00	0.00	0.00											P																			
Leucelene ericoides	0.07	86.67	0.21	0.07	0.20	1		P		P		P		P		P		P		P		P		P		P		P		P					
Sphaeralcea coccinea	0.00	13.33	0.00	0.00	0.00											P				P															
TOTAL NATIVE PERENNIAL FORBS	0.07	86.67	0.21	0.07	0.20	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P					
NATIVE PERENNIAL GRASSES (cool)																																			
Oryzopsis hymenoides	0.00	13.33	0.00	0.00	0.00											P																			
Sitanion hystrix	0.67	93.33	2.07	0.73	2.24	2		3		P		P		P		1		P		P		1		1		P		P		3					
TOTAL NATIVE PERENNIAL GRASSES (c)	0.67	93.33	2.07	0.73	2.24	2	3		P	P	P	P	1	P	P	1	1	P	P	P	1	1	P	P	P	P	P	3	3						
NATIVE PERENNIAL GRASSES (w arm)																																			
Bouteloua gracilis	12.67	100.00	39.42	13.13	40.20	20	2	9		15		14		11		10		5		10		13		18		17	3	11		12	11	14	2		
Hilaria jamesii	0.00	6.67	0.00	0.00	0.00									P																					
TOTAL NATIVE PERENNIAL GRASSES (w)	12.67	100.00	39.42	13.13	40.20	20	2	9		15		14		11		10		5		10		13		18		17	3	11		12	11	14	2		
NATIVE SUBSHRUBS																																			
Ceratoides lanata	0.00	6.67	0.00	0.00	0.00											P																			
Chrysothamnus greenei	0.07	40.00	0.21	0.07	0.20			1						P		P				P						P		P							
Gutierrezia sarothrae	0.00	53.33	0.00	0.00	0.00	P		P		P		P		P		P		P		P		P		P		P		P		P					
TOTAL NATIVE SUBSHRUBS	0.07	73.33	0.21	0.07	0.20	P	1	P		P		P		P		P		P		P		P		P		P		P		P					
NATIVE SHRUBS																																			
Artemisia tridentata	16.07	100.00	50.00	16.07	49.18	22		9		17		12		10		16		18		13		17		20		18		10		19	16	24			
Atriplex canescens	0.13	13.33	0.41	0.13	0.41					1												1													
TOTAL NATIVE SHRUBS	16.20	100.00	50.41	16.20	49.59	22	9	18	12	10	16	18	13	18	20	18	10	19	16	24															
NATIVE TREES																																			
Pinus edulis	1.40	100.00	4.36	1.40	4.29	P		5		1		1		2		1		5		P		1		1		1		1		P	2	P			
TOTAL NATIVE TREES	1.40	100.00	4.36	1.40	4.29	P	5	1	1	2	1	5	P	1	1	1	1	1	1	P	2	P													
SUCCULENTS																																			
Coryphantha vivipara	0.00	13.33	0.00	0.00	0.00											P																			
Opuntia polyacantha	0.00	26.67	0.00	0.00	0.00																					P		P		P					
TOTAL SUCCULENTS	0.00	33.33	0.00	0.00	0.00											P									P	P	P	P							
BRYOPHYTES																																			
Moss spp.	0.13	13.33	0.41	0.13	0.41									1						1															
TOTAL BRYOPHYTES	0.13	13.33	0.41	0.13	0.41									1						1															
LICHEN/FUNGUS																																			
Lichen spp.	0.93	66.67	2.90	0.93	2.86	1		2		1		2				2		2				1		P		1			2						
TOTAL LICHEN	0.93	66.67	2.90	0.93	2.86	1	2	1	2			2	2		1	P	1				1	P	1				2								

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																													
					1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
					1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd		
Standing dead	14.13	100.00	14.13	14.13	3	9	10	10	10	21	13	18	28	13	8	21	24	16	8															
Litter	11.33	100.00	11.33	11.33	17	9	8	9	11	10	13	10	14	8	15	7	7	11	21															
Bare ground	42.33	100.00	42.33	42.33	34	53	47	52	55	42	44	45	26	39	40	48	38	42	30															
Rock	0.07	6.67	0.07	0.07												1																		
TOTALS	100.00		100.00	100.53	100	2	100	0	100	0	100	0	100	0	100	4	100	0	100	0	100	0	100	0	100	4	100	0	100	0	100	0	100	2
TOTAL VEGETATION COVER	32.13	s=(6.51)	32.67	s=(7.29)	46	2	29	0	35	0	29	0	24	0	27	0	30	0	27	0	32	0	40	0	37	4	23	0	31	0	31	0	41	2
GROUND COVER (Veg+Litter+St.Dead+Rock)	57.67	s=(8.26)	58.20	s=(8.77)	66	2	47	0	53	0	48	0	45	0	58	0	56	0	55	0	74	0	61	0	60	4	52	0	62	0	58	0	70	2
SPECIES DENSITY (# of species/100 sq.m.)	7.80	s=(1.61)			7		11		7		6		11		6		9		9		7		7		8		8		7		8		6	

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																													
						1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
NATIVE ANNUAL & BIENNIAL FORBS																																			
Chenopodium graveolens	0.00	26.67	0.00	0.00	0.00	P	P		P	P																									
Chenopodium leptophyllum	0.00	20.00	0.00	0.00	0.00				P					P																	P				
Descurainia pinnata	0.00	6.67	0.00	0.00	0.00																														
Euphorbia glyptosperma	0.33	33.33	1.21	0.33	1.17	2	P		1	2																				P					
Lappula redow skii	0.00	33.33	0.00	0.00	0.00	P	P		P										P																
Solanum triflorum	0.00	26.67	0.00	0.00	0.00																														
Verbesina encelioides	0.00	6.67	0.00	0.00	0.00						P																								
TOTAL NATIVE ANN. & BIEN. FORBS	0.33	66.67	1.21	0.33	1.17	2	P		1	2	P	P					P			P						P			P						
INTRODUCED ANNUAL & BIENNIAL FORBS																																			
Kochia scoparia	0.00	6.67	0.00	0.00	0.00							P																							
Portulaca oleracea	0.07	80.00	0.24	0.07	0.23	P	P		P	P	P	P	P	1	P	P	P													P					
Salsola iberica	0.00	13.33	0.00	0.00	0.00																														
TOTAL INTRO. ANN. & BIEN. FORBS	0.07	80.00	0.24	0.07	0.23	P	P		P	P	P	P	P	1	P	P	P												P						
NATIVE PERENNIAL FORBS																																			
Delphinium scaposum	0.00	13.33	0.00	0.00	0.00																														
Leucelene ericoides	0.13	73.33	0.48	0.13	0.47	P	1		P	P	P	P	P	P	P															P					
Sphaeralcea coccinea	0.00	46.67	0.00	0.00	0.00	P	P	P	P	P	P	P	P	P	P															P					
TOTAL NATIVE PERENNIAL FORBS	0.13	80.00	0.48	0.13	0.47	P	1	P	P	P	P	P	P	P	P														P						
NATIVE PERENNIAL GRASSES (cool)																																			
Oryzopsis hymenoides	0.00	13.33	0.00	0.00	0.00																														
Sitanion hystrix	0.13	93.33	0.48	0.13	0.47	P	P	P	P	P	P		1	P	P	1	P	P	P											P					
TOTAL NATIVE PERENNIAL GRASSES (c)	0.13	93.33	0.48	0.13	0.47	P	P	P	P	P	P		1	P	P	1	P	P	P										P						
NATIVE PERENNIAL GRASSES (w arm)																																			
Bouteloua gracilis	10.33	100.00	37.53	11.20	39.34	12	13	7	10	10	13	5	13 3	16 3	12 2	9	8	8 3	12	7 2															
TOTAL NATIVE PERENNIAL GRASSES (w)	10.33	100.00	37.53	11.20	39.34	12	13	7	10	10	13	5	13 3	16 3	12 2	9	8	8 3	12	7 2															
NATIVE SUBSHRUBS																																			
Chrysothamnus greenei	0.00	26.67	0.00	0.00	0.00																														
Gutierrezia sarothrae	0.00	40.00	0.00	0.00	0.00																														
TOTAL NATIVE SUBSHRUBS	0.00	60.00	0.00	0.00	0.00		P		P	P			P		P	P										P	P	P							
NATIVE SHRUBS																																			
Artemisia tridentata	14.93	100.00	54.24	15.00	52.69	8	23	14	12	15	14	16	17	10	19	16	17	14 1	15	14															
Atriplex canescens	0.13	13.33	0.48	0.13	0.47	1			1																										
TOTAL NATIVE SHRUBS	15.07	100.00	54.72	15.13	53.16	9	23	14	13	15	14	16	17	10	19	16	17	14 1	15	14															
NATIVE TREES																																			
Juniperus osteosperma	0.00	6.67	0.00	0.00	0.00																														
Pinus edulis	1.47	93.33	5.33	1.47	5.15	1			P	5	P	P	1	P	P	1	1	1	3	5	4														
TOTAL NATIVE TREES	1.47	93.33	5.33	1.47	5.15	1			P	5	P	P	1	P	P	1	1	1	3	5	4														
SUCCULENTS																																			
Coryphantha vivipara	0.00	33.33	0.00	0.00	0.00																														
Opuntia phaeacantha	0.00	53.33	0.00	0.00	0.00	P	P	P	P																										
TOTAL SUCCULENTS	0.00	66.67	0.00	0.00	0.00	P	P	P	P																										

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PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover																													
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15															
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd												
BRYOPHYTES																																			
Moss spp.	0.00	20.00	0.00	0.00	0.00																P	P	P												
TOTAL BRYOPHYTES	0.00	20.00	0.00	0.00	0.00																P	P	P												
LICHEN/FUNGUS																																			
Lichen spp.	0.73	60.00	2.66	0.73	2.58	1		1			2	2									P	3	1	1	P										
TOTAL LICHEN	0.73	60.00	2.66	0.73	2.58	1		1			2	2									P	3	1	1	P										
Standing dead	7.07	100.00		7.07		10	8	7	5	2	8	8	8	6	4	4	14	8	7	7															
Litter	23.33	100.00		23.33		25	22	17	24	21	22	24	29	32	22	20	22	23	23	24															
Bare ground	41.20	100.00		41.20		40	33	54	42	49	41	44	32	35	42	49	34	43	37	43															
Rock	0.13	13.33		0.13						1										1															
TOTALS	100.00		102.66	100.93	102.58	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	2										
TOTAL VEGETATION COVER	27.53	s=(4.17)		28.47	s=(4.45)	24	0	37	0	21	0	29	0	27	0	27	0	31	3	27	3	32	2	27	0	27	0	25	4	32	0	25	2		
GROUND COVER (Veg+Litter+St.Dead+Rock)	58.07	s=(6.33)		59.00	s=(6.92)	59	0	67	0	45	0	58	0	51	0	57	0	54	0	68	3	65	3	58	2	51	0	63	0	56	4	62	0	57	2
SPECIES DENSITY (# of species/100 sq.m.)	10.40	s=(3.22)				13		15		7		16		15		8		12		6		8		9		7		11		8		11		10	

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)														
						1		2		3		4		5		6		7	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
NATIVE ANNUAL & BIENNIAL FORBS																			
Chenopodium berlandieri	0.75	29.17	2.88	0.75	2.88	P			6					5					
Helianthus petiolaris	0.00	4.17	0.00	0.00	0.00				P										
Machaeranthera canescens	0.00	4.17	0.00	0.00	0.00														
TOTAL NATIVE ANN. & BIEN. FORBS	0.75	33.33	2.88	0.75	2.88	P			6					5					
INTRODUCED ANNUAL & BIENNIAL FORBS																			
Halogeton glomeratus	0.04	29.17	0.16	0.04	0.16	P			P					P					
Kochia scoparia	5.13	87.50	19.68	5.13	19.68	4	15	4	1	P			2	9					
Polygonum aviculare	0.08	16.67	0.32	0.08	0.32			1											
Salsola iberica	7.54	62.50	28.96	7.54	28.96	29		6	P	5			17	P					
TOTAL INTRO. ANN. & BIEN. FORBS	12.79	100.00	49.12	12.79	49.12	33	15	11	1	5			19	9					
INTRODUCED ANNUAL GRASSES																			
Bromus japonicus	0.79	41.67	3.04	0.79	3.04				P	3	3								
Bromus tectorum	2.92	66.67	11.20	2.92	11.20		2			13	8				P				
TOTAL INTRODUCED ANNUAL GRASSES	3.71	79.17	14.24	3.71	14.24		2	P		16	11				P				
NATIVE PERENNIAL FORBS																			
Ambrosia psilostachya	0.00	4.17	0.00	0.00	0.00				P										
Astragalus wingatanus	0.00	20.83	0.00	0.00	0.00				P										
Sphaeralcea coccinea	0.08	4.17	0.32	0.08	0.32														
TOTAL NATIVE PERENNIAL FORBS	0.08	25.00	0.32	0.08	0.32				P										
INTRODUCED PERENNIAL FORBS																			
Sanguisorba minor	0.13	29.17	0.48	0.13	0.48						2								
TOTAL INTRO. PERENNIAL FORBS	0.13	29.17	0.48	0.13	0.48						2								
NATIVE PERENNIAL GRASSES (cool)																			
Agropyron smithii	1.33	58.33	5.12	1.33	5.12			1	1		3								
Agropyron spicatum	0.17	20.83	0.64	0.17	0.64									2					
Oryzopsis hymenoides	0.88	50.00	3.36	0.88	3.36	4	P												
Sitanion hystrix	0.00	8.33	0.00	0.00	0.00														
TOTAL NATIVE PERENNIAL GRASSES (c)	2.38	87.50	9.12	2.38	9.12	4	1	1			3			2					
NATIVE PERENNIAL GRASSES (warm)																			
Bouteloua gracilis	0.00	4.17	0.00	0.00	0.00														
Hilaria jamesii	0.21	16.67	0.80	0.21	0.80			P											
TOTAL NATIVE PERENNIAL GRASSES (w)	0.21	16.67	0.80	0.21	0.80			P											
INTRODUCED PERENNIAL GRASSES (cool)																			
Agropyron intermedium	0.25	4.17	0.96	0.25	0.96														
Elymus junceus	3.38	87.50	12.96	3.38	12.96	2	6	2	4	8	1			6					
TOTAL INTRO. PERENNIAL GRASSES (c)	3.63	87.50	13.92	3.63	13.92	2	6	2	4	8	1			6					
NATIVE SUBSHRUBS																			
Ceratoides lanata	0.08	25.00	0.32	0.08	0.32				P					P					
Gutierrezia sarothrae	0.00	16.67	0.00	0.00	0.00						P								
Senecio douglasii var. longilobus	0.00	4.17	0.00	0.00	0.00														
TOTAL NATIVE SUBSHRUBS	0.08	41.67	0.32	0.08	0.32				P		P			P					
NATIVE SHRUBS																			
Atriplex canescens	2.17	91.67	8.32	2.17	8.32	3	P	P	3	P	P			P	2				
Atriplex confertifolia	0.08	41.67	0.32	0.08	0.32	P		P		1	P			P					
Chrysothamnus nauseosus	0.04	12.50	0.16	0.04	0.16														
Sarcobatus vermiculatus	0.00	4.17	0.00	0.00	0.00														
TOTAL NATIVE SHRUBS	2.29	95.83	8.80	2.29	8.80	3	P	P	3	1	P			P	2				
Standing dead	0.38	16.67		0.38															
Litter	33.67	100.00		33.67		24	40	29	47	38	27			34					
Bare ground	38.75	100.00		38.75		32	36	50	29	30	46			46					
Rock	1.17	54.17		1.17		2		1		2				3					
TOTALS	100.00		100.00	100.00	100.00	100	0	100	0	100	0	100	0	100	0				
TOTAL VEGETATION COVER	26.04	s=(9.13)		26.04	s=(9.13)	42	0	24	0	20	0	24	0	30	0				
GROUND COVER (Veg+Litter+St.Dead+Rock)	61.25	s=(11.9)		61.25	s=(11.9)	68	0	64	0	50	0	71	0	70	0				
Non-Noxious Foliar Cover	26.00	s=(9.03)				42	24	20	24	30	27	17	17	17	17				
SPECIES DENSITY (# of species/100 sq.m.)	8.46	s=(2.57)				8	7	14	6	10	9	5	5	5	5				

TOTAL VEGETATION COVER	19.95	s=(5.11)	19.95	s=(5.11)	19	24	16	18	17	19	17
GROUND COVER (Veg+Litter+St.Dead+Rock)	55.90	s=(14.69)	55.90	s=(14.69)	37	57	73	48	62	57	42
SPECIES DENSITY (# of species/100 sq.m.)	9.30	s=(3.1)			5	9	16	9	4	9	10

0	24	0	22	0	15	0	20	0	32	0	18	0	18	0	22	0	33	0	14	0	15	0	17	0	19	0
0	43	0	49	0	38	0	45	0	58	0	48	0	53	0	76	0	71	0	68	0	40	0	60	0	93	0
	9		7		7		12		14		9		13		12		9		7		12		6		7	

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)		RELATIVE VEGETATION COVER-ALL (%)		P _i																	
			1	2	3	4	5	6	7	1		2		3										
										1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd					
NATIVE ANNUAL & BIENNIAL FORBS																								
Chenopodium berlandieri	0.00	6.67	0.00	0.00	0.00																			
Cordylanthus wrightii	0.20	46.67	0.96	0.27	1.14			P		1	1		1											
TOTAL NATIVE ANN. & BIEN. FORBS	0.20	46.67	0.96	0.27	1.14			P		1	1		1											
INTRODUCED ANNUAL & BIENNIAL FORBS																								
Salsola iberica	0.00	6.67	0.00	0.00	0.00																			
TOTAL INTRO. ANN. & BIEN. FORBS	0.00	6.67	0.00	0.00	0.00																			
NATIVE ANNUAL GRASSES																								
Festuca octoflora	0.13	40.00	0.64	0.13	0.57			P													P			
TOTAL NATIVE ANNUAL GRASSES	0.13	40.00	0.64	0.13	0.57			P													P			
NATIVE PERENNIAL FORBS																								
Leucelene ericoides	0.13	60.00	0.64	0.13	0.57			P			P		P									P		
Sphaeralcea coccinea	0.07	6.67	0.32	0.07	0.28					1														
TOTAL NATIVE PERENNIAL FORBS	0.20	66.67	0.96	0.20	0.85			P		1	P		P									P		
NATIVE PERENNIAL GRASSES (cool)																								
Oryzopsis hymenoides	0.33	66.67	1.60	0.40	1.70	1				1	1	P										1		
Sitanion hystrix	1.00	100.00	4.79	1.60	6.82	1	1	P		1	1	3	2		P							2		
Stipa comata	0.00	6.67	0.00	0.00	0.00							P												
TOTAL NATIVE PERENNIAL GRASSES (c)	1.33	100.00	6.39	2.00	8.52	2	1	P		2	1	1	3	2	P							3		
NATIVE PERENNIAL GRASSES (warm)																								
Aristida purpurea	0.00	6.67	0.00	0.00	0.00						P													
Bouteloua gracilis	4.33	100.00	20.77	5.27	22.44	9	2	6		3	1	4	2	3		3	1					1		
Hilaria jamesii	1.60	93.33	7.67	1.87	7.95	P		3		P		2	1	3	1	P						3		
Muhlenbergia torreyi	0.07	20.00	0.32	0.07	0.28							P										P		
TOTAL NATIVE PERENNIAL GRASSES (w)	6.00	100.00	28.75	7.20	30.68	9	2	9		3	1	6	3	6	1	3	1					4		
NATIVE SUBSHRUBS																								
Ceratoides lanata	0.07	46.67	0.32	0.07	0.28	P				P												P		
Chrysothamnus Greenei	3.33	100.00	15.97	3.73	15.91	1		6		7	1	P	1	1		1						4		
Eriogonum microthecum	0.00	6.67	0.00	0.00	0.00					P														
Gutierrezia sarothrae	0.00	40.00	0.00	0.00	0.00					P		P		P										
TOTAL NATIVE SUBSHRUBS	3.40	100.00	16.29	3.80	16.19	1	6	7	1	P	1	1	1	1	1	1	1	1	1	1	1	4		
NATIVE SHRUBS																								
Artemisia tridentata	7.67	100.00	36.74	7.87	33.52	9		6		3	1	16		9		13						5		
Atriplex canescens	1.13	53.33	5.43	1.13	4.83					2						2						1		
TOTAL NATIVE SHRUBS	8.80	100.00	42.17	9.00	38.35	9	6	5	1	16	9	15	9	15	6	6	6	6	6	6	6	6		
SUCCULENTS																								
Coryphantha vivipara	0.00	6.67	0.00	0.00	0.00																			
Echinocereus triglochidiatus var. melanacanthus	0.00	6.67	0.00	0.00	0.00																			
Opuntia fragilis var. fragilis	0.00	13.33	0.00	0.00	0.00																			
Opuntia phaeacantha	0.00	20.00	0.00	0.00	0.00					P		P												
TOTAL SUCCULENTS	0.00	46.67	0.00	0.00	0.00					P		P												
BRYOPHYTES																								
Moss spp.	0.20	100.00	0.96	0.27	1.14	P		1		P		P		P		1						P		
TOTAL BRYOPHYTES	0.20	100.00	0.96	0.27	1.14	P		1		P		P		P		1						P		
LICHEN/FUNGUS																								
Lichen spp.	0.60	100.00	2.88	0.60	2.56	P		1		2		P		P		P						1		
TOTAL LICHEN	0.60	100.00	2.88	0.60	2.56	P		1		2		P		P		P						1		
Standing dead	13.93	100.00		13.93		9		14		20		16		17		16						14		
Litter	25.07	100.00		25.07		31		18		22		21		27		34						23		
Bare ground	37.07	100.00		37.07		39		45		35		40		37		30						40		
Rock	3.07	53.33		3.07						2												5		
TOTALS	100.00		100.00	102.60	100.00	100	3	100	0	100	5	100	7	100	1	100	1	100	1	100	1	100		
TOTAL VEGETATION COVER	20.87	s=(4.58)		23.47	s=(5.57)	21	3	23	0	21	5	23	7	19	1	20	1	18	18	18	18	18		
GROUND COVER (Veg+Litter+St.Dead+Rock)	62.93	s=(5.84)		65.53	s=(6.39)	61	3	55	0	65	5	60	7	63	1	70	1	60	60	60	60	60		
SPECIES DENSITY (# of species/100 sq.m.)	11.53	s=(2.39)				9		10		17		12		10		9		12	12	12	12	12		

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	P _i													
						1		2		3		4		5		6		7	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	
NATIVE ANNUAL & BIENNIAL FORBS																			
Cordylanthus wrightii	0.00	6.67	0.00	0.00	0.00														
Descurainia pinnata	0.13	80.00	0.93	0.13	0.93	P	P	P	2	P	P	P			P				
Eriogonum cernuum	0.00	13.33	0.00	0.00	0.00			P											
Lappula redowskii	0.00	33.33	0.00	0.00	0.00				P	P	P	P							
Machaeranthera canescens	0.00	13.33	0.00	0.00	0.00														
TOTAL NATIVE ANN. & BIEN. FORBS	0.13	80.00	0.93	0.13	0.93	P	P	P	2	P	P	P			P				
INTRODUCED ANNUAL & BIENNIAL FORBS																			
Chenopodium album	0.00	53.33	0.00	0.07	0.47			P							P				
TOTAL INTRO. ANN. & BIEN. FORBS	0.00	53.33	0.00	0.07	0.47			P							P				
NATIVE PERENNIAL FORBS																			
Arabis fendleri	0.00	6.67	0.00	0.00	0.00														
Astragalus calycosus var. scaposus	0.00	6.67	0.00	0.00	0.00					P									
Astragalus praelongus	0.00	40.00	0.00	0.00	0.00	P	P		P						P				
Calochortus nuttallii	0.00	6.67	0.00	0.00	0.00														
Euphorbia fendleri	0.00	33.33	0.00	0.00	0.00	P					P				P				
Leucelene ericoides	0.27	93.33	1.87	0.27	1.86	P	P	P	P	1		P			P				
Psilostrophe sparsiflora	0.00	6.67	0.00	0.00	0.00	P													
Sphaeralcea coccinea	0.20	73.33	1.40	0.20	1.40	P	P		P	1					P				
Stanleya pinnata	0.00	6.67	0.00	0.00	0.00														
TOTAL NATIVE PERENNIAL FORBS	0.47	100.00	3.27	0.47	3.26	P	P	P	P	2		P			P				
NATIVE PERENNIAL GRASSES (cool)																			
Oryzopsis hymenoides	0.27	93.33	1.87	0.27	1.86	P	P		P	P	P	P			P				
Sitanion hystrix	0.27	80.00	1.87	0.27	1.86		1	1	P	1	1	1			P				
TOTAL NATIVE PERENNIAL GRASSES (c)	0.53	100.00	3.74	0.53	3.72	P	1	1	P	1	1	1			P				
NATIVE PERENNIAL GRASSES (warm)																			
Bouteloua gracilis	1.27	93.33	8.88	1.27	8.84	P	P	1		P	P	P			2				
Hilaria jamesii	2.00	93.33	14.02	2.00	13.95	2	10		1	1	2	2			2				
TOTAL NATIVE PERENNIAL GRASSES (w)	3.27	100.00	22.90	3.27	22.79	2	10	1	1	1	2	2			4				
NATIVE SUBSHRUBS																			
Ceratoides lanata	0.00	13.33	0.00	0.00	0.00			P		P									
Chrysothamnus Greenei	2.67	93.33	18.69	2.67	18.60	6	2	3	3	3	3	3			3				
Gutierrezia sarothrae	0.20	100.00	1.40	0.20	1.40	P	P	P	1	P	P	P			P				
TOTAL NATIVE SUBSHRUBS	2.87	100.00	20.09	2.87	20.00	6	2	3	4	3	3	3			3				
NATIVE SHRUBS																			
Artemisia tridentata	3.27	100.00	22.90	3.27	22.79	1	P	3	4	P	2	3			3				
Atriplex canescens	1.27	80.00	8.88	1.27	8.84	2	P	2	3	P	4								
Chrysothamnus nauseosus	0.00	20.00	0.00	0.00	0.00				P	P									
Chrysothamnus viscidiflorus	0.20	13.33	1.40	0.20	1.40			1											
Ephedra viridis	0.00	6.67	0.00	0.00	0.00										P				
Lycium pallidum	0.07	6.67	0.47	0.07	0.47						1								
Tetradymia canescens	0.00	20.00	0.00	0.00	0.00				P	P					P				
TOTAL NATIVE SHRUBS	4.80	100.00	33.64	4.80	33.49	3	P	6	7	P	9	3			3				
NATIVE TREES																			
Juniperus osteosperma	0.13	26.67	0.93	0.13	0.93														
Pinus edulis	1.80	73.33	12.62	1.80	12.56	1			3	P					3				
TOTAL NATIVE TREES	1.93	80.00	13.55	1.93	13.49	1			3	P					3				
SUCCULENTS																			
Opuntia phaeacantha	0.07	13.33	0.47	0.07	0.47														
Opuntia polyacantha	0.00	6.67	0.00	0.00	0.00		P												
Opuntia whipplei	0.00	6.67	0.00	0.00	0.00														
TOTAL SUCCULENTS	0.07	26.67	0.47	0.07	0.47		P												
BRYOPHYTES																			
Moss spp.	0.13	13.33	0.93	0.13	0.93														
TOTAL BRYOPHYTES	0.13	13.33	0.93	0.13	0.93														
LICHEN/FUNGUS																			
Lichen spp.	0.07	6.67	0.47	0.07	0.47		1												
TOTAL LICHEN	0.07	6.67	0.47	0.07	0.47		1												
Standing dead	12.20	100.00		12.20		6	13	20	18	9	24	7							
Litter	19.60	100.00		19.60		18	11	23	22	20	20	17							
Bare ground	41.07	100.00		41.07		48	44	36	37	48	29	56							
Rock	12.93	100.00		12.93		16	19	10	6	16	12	7							
TOTALS	100.07		100.00	100.13	100.00	100	0	101	0	100	0	100	0	100	0				

TOTAL VEGETATION COVER	14.27	s=(3.49)	14.33	s=(3.52)	12 0	14 0	11 0	17 0	7 0	15 0	13
GROUND COVER (Veg+Litter+St.Dead+Rock)	59.00	s=(8.6)	59.07	s=(8.67)	52 0	57 0	64 0	63 0	52 0	71 0	44
SPECIES DENSITY (# of species/100 sq.m.)	14.33	s=(2.06)			14	14	12	16	17	15	15

0	11 0	16 0	16 0	16 0	17 0	15 1	12 0	22 0
0	64 0	47 0	66 0	71 0	62 0	67 1	54 0	51 0
	12	12	13	16	16	14	18	11

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	P _i													
						1		2		3		4		5		6		7	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	
NATIVE ANNUAL & BIENNIAL FORBS																			
Lappula redowskii	0.00	13.33	0.00	0.00	0.00										P				
TOTAL NATIVE ANN. & BIEN. FORBS	0.00	13.33	0.00	0.00	0.00										P				
NATIVE PERENNIAL FORBS																			
Arabis fendleri	0.00	20.00	0.00	0.00	0.00		P				P				P				
Leucelene ericoides	0.07	86.67	0.21	0.07	0.20	1	P	P	P	P	P	P			P				
Sphaeralcea coccinea	0.00	13.33	0.00	0.00	0.00														
TOTAL NATIVE PERENNIAL FORBS	0.07	86.67	0.21	0.07	0.20	1	P	P	P	P	P	P			P				
NATIVE PERENNIAL GRASSES (cool)																			
Oryzopsis hymenoides	0.00	13.33	0.00	0.00	0.00		P				P								
Sitanion hystrix	0.67	93.33	2.07	0.73	2.24	2	3		P	P	P				P				
TOTAL NATIVE PERENNIAL GRASSES (c)	0.67	93.33	2.07	0.73	2.24	2	3		P	P	P				P				
NATIVE PERENNIAL GRASSES (warm)																			
Bouteloua gracilis	12.67	100.00	39.42	13.13	40.20	20	2	9	15	14	11	10	5						
Hilaria jamesii	0.00	6.67	0.00	0.00	0.00						P								
TOTAL NATIVE PERENNIAL GRASSES (w)	12.67	100.00	39.42	13.13	40.20	20	2	9	15	14	11	10	5						
NATIVE SUBSHRUBS																			
Ceratoides lanata	0.00	6.67	0.00	0.00	0.00			P											
Chrysothamnus Greenei	0.07	40.00	0.21	0.07	0.20			1			P				P				
Gutierrezia sarothrae	0.00	53.33	0.00	0.00	0.00	P	P	P			P								
TOTAL NATIVE SUBSHRUBS	0.07	73.33	0.21	0.07	0.20	P	1	P			P				P				
NATIVE SHRUBS																			
Artemisia tridentata	16.07	100.00	50.00	16.07	49.18	22	9	17	12	10	16	18							
Atriplex canescens	0.13	13.33	0.41	0.13	0.41			1											
TOTAL NATIVE SHRUBS	16.20	100.00	50.41	16.20	49.59	22	9	18	12	10	16	18							
NATIVE TREES																			
Pinus edulis	1.40	100.00	4.36	1.40	4.29	P	5	1	1	2	1	5							
TOTAL NATIVE TREES	1.40	100.00	4.36	1.40	4.29	P	5	1	1	2	1	5							
SUCCULENTS																			
Coryphantha vivipara	0.00	13.33	0.00	0.00	0.00									P					
Opuntia polyacantha	0.00	26.67	0.00	0.00	0.00														
TOTAL SUCCULENTS	0.00	33.33	0.00	0.00	0.00									P					
BRYOPHYTES																			
Moss spp.	0.13	13.33	0.41	0.13	0.41					1									
TOTAL BRYOPHYTES	0.13	13.33	0.41	0.13	0.41					1									
LICHEN/FUNGUS																			
Lichen spp.	0.93	66.67	2.90	0.93	2.86	1	2	1	2						2				
TOTAL LICHEN	0.93	66.67	2.90	0.93	2.86	1	2	1	2						2				
Standing dead	14.13	100.00		14.13		3	9	10	10	10	21	13							
Litter	11.33	100.00		11.33		17	9	8	9	11	10	13							
Bare ground	42.33	100.00		42.33		34	53	47	52	55	42	44							
Rock	0.07	6.67		0.07															
TOTALS	100.00		100.00	100.53	100.00	100	2	100	0	100	0	100	0	100	0				
TOTAL VEGETATION COVER	32.13	s=(6.51)		32.67	s=(7.29)	46	2	29	0	35	0	29	0	24	0				
GROUND COVER (Veg+Litter+St.Dead+Rock)	57.67	s=(8.26)		58.20	s=(8.77)	66	2	47	0	53	0	48	0	45	0				
SPECIES DENSITY (# of species/100 sq.m.)	7.80	s=(1.61)				7	11	7	6	11	6	9							

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent f
						1 1 st 2 nd
NATIVE ANNUAL & BIENNIAL FORBS						
Amaranthus retroflexus	0.00	12.82	0.00	0.00	0.00	
Chenopodium berlandieri	0.03	20.51	0.09	0.03	0.09	
Chenopodium graveolens	0.00	2.56	0.00	0.00	0.00	
Chenopodium leptophyllum	0.00	2.56	0.00	0.00	0.00	
Cleome serrulata	0.00	2.56	0.00	0.00	0.00	
Euphorbia glyptosperma	0.00	15.38	0.00	0.00	0.00	
Lappula redowskii	0.00	2.56	0.00	0.00	0.00	
Machaeranthera canescens	0.00	5.13	0.00	0.00	0.00	
Verbesina encelioides	0.00	2.56	0.00	0.00	0.00	
TOTAL NATIVE ANN. & BIEN. FORBS	0.03	48.72	0.09	0.03	0.09	
INTRODUCED ANNUAL & BIENNIAL FORBS						
Amaranthus graecizans	0.03	7.69	0.09	0.03	0.09	
Halogeton glomeratus	0.41	51.28	1.52	0.41	1.51	P
Kochia scoparia	4.46	89.74	16.49	4.49	16.50	3
Melilotus officinalis	0.00	7.69	0.00	0.00	0.00	
Portulaca oleracea	0.13	10.26	0.47	0.15	0.57	
Salsola iberica	11.31	100.00	41.80	11.38	41.86	28
Sisymbrium altissimum	0.00	7.69	0.00	0.00	0.00	
Tragopogon dubius	0.00	2.56	0.00	0.00	0.00	
Tribulus terrestris	0.03	2.56	0.09	0.03	0.09	
TOTAL INTRO. ANN. & BIEN. FORBS	16.36	100.00	60.47	16.49	60.61	31
NATIVE ANNUAL GRASSES						
Monroa squarrosa	0.03	7.69	0.09	0.03	0.09	
TOTAL NATIVE ANNUAL GRASSES	0.03	7.69	0.09	0.03	0.09	
INTRODUCED ANNUAL GRASSES						
Bromus tectorum	0.00	10.26	0.00	0.00	0.00	
Eragrostis cilianensis	0.00	2.56	0.00	0.00	0.00	
TOTAL INTRODUCED ANNUAL GRASSES	0.00	12.82	0.00	0.00	0.00	
NATIVE PERENNIAL FORBS						
Leucelene ericoides	0.03	2.56	0.09	0.03	0.09	
Linum lewisii	0.00	2.56	0.00	0.00	0.00	
Mirabilis multiflora	0.00	2.56	0.00	0.00	0.00	
Penstemon palmeri	0.00	5.13	0.00	0.00	0.00	
Ratibida columnaris	0.00	2.56	0.00	0.00	0.00	
Sphaeralcea coccinea	0.00	12.82	0.00	0.00	0.00	
TOTAL NATIVE PERENNIAL FORBS	0.03	23.08	0.09	0.03	0.09	
INTRODUCED PERENNIAL FORBS						
Astragalus cicer	0.00	2.56	0.00	0.00	0.00	
Medicago sativa	0.00	2.56	0.00	0.00	0.00	
Onobrychis viciifolia	0.05	20.51	0.19	0.05	0.19	P
Rumex crispus	0.00	2.56	0.00	0.00	0.00	
Sanguisorba minor	0.00	5.13	0.00	0.00	0.00	
TOTAL INTRO. PERENNIAL FORBS	0.05	28.21	0.19	0.05	0.19	P
NATIVE PERENNIAL GRASSES (cool)						

Agropyron dasystachyum	0.31	28.21	1.14	0.31	1.13	
Agropyron smithii	1.59	94.87	5.88	1.62	5.94	1
Agropyron spicatum	0.59	53.85	2.18	0.64	2.36	
Agropyron trachycaulum	0.38	41.03	1.42	0.38	1.41	P
Oryzopsis hymenoides	0.46	69.23	1.71	0.46	1.70	P
Sitanion hystrix	0.00	7.69	0.00	0.00	0.00	
Stipa comata	0.00	2.56	0.00	0.00	0.00	
TOTAL NATIVE PERENNIAL GRASSES (c)	3.33	100.00	12.32	3.41	12.54	1
NATIVE PERENNIAL GRASSES (warm)						
Bouteloua gracilis	0.54	43.59	1.99	0.56	2.07	
Buchloe dactyloides	0.05	25.64	0.19	0.05	0.19	
Hilaria jamesii	0.49	46.15	1.80	0.51	1.89	
Sporobolus airoides	0.36	30.77	1.33	0.36	1.32	
Sporobolus cryptandrus	0.03	15.38	0.09	0.03	0.09	
TOTAL NATIVE PERENNIAL GRASSES (w)	1.46	51.28	5.40	1.51	5.56	
INTRODUCED PERENNIAL GRASSES (cool)						
Elymus junceus	1.38	84.62	5.12	1.41	5.18	
TOTAL INTRO. PERENNIAL GRASSES (c)	1.38	84.62	5.12	1.41	5.18	
NATIVE SUBSHRUBS						
Artemisia frigida	0.00	5.13	0.00	0.00	0.00	
Ceratoides lanata	0.15	51.28	0.57	0.15	0.57	1
Chrysothamnus greenei	0.03	2.56	0.09	0.03	0.09	
Gutierrezia sarothrae	0.00	7.69	0.00	0.00	0.00	
TOTAL NATIVE SUBSHRUBS	0.18	64.10	0.66	0.18	0.66	1
INTRODUCED SUBSHRUBS						
Kochia prostrata	0.03	12.82	0.09	0.03	0.09	
TOTAL INTRO. SUBSHRUBS	0.03	12.82	0.09	0.03	0.09	
NATIVE SHRUBS						
Artemisia tridentata	0.00	5.13	0.00	0.00	0.00	
Atriplex canescens	4.00	94.87	14.79	4.00	14.71	2
Atriplex confertifolia	0.05	25.64	0.19	0.05	0.19	P
Atriplex obovata	0.03	12.82	0.09	0.03	0.09	
Chrysothamnus nauseosus	0.08	12.82	0.28	0.08	0.28	
Ephedra viridis	0.00	2.56	0.00	0.00	0.00	
Purshia tridentata	0.03	2.56	0.09	0.03	0.09	
TOTAL NATIVE SHRUBS	4.18	94.87	15.45	4.18	15.37	2
AGAVOIDS						
Yucca baccata	0.00	5.13	0.00	0.00	0.00	
TOTAL NATIVE TREES	0.00	5.13	0.00	0.00	0.00	
Standing dead	4.28	82.05		4.69		1
Litter	24.36	100.00		24.40		45
Bare ground	52.03	100.00		52.89		50
Rock	3.82	87.18		3.91		1
TOTALS	111.54		100.00	113.22	100.49	132 0
TOTAL VEGETATION COVER	27.05	s=(9.53)		27.20	s=(9.54)	35 0
GROUND COVER (Veg+Litter+St.Dead+Rock)	59.51	s=(15.04)		60.20	s=(15.01)	82 0
Non-Noxious Foliar Cover	26.64	s=(9.56)				35
SPECIES DENSITY (# of species/100 sq.m.)	12.13	s=(3.43)				10

Ground Cover	59.51
Grass Cover	6.21
Shrub Cover	4.38
Forb Cover	16.05
Species	57.00
Grass Species	16.00
Forb Species	28.00
Woody Species	13.00

170 180 320 160 100 165 20 270 190 70 175 140 50 190 10
 091821 091821 091821 091821 091821 091821 091821 091821 091821 091821 091821 091821 091821 091821 091821

Foliar Cover														Percent f
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd	1 st 2 nd
		P		P	P	P		P		P				P
2	12 1	P	P P	P P	P P	P P	P P	P P		P		P 3	P P	P
40	14	16 1	26 P 1	41	6	30	25	12	14	10	4	20 1 P	12	42
42	27	16 1	27	41	6	30	25	12	14	10	4	23 1	12	42
			P							P				
			P							P				
		P P P P		P							P			
		P		P							P			
		1 P 1			1						P P P	P P P	P	
					1						P	P	P	

2	2		P	1	6	1	2				4				
P	P		P	P	6	P	3	3	4	P	7	1	2	1	3
P	2	3	1	1	1	P	2	P	P	1	5	P	3	1	P
				P	2		1	P	1	P	3	P			3
2	4	3	1	2	15	1	8	7	5	1	19	1	5	2	6
			P												
			P												
	P		P	1	P	P	P	3	4		2	1			1
	P		P	1	P	P	P	3	4		2	1			1
	P	P	P	P	1	P	P	1						P	1
	P	P	P	P	1	P	P	1			P			P	1
1	2	P	1	3	5	1	4	2	1	4	3	P	1		4
		P	P	1	P	P	P	1			1	P	P		
		P	P	1								P	P		
1	2	2	1	4	5	1	4	3	3	5	4	P	1		4
		P													
		P													
4	7	5	6	12	5	5	12	12	10	11	6	7	3		6
32	28	10	15	26	15	16	13	18	34	41	18	33	29		26
48	53	66	52	47	58	58	61	56	42	40	71	47	53		55
6	2	14	13	3	11	7	6	9			3	4	11		6
135 0	123 0	117 1	115 0	136 0	117 0	118 0	129 0	121 0	112 0	108 0	127 1	120 1	111 0	147 0	
45 0	33 0	22 1	29 0	48 0	28 0	32 0	37 0	26 0	26 0	16 0	29 1	29 1	15 0	54 0	
87 0	70 0	51 1	63 0	89 0	59 0	60 0	68 0	65 0	70 0	68 0	56 1	73 1	58 0	92 0	
45	21	22	29	48	28	32	37	26	26	16	29	29	15	54	
6	9	17	14	13	12	10	11	13	8	10	12	14	10	10	

1	2	1		4	2	P	1	1	P	P	2	1	1	P	
1	1	1		P	2		1			1		P	P	P	
P	1		1	P	P	P						P		P	
2	5	2	1	4	5	P	2	1	P	2	2	1	2	1	
				P	P	P	1	P		2	1	1	2	1	
	P			2	P	1	2	P		P	2	P	2	P	
				P	P		3	1		1	3	P	2	P	
	P			2	P		6	2		2	5	1	4	3	
P	P	1		1	4	P	2	1	3	P	3	3	1	5	
P	P	1		1	4	P	2	1	3	P	3	3	1	5	
P	P				P		P	1		1	P			P	
P	P	P	1		P		P	1		1	P			P	
								P					P		
								P					P		
1	4	1	P	5	6	1	11	1	P	P	6		18	7	
P	P		6		P										
1	4	1	6	5	6	1	11	1	P	P	6		18	7	
							P								
							P								
10	8	8	9		3		1			3	1	1	2	2	
20	19	11	46	19	9	27	20	23	23	28	22	32	20	14	
50	61	69	35	59	71	55	48	59	57	44	59	30	50	67	
5	2	5	3	4	1	4	6	2				1	2	1	
126	1	119	1	124	0	113	0	100	0	100	0	100	0	100	0
41	1	29	1	31	0	20	0	18	0	16	0	14	0	25	0
76	1	58	1	55	0	78	0	41	0	29	0	45	0	52	0
41	29	29	20	18	16	13	25	16	19	25	18	36	26	16	
12	12	10	9	10	17	13	12	13	6	19	11	9	13	14	

1 1 P	3	P	P 1 3 P P	1 P	1 3 1 1	P P	P 1 P P 1	2
2	3	P	4	1	6	P	2	2
2 P	3 P 3 P	1 P	3 P 4 1	1 P 2 4	1 P	 P	3 P P P	
2	6	1	1	8	7	1	P	3
2	5	P	2	1	5	1	1	2
2	5	P	2	1	5	1	1	2
			P	P				P
				1	P			P
				1	P			P
2	7	P	16	16	5			8
2	7	P	16	16	5			8
23 56 1	1 30 45 2	1 43 38 1	2 26 41 1	25 41 1	2 28 33 3	27 45 4	1 16 59 4	
100 0	100 1	100 0	100 0	100 0	100 1	100 0	100 2	
20 0	22 1	17 0	30 0	33 0	34 1	24 0	20 2	
44 0	55 1	62 0	59 0	59 0	67 1	55 0	41 2	
20	22	17	30	33	34	24	20	
18	13	9	20	13	16	7	18	

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)														
						1		2		3		4		5		6		7	
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
NATIVE ANNUAL & BIENNIAL FORBS																			
Chenopodium berlandieri	0.00	8.33	0.00	0.00	0.00														
Chenopodium fremontii	0.00	8.33	0.00	0.00	0.00		P												
Chenopodium leptophyllum	0.04	16.67	0.24	0.04	0.24										P				
Dyssodia papposa	0.00	4.17	0.00	0.00	0.00														
Euphorbia glyptosperma	0.04	8.33	0.24	0.04	0.24		1												
Gilia aggregata	0.00	4.17	0.00	0.00	0.00														
Machaeranthera canescens	0.00	12.50	0.00	0.00	0.00					P									
Mentzelia pumila	0.04	4.17	0.24	0.04	0.24														
Verbesina encelioides	0.00	4.17	0.00	0.00	0.00														
TOTAL NATIVE ANN. & BIEN. FORBS	0.13	50.00	0.71	0.13	0.71		1			P					P				
INTRODUCED ANNUAL & BIENNIAL FORBS																			
Amaranthus albus	0.00	8.33	0.00	0.00	0.00			P											
Chenopodium album	0.00	4.17	0.00	0.00	0.00										P				
Halogeton glomeratus	0.00	16.67	0.00	0.00	0.00			P				P		P					
Kochia scoparia	2.67	83.33	15.24	2.67	15.09	12	P	1	17	P		P	4	2					
Melilotus officinalis	0.00	4.17	0.00	0.00	0.00					P									
Portulaca oleracea	0.00	4.17	0.00	0.00	0.00		P												
Salsola iberica	3.33	95.83	19.05	3.33	18.87	7	2	P	3	1		4		8					
TOTAL INTRO. ANN. & BIEN. FORBS	6.00	95.83	34.29	6.00	33.96	19	2	1	20	1		8		10					
INTRODUCED ANNUAL GRASSES																			
Bromus tectorum	0.13	4.17	0.71	0.13	0.71														
TOTAL INTRODUCED ANNUAL GRASSES	0.13	4.17	0.71	0.13	0.71														
NATIVE PERENNIAL FORBS																			
Cryptantha flavoculata	0.00	4.17	0.00	0.00	0.00														
Gaillardia aristata	0.00	4.17	0.00	0.00	0.00														
Mirabilis linearis	0.00	4.17	0.00	0.00	0.00														
Mirabilis multiflora	0.00	4.17	0.00	0.00	0.00			P											
Penstemon linarioides	0.00	4.17	0.00	0.00	0.00														
Penstemon palmeri	0.04	8.33	0.24	0.04	0.24			1											
Sphaeralcea coccinea	0.00	4.17	0.00	0.00	0.00														
TOTAL NATIVE PERENNIAL FORBS	0.04	16.67	0.24	0.04	0.24			1											
INTRODUCED PERENNIAL FORBS																			
Onobrychis vicifolia	0.00	12.50	0.00	0.00	0.00				P										
Sanguisorba minor	0.00	8.33	0.00	0.00	0.00				P										
TOTAL INTRO. PERENNIAL FORBS	0.00	16.67	0.00	0.00	0.00				P			P							
NATIVE PERENNIAL GRASSES (cool)																			
Agropyron dasystachyum	0.21	16.67	1.19	0.21	1.18			P											
Agropyron smithii	1.42	83.33	8.10	1.42	8.02	P			P	P	P	1		P					
Agropyron spicatum	0.04	8.33	0.24	0.04	0.24				P										
Agropyron trachycaulum	0.50	58.33	2.86	0.50	2.83				P	P	2	P							
Hordeum jubatum	0.00	4.17	0.00	0.00	0.00														
Oryzopsis hymenoides	0.50	41.67	2.86	0.50	2.83						P			P					
Sitanion hystrix	0.00	20.83	0.00	0.00	0.00				P				P						
Stipa comata	0.13	4.17	0.71	0.13	0.71														
TOTAL NATIVE PERENNIAL GRASSES (c)	2.79	95.83	15.95	2.79	15.80	P	P	P	P	2	1	P		P					
NATIVE PERENNIAL GRASSES (warm)																			
Bouteloua gracilis	0.17	20.83	0.95	0.17	0.94						4								
Buchloe dactyloides	0.04	4.17	0.24	0.04	0.24														
Hilaria jamesii	0.33	33.33	1.90	0.33	1.89						P			P					
Sporobolus airoides	0.13	8.33	0.71	0.13	0.71						3								
Sporobolus cryptandrus	0.04	8.33	0.24	0.04	0.24			P							1				
TOTAL NATIVE PERENNIAL GRASSES (w)	0.71	37.50	4.05	0.71	4.01			P			7			1					
INTRODUCED PERENNIAL GRASSES (cool)																			
Agropyron intermedium	0.00	4.17	0.00	0.00	0.00														
Elymus junceus	3.96	87.50	22.62	4.13	23.35	6	4		P	10	1			1					
TOTAL INTRO. PERENNIAL GRASSES (c)	3.96	87.50	22.62	4.13	23.35	6	4		P	10	1			1					
NATIVE SUBSHRUBS																			
Artemisia frigida	0.04	8.33	0.24	0.04	0.24				1										
Ceratoides lanata	0.08	25.00	0.48	0.08	0.47			P	P	1									
Chrysothamnus Greenei	0.00	8.33	0.00	0.00	0.00														
Gutierrezia sarothrae	0.13	4.17	0.71	0.13	0.71														
Senecio douglasii var. longilobus	0.00	12.50	0.00	0.00	0.00			P		P									
TOTAL NATIVE SUBSHRUBS	0.25	37.50	1.43	0.25	1.42			1	P	1									

INTRODUCED SUBSHRUBS												
Kochia prostrata	0.46	12.50	2.62	0.46	2.59		5					
TOTAL INTRO. SUBSHRUBS	0.46	12.50	2.62	0.46	2.59		5					
NATIVE SHRUBS												
Artemisia tridentata	0.08	12.50	0.48	0.08	0.47							
Atriplex canescens	2.00	83.33	11.43	2.00	11.32	3	4	1	P	4	5	1
Atriplex confertifolia	0.29	37.50	1.67	0.29	1.65	1					P	
Atriplex obovata	0.08	16.67	0.48	0.08	0.47							
Chrysothamnus nauseosus	0.54	33.33	3.10	0.54	3.07			P		P		
Ephedra viridis	0.00	8.33	0.00	0.00	0.00							
Purshia tridentata	0.04	12.50	0.24	0.04	0.24			1				
Shepherdia rotundifolia	0.00	4.17	0.00	0.00	0.00			P				
TOTAL NATIVE SHRUBS	3.04	87.50	17.38	3.04	17.22	4	4	2	P	4	5	1
NATIVE TREES												
Pinus edulis	0.00	8.33	0.00	0.00	0.00			P				
TOTAL NATIVE TREES	0.00	8.33	0.00	0.00	0.00			P				
Standing dead	2.33	58.33		2.33			6			3		
Litter	17.58	100.00		17.58		29	17	12	13	34	7	7
Bare ground	45.50	95.83		45.50		41	48	4	58	34	70	73
Rock	17.04	100.00		17.04		1	13	79	9	4	8	7
TOTALS	99.96		100.00	100.13	100.00	100 0	100 0	100 0	100 0	100 0	100 0	100
TOTAL VEGETATION COVER	17.50	s=(5.98)		17.67	s=(6.09)	29 0	16 0	5 0	20 0	25 0	15 0	13
GROUND COVER (Veg+Litter+St.Dead+Rock)	54.46	s=(19.97)		54.63	s=(19.98)	59 0	52 0	96 0	42 0	66 0	30 0	27
SPECIES DENSITY (# of species/100 sq.m.)	10.38	s=(3.92)				6	12	18	7	17	9	10

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	DATE												
						1		2		3		4		5		6		7
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st
NATIVE ANNUAL & BIENNIAL FORBS																		
Chenopodium fremontii	0.07	20.00	0.61	0.07	0.60												P	
Chenopodium leptophyllum	0.40	100.00	3.64	0.40	3.59	1		P		P		1		P		P	1	
Euphorbia glyptosperma	0.07	60.00	0.61	0.07	0.60	P			P					P		1		
TOTAL NATIVE ANN. & BIEN. FORBS	0.53	100.00	4.85	0.53	4.79	1	P	P	1	P	1	P	1	1	1	1	1	
INTRODUCED ANNUAL & BIENNIAL FORBS																		
Chenopodium album	0.00	6.67	0.00	0.00	0.00			P										
Portulaca oleracea	0.20	86.67	1.82	0.20	1.80	P			P		P		P		1		P	
Salsola iberica	0.00	46.67	0.00	0.00	0.00			P			P		P		P			
TOTAL INTRO. ANN. & BIEN. FORBS	0.20	100.00	1.82	0.20	1.80	P	P	P	P	P	1	P	1	P	1	P	P	
NATIVE ANNUAL GRASSES																		
Monroa squarrosa	0.00	26.67	0.00	0.00	0.00				P									
TOTAL NATIVE ANNUAL GRASSES	0.00	26.67	0.00	0.00	0.00				P									
NATIVE PERENNIAL FORBS																		
Sphaeralcea coccinea	0.00	33.33	0.00	0.00	0.00	P		P						P			P	
TOTAL NATIVE PERENNIAL FORBS	0.00	33.33	0.00	0.00	0.00	P	P							P			P	
NATIVE PERENNIAL GRASSES (cool)																		
Oryzopsis hymenoides	0.00	26.67	0.00	0.00	0.00				P					P				
Sitanion hystrix	0.07	60.00	0.61	0.07	0.60							P			1		P	
TOTAL NATIVE PERENNIAL GRASSES (c)	0.07	80.00	0.61	0.07	0.60				P			P		P	1		P	
NATIVE PERENNIAL GRASSES (warm)																		
Bouteloua gracilis	0.73	100.00	6.67	0.80	7.19	P		1		P		P		1	1	4	1	
Hilaria jamesii	0.60	86.67	5.45	0.60	5.39	1						1		P	P	P	P	
TOTAL NATIVE PERENNIAL GRASSES (w)	1.33	100.00	12.12	1.40	12.57	1	1	P	1	1	1	1	1	1	1	4	1	
NATIVE SUBSHRUBS																		
Ceratoides lanata	0.47	60.00	4.24	0.47	4.19	P		2		1				P		2		
Chrysothamnus Greenei	1.53	100.00	13.94	1.53	13.77	2		3		4		2		3		1	1	
Eriogonum microthecum	0.00	6.67	0.00	0.00	0.00													
Gutierrezia sarothrae	0.00	13.33	0.00	0.00	0.00	P											P	
TOTAL NATIVE SUBSHRUBS	2.00	100.00	18.18	2.00	17.96	2	5	5	2	3	3	3	3	3	3	3	1	
NATIVE SHRUBS																		
Artemisia tridentata	5.67	100.00	51.52	5.67	50.90	5		P		8		5		5		3	5	
Atriplex canescens	0.60	66.67	5.45	0.60	5.39	1		P				1		P		P	2	
TOTAL NATIVE SHRUBS	6.27	100.00	56.97	6.27	56.29	6	P	8	6	5	3	5	3	5	3	3	7	
SUCCULENTS																		
Coryphantha vivipara	0.00	33.33	0.00	0.00	0.00			P						P				
Opuntia phaeacantha	0.00	53.33	0.00	0.00	0.00			P						P		P	P	
Opuntia whipplei	0.00	20.00	0.00	0.00	0.00	P			P									
TOTAL SUCCULENTS	0.00	80.00	0.00	0.00	0.00	P	P	P						P	P	P	P	
BRYOPHYTES																		
Moss spp.	0.60	66.67	5.45	0.67	5.99					P	1	1		2			1	
TOTAL BRYOPHYTES	0.60	66.67	5.45	0.67	5.99					P	1	1		2			1	
LICHEN/FUNGUS																		
Lichen spp.	0.33	53.33	3.03	0.33	2.99					P				P		1	P	
TOTAL LICHEN	0.33	53.33	3.03	0.33	2.99					P				P		1	P	
Standing dead	13.07	100.00		13.07		16		19		8		12		11		14	12	
Litter	25.80	100.00		25.80		7		1		36		35		17		30	24	
Bare ground	47.00	100.00		47.00		57		72		42		40		56		41	52	
Rock	2.80	66.67		2.80		10		2		1		2		5		1	1	
TOTALS	100.00		103.03	100.13	102.99	100	0	100	0	100	1	100	0	100	1	100	0	100
TOTAL VEGETATION COVER	11.00	s=(3.12)		11.13	s=(3.18)	10	0	6	0	13	1	11	0	11	1	13	0	11
GROUND COVER (Veg+Litter+St.Dead+Rock)	52.67	s=(10.03)		52.80	s=(10.02)	43	0	28	0	58	1	60	0	44	1	58	0	48
SPECIES DENSITY (# of species/100 sq.m.)	12.27	s=(2.22)				12		13		11		10		16		13		14

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	P _i												
						1		2		3		4		5		6		7
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st
NATIVE ANNUAL & BIENNIAL FORBS																		
Chenopodium berlandieri	0.00	13.33	0.00	0.00	0.00			P										
Chenopodium fremontii	0.00	20.00	0.00	0.07	0.33					P	1							
Chenopodium graveolens	0.00	33.33	0.00	0.00	0.00			P							P			
Chenopodium leptophyllum	0.00	13.33	0.00	0.00	0.00	P												
Euphorbia glyptosperma	0.33	73.33	1.69	0.33	1.66	1	P			P				P	1			
Lappula redowskii	0.07	73.33	0.34	0.07	0.33	P	P			1	P		P	P	P			
TOTAL NATIVE ANN. & BIEN. FORBS	0.40	80.00	2.03	0.47	2.32	1	P			1	1	P		P	1			
INTRODUCED ANNUAL & BIENNIAL FORBS																		
Portulaca oleracea	0.27	46.67	1.36	0.27	1.32	3	P			P								
TOTAL INTRO. ANN. & BIEN. FORBS	0.27	46.67	1.36	0.27	1.32	3	P			P								
NATIVE ANNUAL GRASSES																		
Monroa squarrosa	0.00	6.67	0.00	0.00	0.00													
TOTAL NATIVE ANNUAL GRASSES	0.00	6.67	0.00	0.00	0.00													
NATIVE PERENNIAL FORBS																		
Astragalus calycosus var. scaposus	0.00	20.00	0.00	0.00	0.00	P												
Astragalus wingatanus	0.00	40.00	0.00	0.00	0.00					P					P			
Leucelene ericoides	0.47	100.00	2.37	0.47	2.32	2	2	P		P		1	P		P			
Mirabilis multiflora	0.00	6.67	0.00	0.00	0.00													
Mirabilis oxybaphoides	0.00	6.67	0.00	0.00	0.00													
Psilostrophe sparsiflora	0.13	6.67	0.68	0.13	0.66													
Sphaeralcea coccinea	0.20	100.00	1.02	0.20	0.99	1	P	P		P			1		P			
Stanleya pinnata	0.00	20.00	0.00	0.00	0.00			P				P						
TOTAL NATIVE PERENNIAL FORBS	0.80	100.00	4.07	0.80	3.97	3	2	P		P		1		1	P			
NATIVE PERENNIAL GRASSES (cool)																		
Agropyron smithii	0.00	6.67	0.00	0.00	0.00													
Oryzopsis hymenoides	0.60	93.33	3.05	0.60	2.98			1	P	1	P		P	P	1			
Sitanion hystrix	0.33	66.67	1.69	0.53	2.65	P	P	3	P			P						
Stipa comata	0.00	6.67	0.00	0.00	0.00									P				
TOTAL NATIVE PERENNIAL GRASSES (c)	0.93	100.00	4.75	1.13	5.63	P	1	3	P	1	P		P	P	1			
NATIVE PERENNIAL GRASSES (warm)																		
Bouteloua gracilis	1.80	100.00	9.15	1.87	9.27	4	1	4	P	3	P		1		P			
Hilaria jamesii	2.47	93.33	12.54	2.60	12.91	1		3	1	3	3		3	3	8			
Sporobolus cryptandrus	0.07	13.33	0.34	0.07	0.33			1										
TOTAL NATIVE PERENNIAL GRASSES (w)	4.33	100.00	22.03	4.53	22.52	5	1	8	1	6	3		4	4	8			
NATIVE SUBSHRUBS																		
Chrysothamnus depressus	0.00	13.33	0.00	0.00	0.00			P										
Chrysothamnus Greenei	2.33	100.00	11.86	2.33	11.59	P		P	4	P		4	1		P			
Eriogonum microthecum	0.00	6.67	0.00	0.00	0.00													
Gutierrezia sarothrae	0.27	100.00	1.36	0.27	1.32	2	P	P	P	P	P		P	P	P			
TOTAL NATIVE SUBSHRUBS	2.60	100.00	13.22	2.60	12.91	2	P	4	P	4	4		1	P				
NATIVE SHRUBS																		
Artemisia tridentata	5.53	100.00	28.14	5.53	27.48	10	7	5	2	5	4		4		2			
Atriplex canescens	1.73	93.33	8.81	1.73	8.61	2	3	1	1	2	2		2		3			
TOTAL NATIVE SHRUBS	7.27	100.00	36.95	7.27	36.09	12	10	6	3	7	6		6		5			
NATIVE TREES																		
Juniperus osteosperma	0.47	33.33	2.37	0.47	2.32					2	1				1			
Pinus edulis	2.53	93.33	12.88	2.53	12.58	2	4	2	1	2	4		4		2			
TOTAL NATIVE TREES	3.00	100.00	15.25	3.00	14.90	2	4	2	3	3	4		4		3			
SUCCULENTS																		
Coryphantha vivipara	0.00	13.33	0.00	0.00	0.00	P			P									
Opuntia fragilis var. fragilis	0.00	6.67	0.00	0.00	0.00							P						
Opuntia phaeacantha	0.00	13.33	0.00	0.00	0.00										P			
Opuntia polyacantha	0.00	20.00	0.00	0.00	0.00					P								
Opuntia whipplei	0.00	6.67	0.00	0.00	0.00													
Sclerocactus parviflorus	0.00	13.33	0.00	0.00	0.00				P						P			
TOTAL SUCCULENTS	0.00	46.67	0.00	0.00	0.00	P			P	P	P				P			
BRYOPHYTES																		
Moss spp.	0.07	26.67	0.34	0.07	0.33					P								
TOTAL BRYOPHYTES	0.07	26.67	0.34	0.07	0.33					P								
LICHEN/FUNGUS																		
Lichen spp.	0.00	20.00	0.00	0.00	0.00					P								
TOTAL LICHEN	0.00	20.00	0.00	0.00	0.00					P								

Standing dead	8.00	100.00	8.00		9	10	9	9	6	11	12	
Litter	19.93	100.00	19.93		15	20	24	15	27	9	21	
Bare ground	34.00	100.00	34.00		12	32	26	53	23	49	44	
Rock	18.40	100.00	18.40		36	13	28	9	26	15	5	
TOTALS	100.00		100.00	100.47	100.00	100 1	100 3	100 0	100 1	100 0	100 0	100
TOTAL VEGETATION COVER	19.67	s=(4.58)	20.13	s=(5.05)	28 1	25 3	13 0	14 1	18 0	16 0	18	
GROUND COVER (Veg+Litter+St.Dead+Rock)	66.00	s=(12.47)	66.47	s=(12.49)	88 1	68 3	74 0	47 1	77 0	51 0	56	
SPECIES DENSITY (# of species/100 sq.m.)	16.20	s=(2.73)			16	21	13	18	15	13	17	

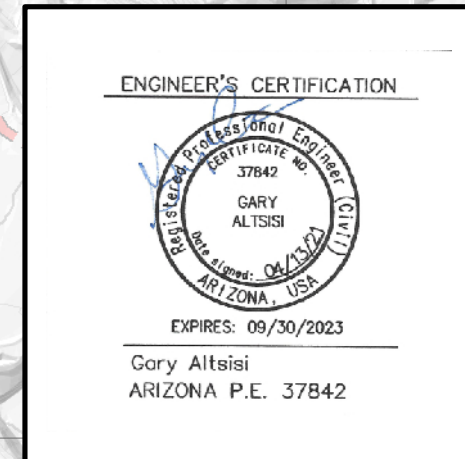
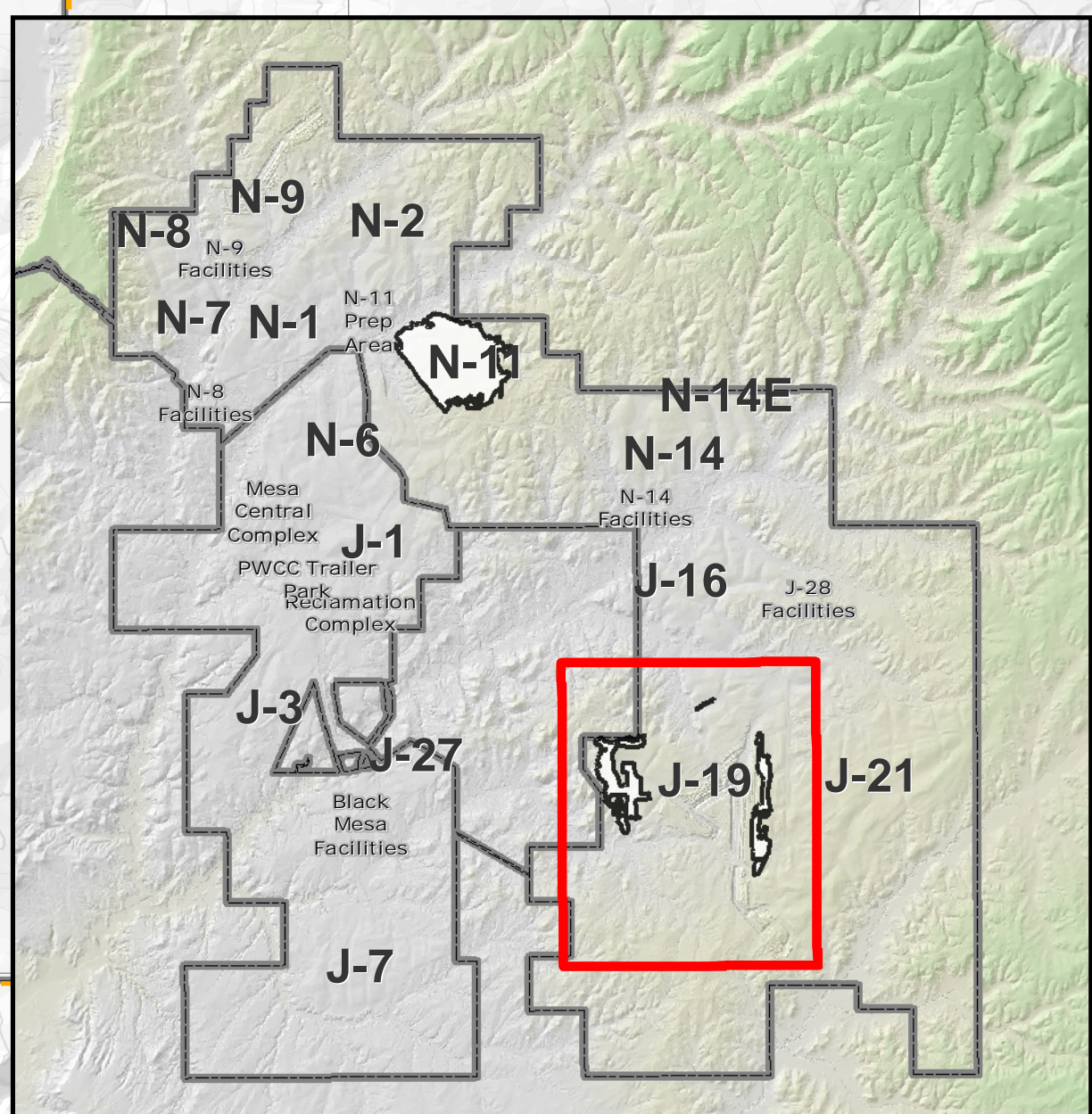
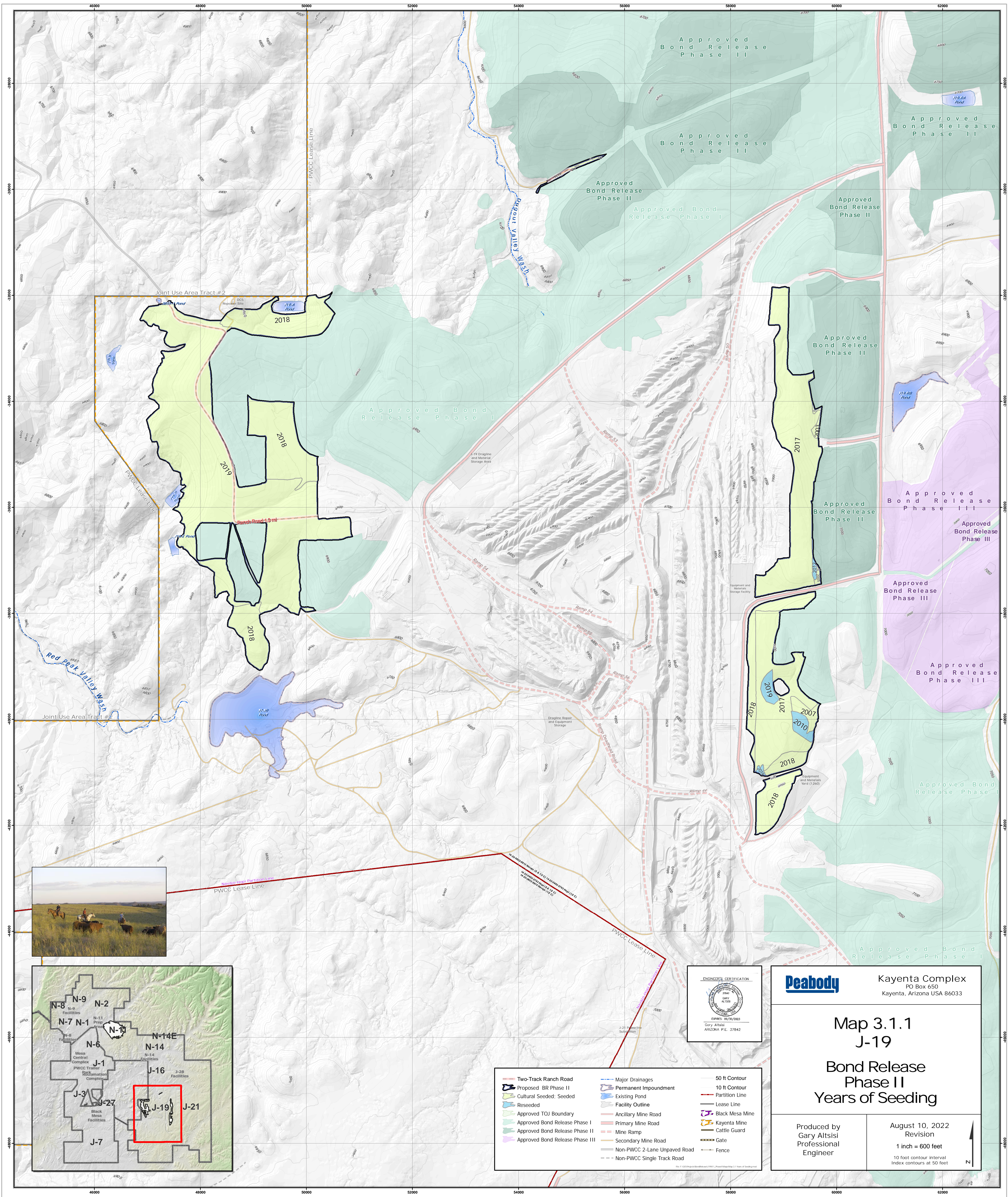
	2	12	6	8	12	2	5	7								
	14	16	18	9	28	27	32	24								
	29	44	31	55	20	28	31	33								
	39	7	28	5	20	26	10	9								
0	100	0	100	1	100	0	100	0	100	1						
0	16	0	21	1	17	0	23	0	20	0	17	0	22	0	27	1
0	71	0	56	1	69	0	45	0	80	0	72	0	69	0	67	1
	14	21	15	12	16	19	16	17								

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	P _i												
						1		2		3		4		5		6		7
						1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st
NATIVE ANNUAL & BIENNIAL FORBS																		
Chenopodium graveolens	0.00	26.67	0.00	0.00	0.00	P	P			P	P							
Chenopodium leptophyllum	0.00	20.00	0.00	0.00	0.00					P							P	
Descurainia pinnata	0.00	6.67	0.00	0.00	0.00		P											
Euphorbia glyptosperma	0.33	33.33	1.21	0.33	1.17	2	P			1	2						P	
Lappula redowskii	0.00	33.33	0.00	0.00	0.00	P	P			P							P	
Solanum triflorum	0.00	26.67	0.00	0.00	0.00		P				P						P	
Verbesina encelioides	0.00	6.67	0.00	0.00	0.00												P	
TOTAL NATIVE ANN. & BIEN. FORBS	0.33	66.67	1.21	0.33	1.17	2	P			1	2						P	
INTRODUCED ANNUAL & BIENNIAL FORBS																		
Kochia scoparia	0.00	6.67	0.00	0.00	0.00						P							
Portulaca oleracea	0.07	80.00	0.24	0.07	0.23	P	P			P	P			P			P	
Salsola iberica	0.00	13.33	0.00	0.00	0.00		P				P							
TOTAL INTRO. ANN. & BIEN. FORBS	0.07	80.00	0.24	0.07	0.23	P	P			P	P			P			P	
NATIVE PERENNIAL FORBS																		
Delphinium scaposum	0.00	13.33	0.00	0.00	0.00						P							
Leucelene ericoides	0.13	73.33	0.48	0.13	0.47	P	1			P	P			P			P	
Sphaeralcea coccinea	0.00	46.67	0.00	0.00	0.00	P	P	P		P	P							
TOTAL NATIVE PERENNIAL FORBS	0.13	80.00	0.48	0.13	0.47	P	1	P		P	P			P			P	
NATIVE PERENNIAL GRASSES (cool)																		
Oryzopsis hymenoides	0.00	13.33	0.00	0.00	0.00													
Sitanion hystrix	0.13	93.33	0.48	0.13	0.47	P	P	P		P	P			P				
TOTAL NATIVE PERENNIAL GRASSES (c)	0.13	93.33	0.48	0.13	0.47	P	P	P		P	P			P				
NATIVE PERENNIAL GRASSES (warm)																		
Bouteloua gracilis	10.33	100.00	37.53	11.20	39.34	12	13	7	10	10	13	5						
TOTAL NATIVE PERENNIAL GRASSES (w)	10.33	100.00	37.53	11.20	39.34	12	13	7	10	10	13	5						
NATIVE SUBSHRUBS																		
Chrysothamnus Greenei	0.00	26.67	0.00	0.00	0.00						P						P	
Gutierrezia sarothrae	0.00	40.00	0.00	0.00	0.00					P	P							
TOTAL NATIVE SUBSHRUBS	0.00	60.00	0.00	0.00	0.00					P	P						P	
NATIVE SHRUBS																		
Artemisia tridentata	14.93	100.00	54.24	15.00	52.69	8	23	14	12	15	14	16						
Atriplex canescens	0.13	13.33	0.48	0.13	0.47	1			1									
TOTAL NATIVE SHRUBS	15.07	100.00	54.72	15.13	53.16	9	23	14	13	15	14	16						
NATIVE TREES																		
Juniperus osteosperma	0.00	6.67	0.00	0.00	0.00					P								
Pinus edulis	1.47	93.33	5.33	1.47	5.15	1		P	5	P	P	1						
TOTAL NATIVE TREES	1.47	93.33	5.33	1.47	5.15	1		P	5	P	P	1						
SUCCULENTS																		
Coryphantha vivipara	0.00	33.33	0.00	0.00	0.00					P							P	
Opuntia phaeacantha	0.00	53.33	0.00	0.00	0.00	P	P	P	P								P	
TOTAL SUCCULENTS	0.00	66.67	0.00	0.00	0.00	P	P	P	P								P	
BRYOPHYTES																		
Moss spp.	0.00	20.00	0.00	0.00	0.00													
TOTAL BRYOPHYTES	0.00	20.00	0.00	0.00	0.00													
LICHEN/FUNGUS																		
Lichen spp.	0.73	60.00	2.66	0.73	2.58	1		1						2			2	
TOTAL LICHEN	0.73	60.00	2.66	0.73	2.58	1		1						2			2	
Standing dead	7.07	100.00		7.07		10	8	7	5	2	8	8						
Litter	23.33	100.00		23.33		25	22	17	24	21	22	24						
Bare ground	41.20	100.00		41.20		40	33	54	42	49	41	44						
Rock	0.13	13.33		0.13						1								
TOTALS	100.00		102.66	100.93	102.58	100	0	100	0	100	0	100	0	100	0	100	0	
TOTAL VEGETATION COVER	27.53	s=(4.17)		28.47	s=(4.45)	24	0	37	0	21	0	29	0	27	0	27	0	
GROUND COVER (Veg+Litter+St.Dead+Rock)	58.07	s=(6.33)		59.00	s=(6.92)	59	0	67	0	45	0	58	0	51	0	57	0	
SPECIES DENSITY (# of species/100 sq.m.)	10.40	s=(3.22)				13		15		7		16		15		8	12	

8 130 80 310 180 310 186 160 160
 321 091621 091621 091621 091621 091621 091621 091621 091621

ercent Foliar Cover

8		9		10		11		12		13		14		15			
2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd	
																P	
				P				P					P				
				P				P					P			P	
	P		1	P		P		P								P	
	P		1	P		P		P								P	
	P		P	P				1					P				
	P		P	P				P					P				
										P			P				
	1		P	P		1		P		P			P			P	
	1		P	P		1		P		P			P			P	
	13	3	16	3	12	2	9	8	8	3	12		7	2			
	13	3	16	3	12	2	9	8	8	3	12		7	2			
											P						
			P		P						P		P			P	
			P		P						P		P			P	
	17		10		19		16		17		14	1	15			14	
	17		10		19		16		17		14	1	15			14	
	P		P		1		1		1		3		5			4	
	P		P		1		1		1		3		5			4	
			P		P				P				P			P	
			P		P				P				P			P	
							P				P					P	
							P				P					P	
							P		3		1		1			P	
							P		3		1		1			P	
	8		6		4		4		14		8		7			7	
	29		32		22		20		22		23		23			24	
	32		35		42		49		34		43		37			43	
																1	
	0	100	3	100	3	100	2	100	0	100	0	100	4	100	0	100	2
	0	31	3	27	3	32	2	27	0	27	0	25	4	32	0	25	2
	0	68	3	65	3	58	2	51	0	63	0	56	4	62	0	57	2
	6		8		9		7		11		8		11			10	



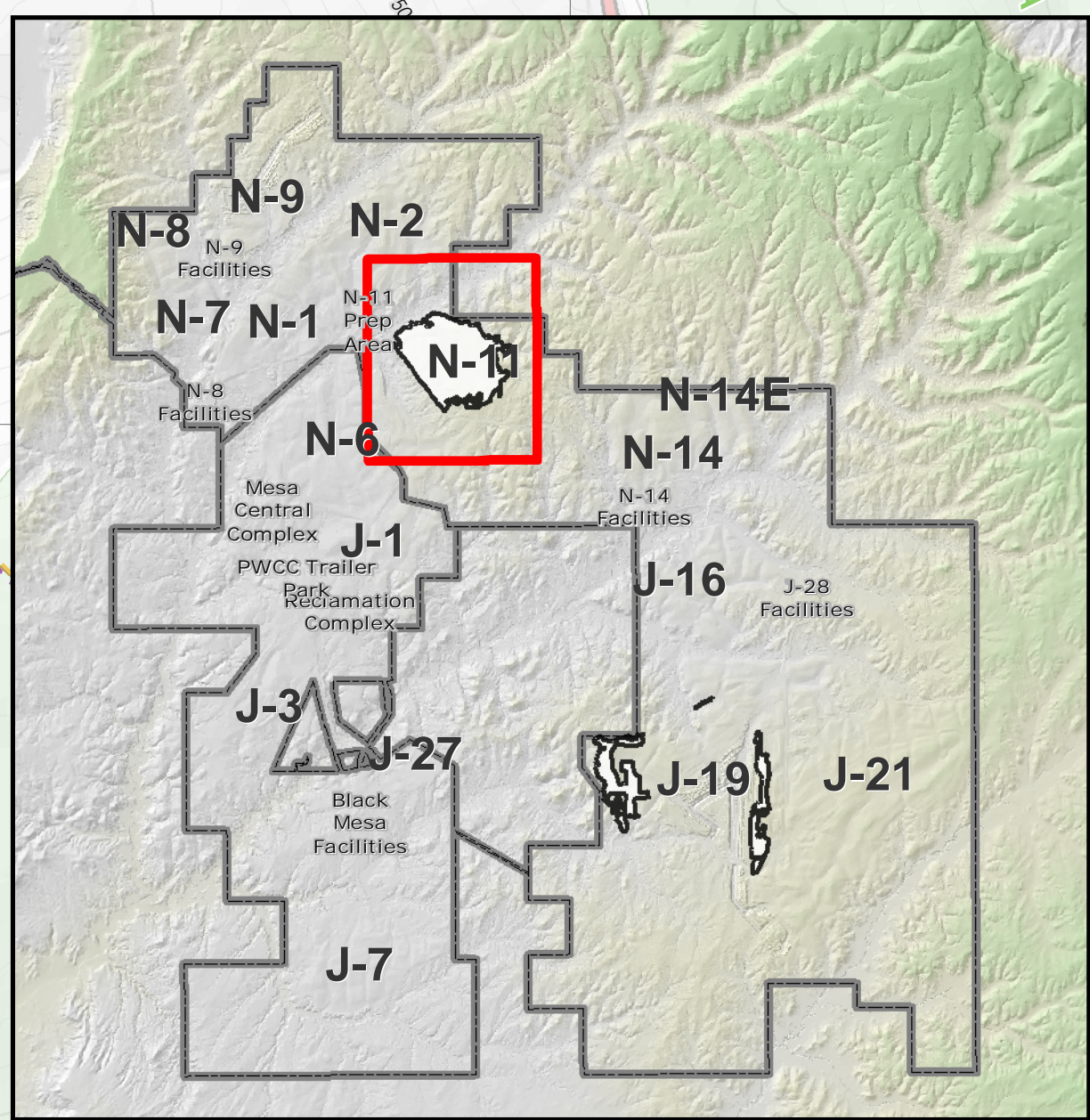
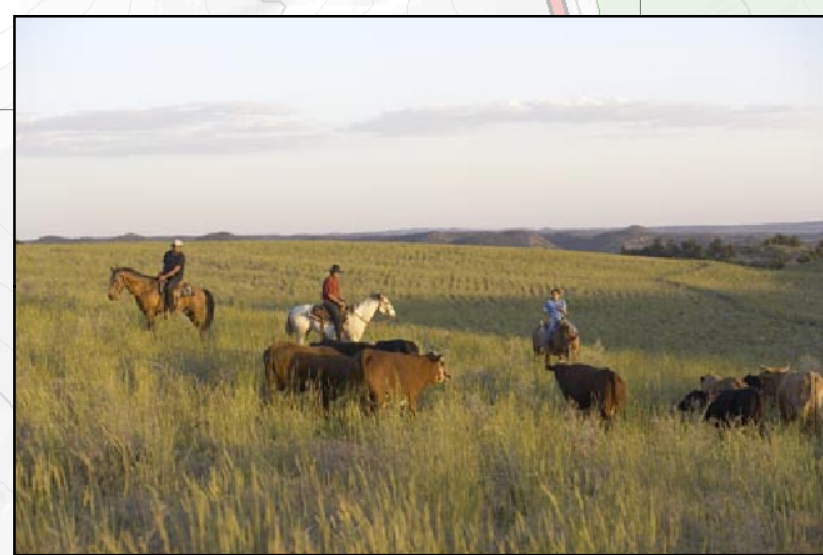
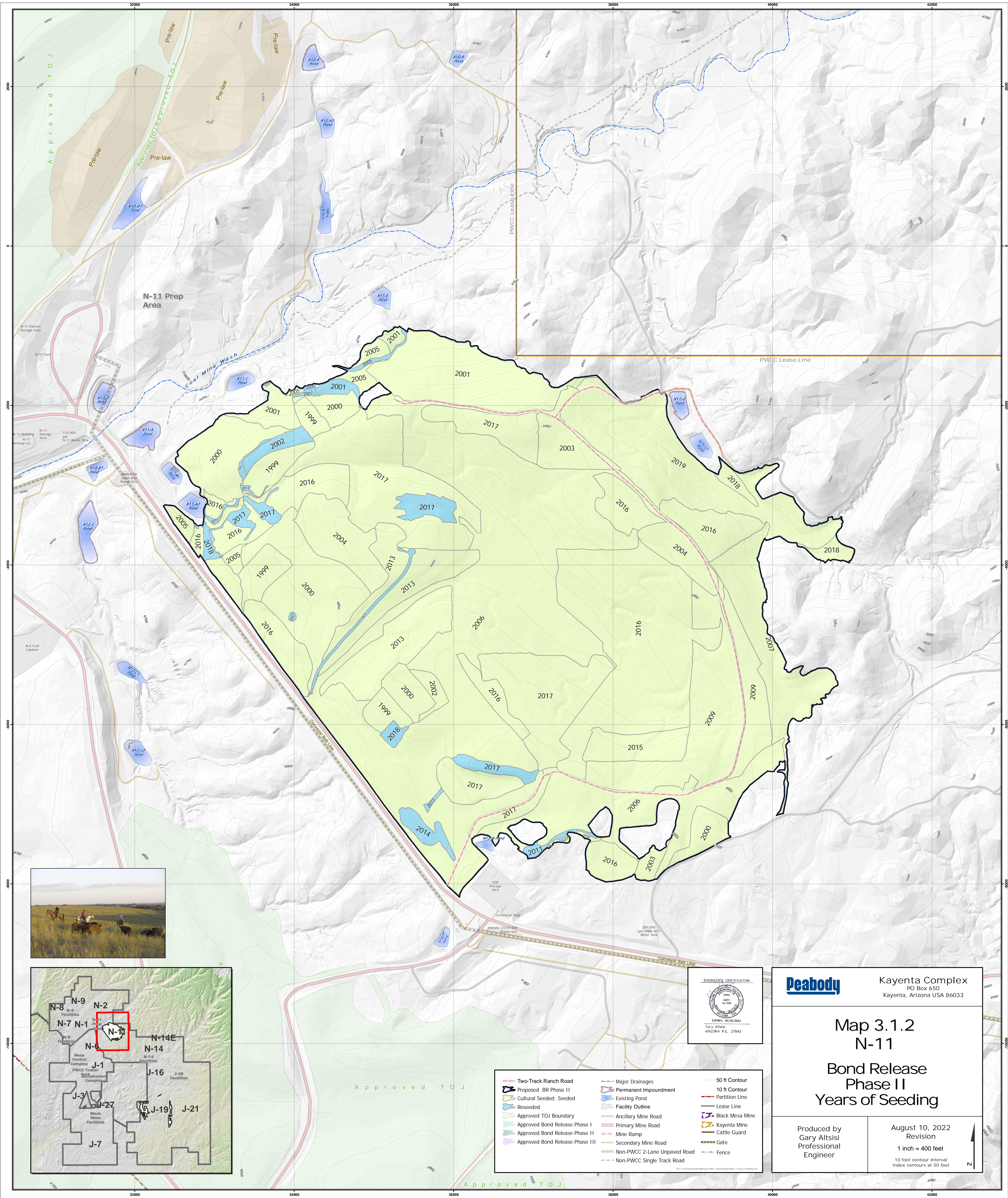
Peabody Kayenta Complex
 PO Box 650
 Kayenta, Arizona USA 86033

Map 3.1.1 J-19 Bond Release Phase II Years of Seeding

Produced by
 Gary Altisi
 Professional
 Engineer

August 10, 2022
 Revision
 1 inch = 600 feet
 10 foot contour interval
 Index contours at 50 feet

- | | | |
|---------------------------------|------------------------------|-----------------|
| Two-Track Ranch Road | Major Drainages | 50 ft Contour |
| Proposed BR Phase II | Permanent Impoundment | 10 ft Contour |
| Cultural Seeded; Seeded | Existing Pond | Partition Line |
| Reseeded | Facility Outline | Lease Line |
| Approved TOJ Boundary | Ancillary Mine Road | Black Mesa Mine |
| Approved Bond Release Phase I | Primary Mine Road | Kayenta Mine |
| Approved Bond Release Phase II | Mine Ramp | Cattle Guard |
| Approved Bond Release Phase III | Secondary Mine Road | Gate |
| | Non-PWCC 2-Lane Unpaved Road | Fence |
| | Non-PWCC Single Track Road | |



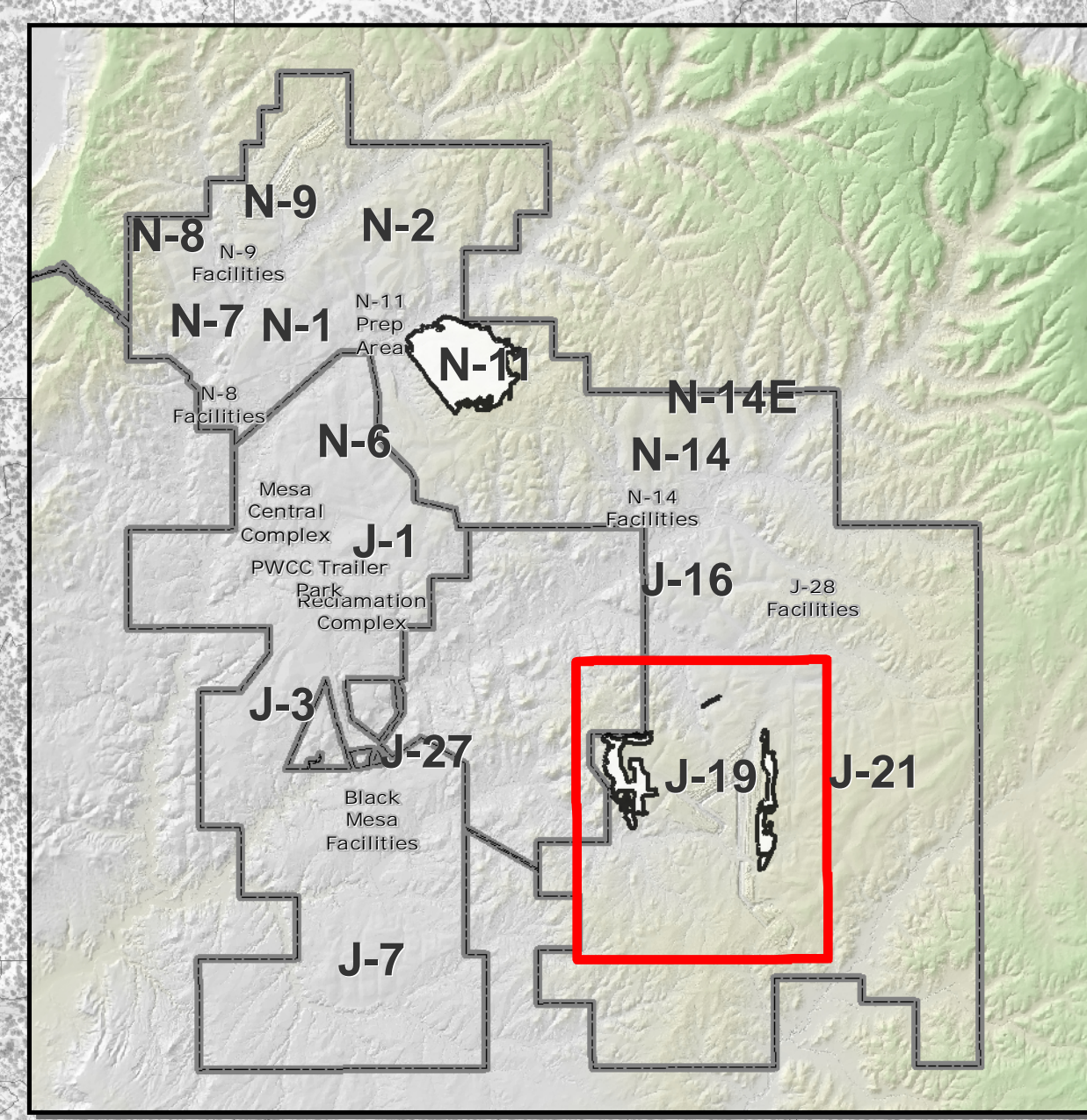
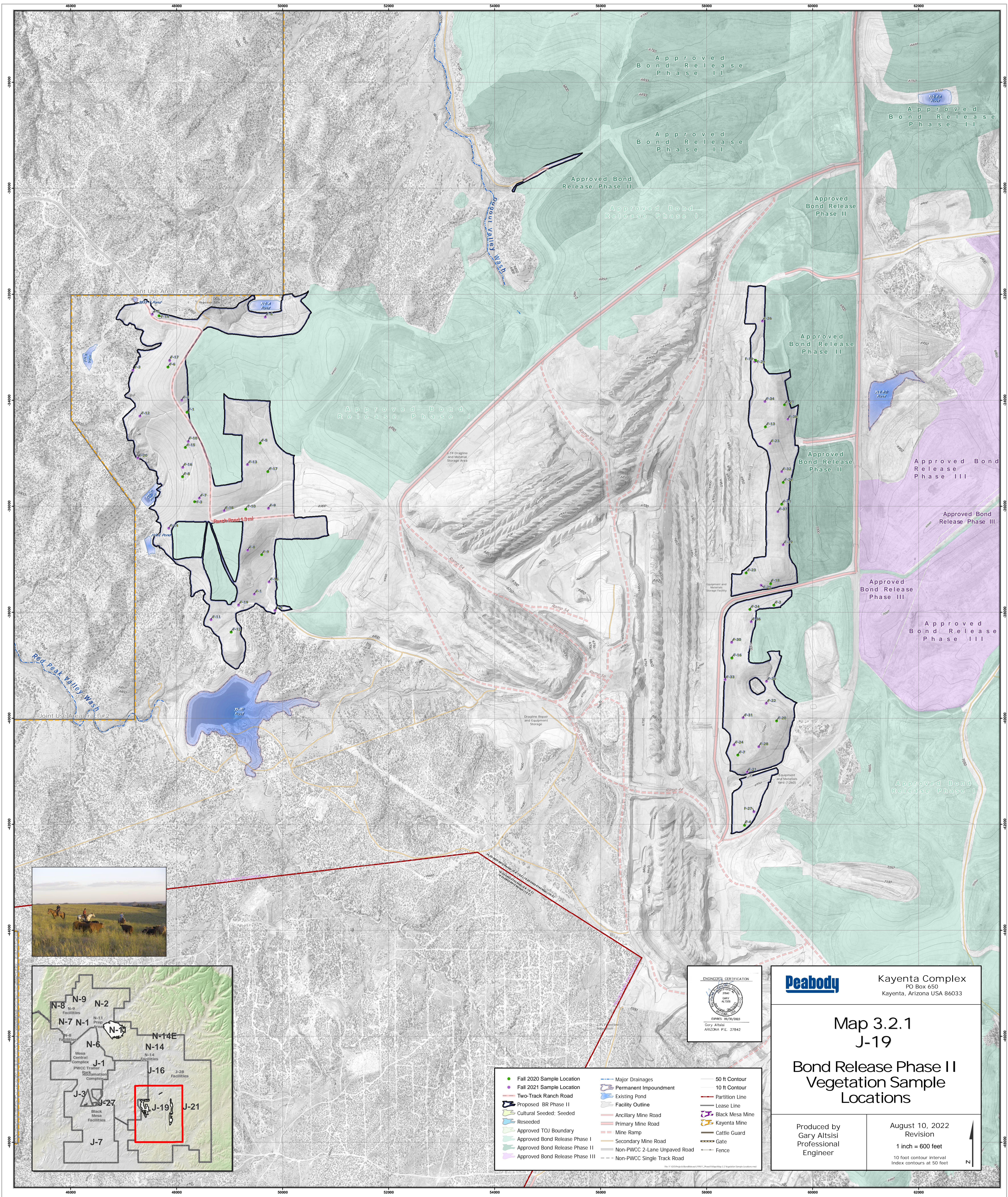
Peabody Kayenta Complex
 PO Box 650
 Kayenta, Arizona USA 86033

Map 3.1.2 N-11 Bond Release Phase II Years of Seeding

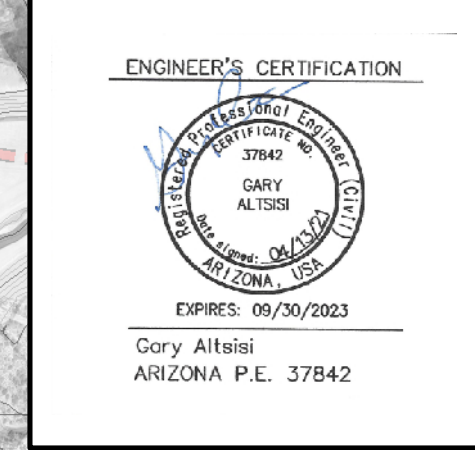
Produced by
 Gary Altisi
 Professional
 Engineer

August 10, 2022
 Revision
 1 inch = 400 feet
 10 foot contour interval
 Index contours at 50 feet

Two-Track Ranch Road	Major Drainages	50 ft Contour
Proposed BR Phase II	Permanent Impoundment	10 ft Contour
Cultural Seeded: Seeded	Existing Pond	Partition Line
Reseeded	Facility Outline	Lease Line
Approved TOJ Boundary	Ancillary Mine Road	Black Mesa Mine
Approved Bond Release Phase I	Primary Mine Road	Kayenta Mine
Approved Bond Release Phase II	Mine Ramp	Cattle Guard
Approved Bond Release Phase III	Secondary Mine Road	Gate
	Non-PWCC 2-Lane Unpaved Road	Fence
	Non-PWCC Single Track Road	



- | | | |
|-----------------------------------|--------------------------------|-------------------|
| ● Fall 2020 Sample Location | — Major Drainages | — 50 ft Contour |
| ● Fall 2021 Sample Location | — Permanent Impoundment | — 10 ft Contour |
| — Two-Track Ranch Road | — Existing Pond | — Partition Line |
| — Proposed BR Phase II | — Facility Outline | — Lease Line |
| — Cultural Seeded: Seeded | — Ancillary Mine Road | — Black Mesa Mine |
| — Reseeded | — Primary Mine Road | — Kayenta Mine |
| — Approved TOJ Boundary | — Mine Ramp | — Cattle Guard |
| — Approved Bond Release Phase I | — Secondary Mine Road | — Gate |
| — Approved Bond Release Phase II | — Non-PWCC 2-Lane Unpaved Road | — Fence |
| — Approved Bond Release Phase III | — Non-PWCC Single Track Road | |



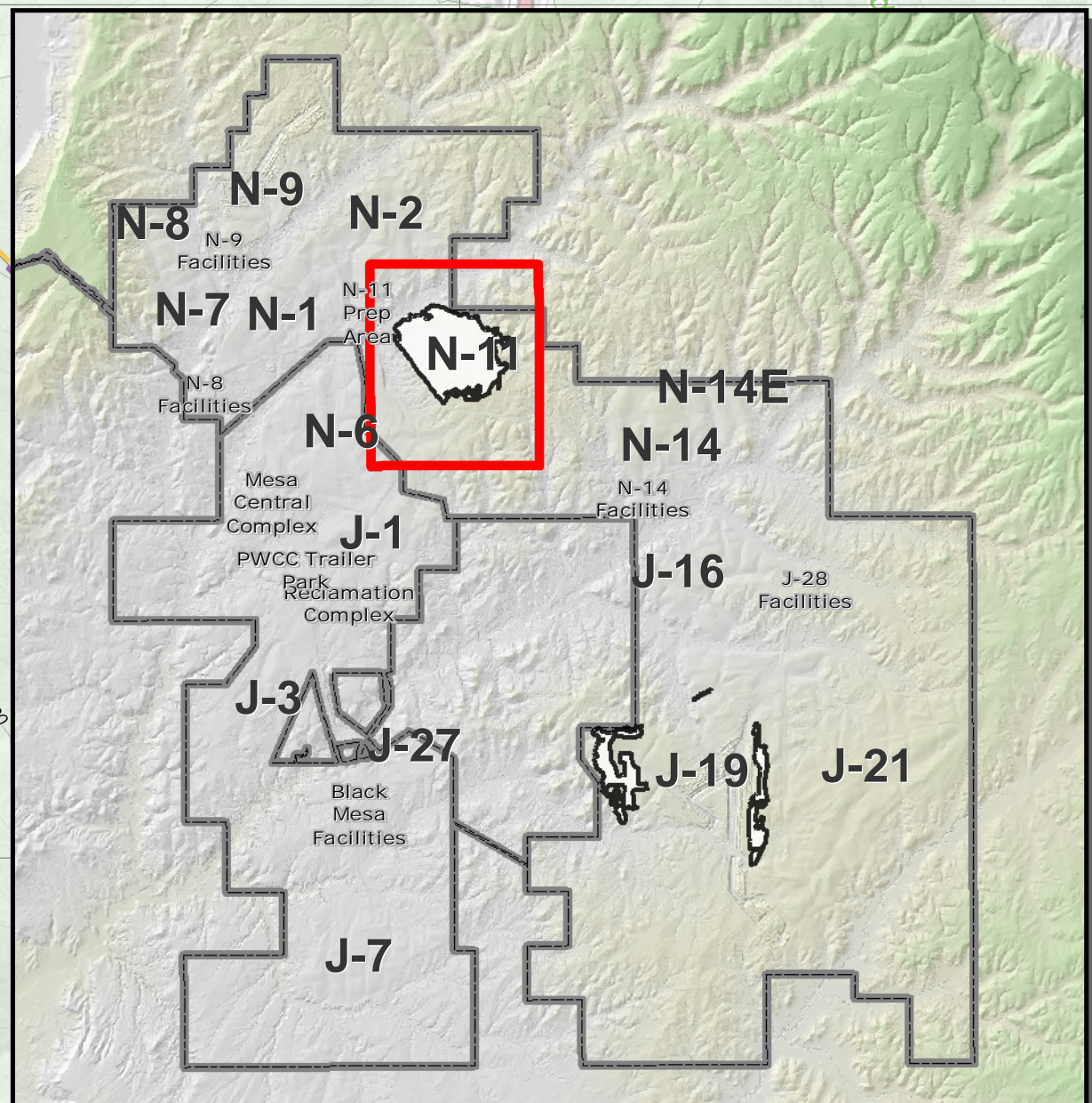
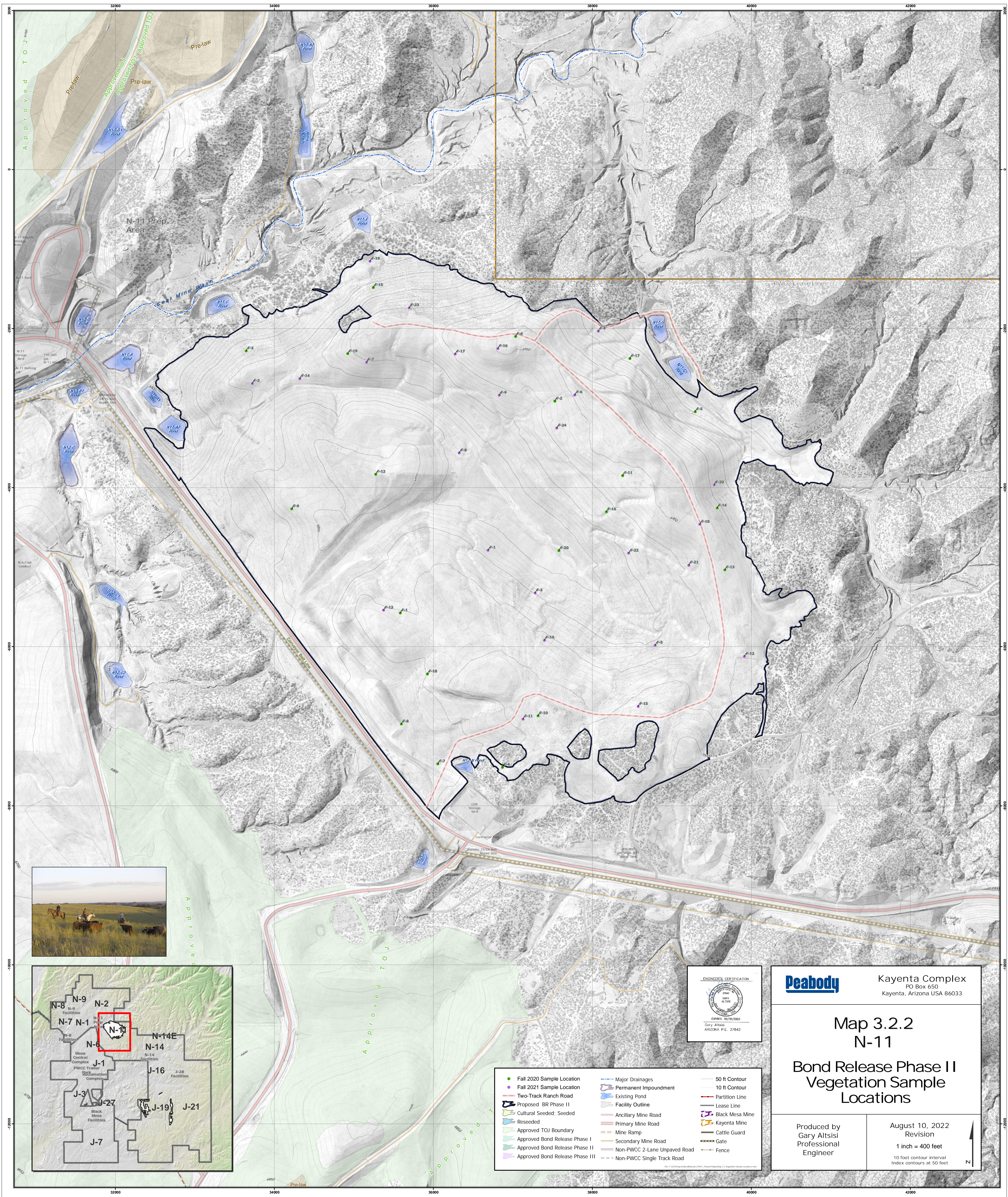
Kayenta Complex
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Kayenta, Arizona USA 86033

Map 3.2.1 J-19

Bond Release Phase II Vegetation Sample Locations

Produced by
Gary Altisi
Professional
Engineer

August 10, 2022
Revision
1 inch = 600 feet
10 foot contour interval
Index contours at 50 feet



- | | | |
|--|---|--|
| <ul style="list-style-type: none"> ● Fall 2020 Sample Location ● Fall 2021 Sample Location — Two-Track Ranch Road — Proposed BR Phase II — Cultural Seeded: Seeded — Reseeded — Approved TOJ Boundary — Approved Bond Release Phase I — Approved Bond Release Phase II — Approved Bond Release Phase III | <ul style="list-style-type: none"> — Major Drainages — Permanent Impoundment — Existing Pond — Facility Outline — Ancillary Mine Road — Primary Mine Road — Mine Ramp — Secondary Mine Road — Non-PWCC 2-Lane Unpaved Road — Non-PWCC Single Track Road | <ul style="list-style-type: none"> — 50 ft Contour — 10 ft Contour — Partition Line — Lease Line — Black Mesa Mine — Kayenta Mine — Cattle Guard — Gate — Fence |
|--|---|--|



Kayenta Complex
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Kayenta, Arizona USA 86033

Map 3.2.2

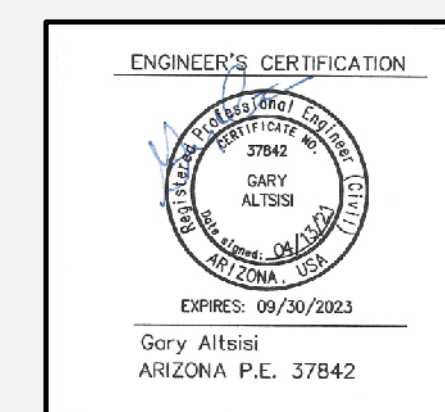
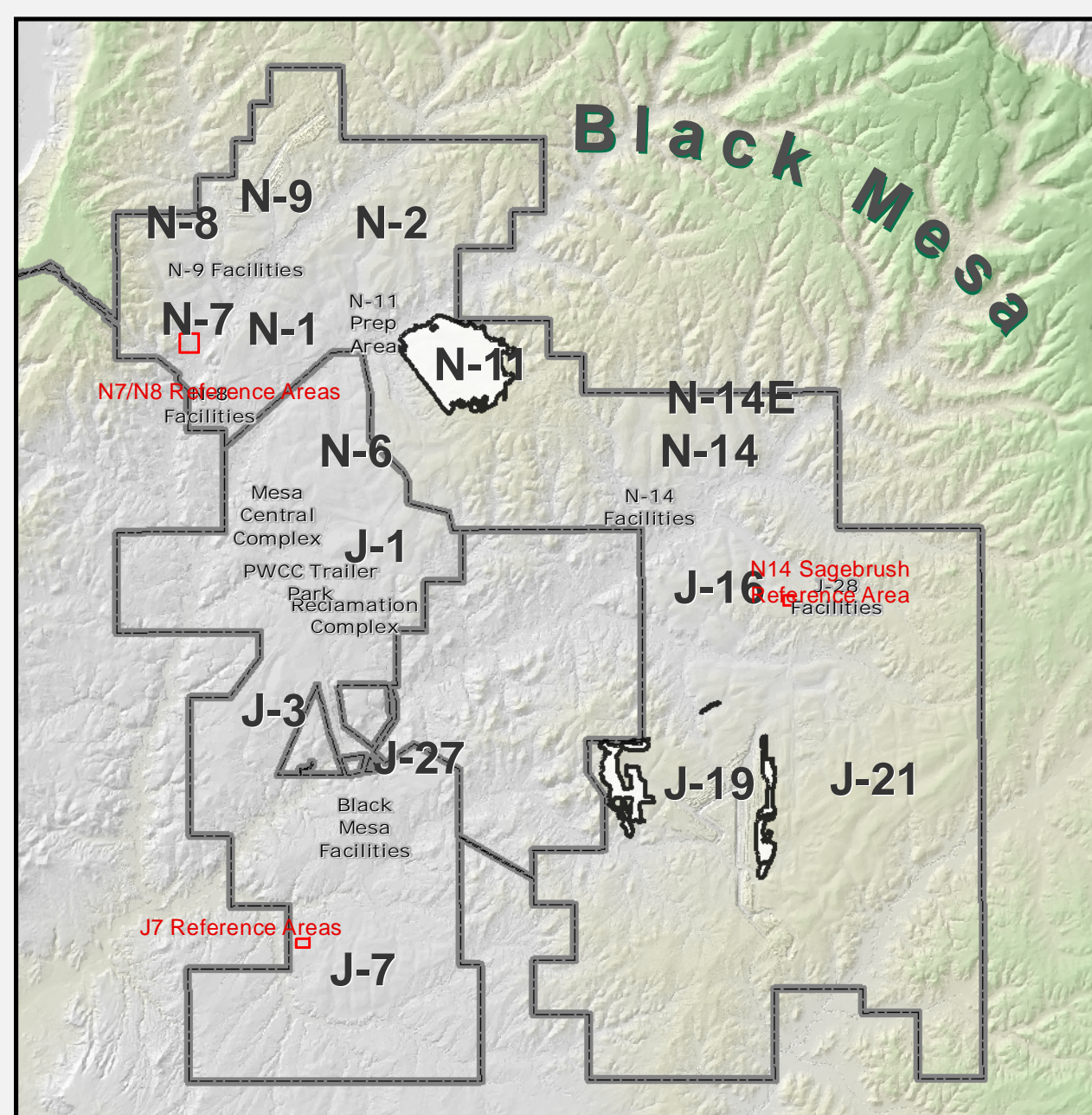
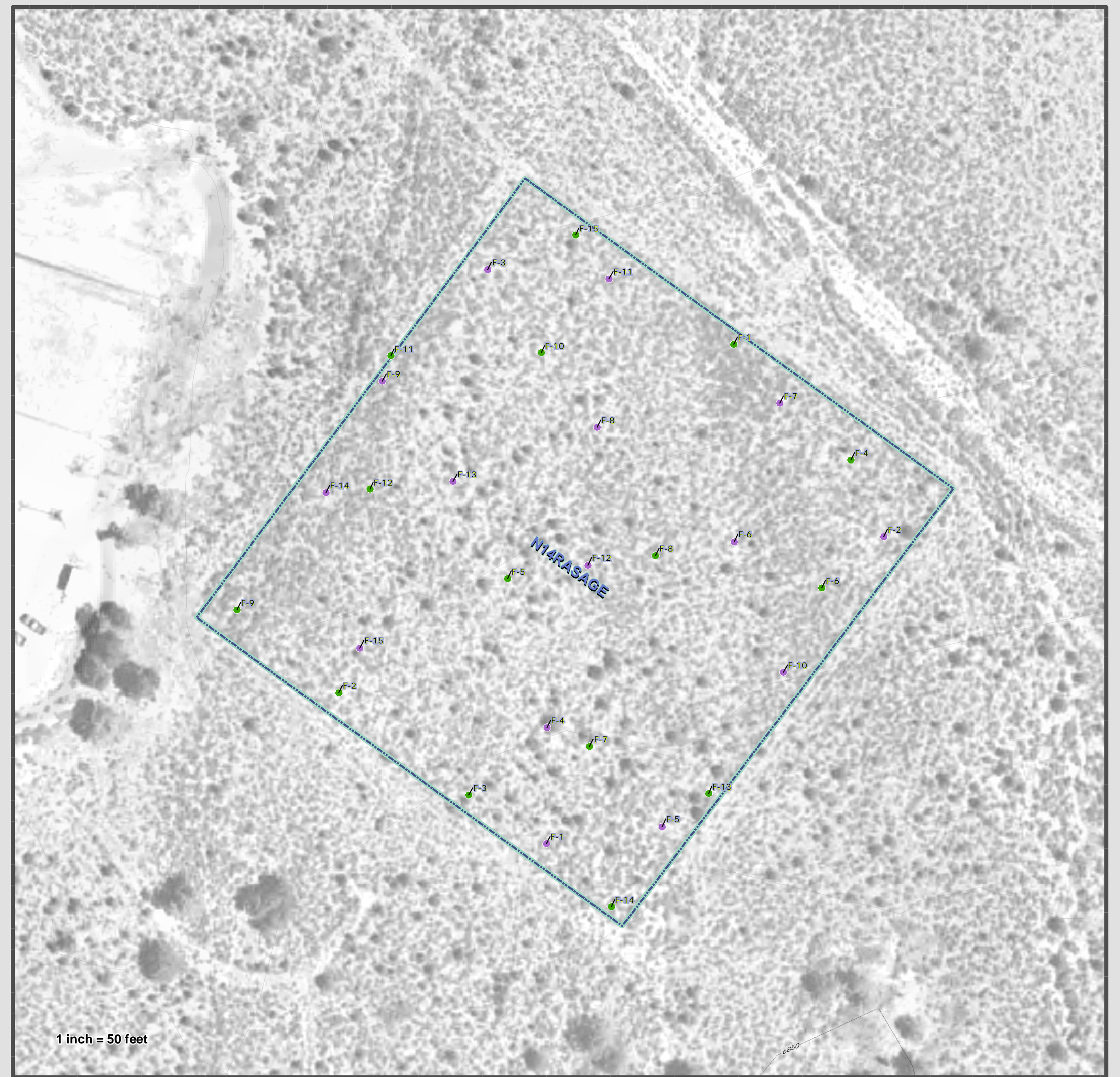
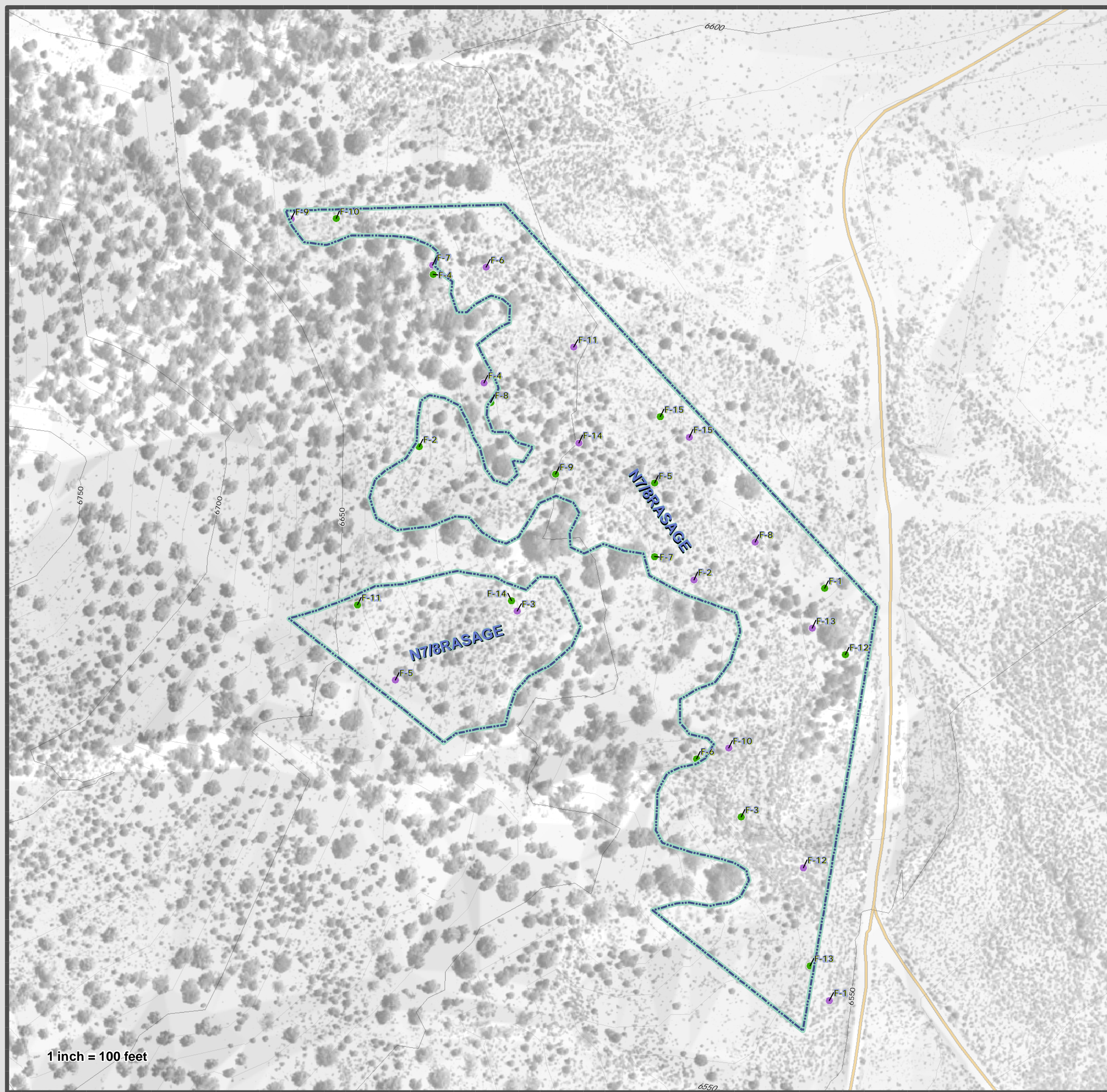
N-11

Bond Release Phase II

Vegetation Sample Locations

Produced by
Gary Altisi
Professional Engineer

August 10, 2022
Revision
1 inch = 400 feet
10 foot contour interval
Index contours at 50 feet



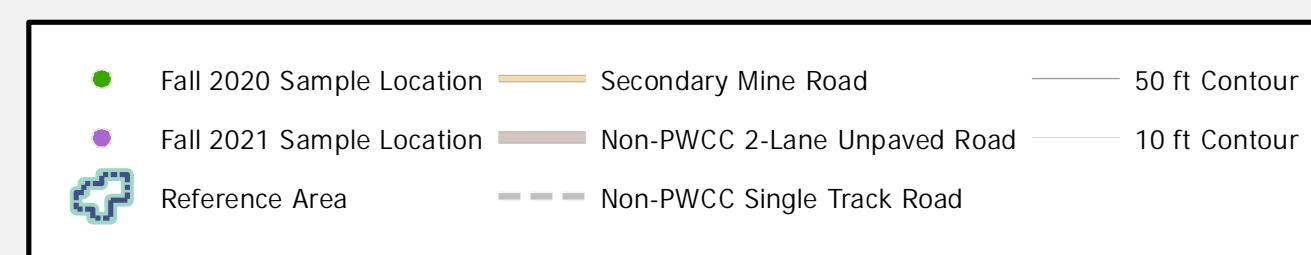
Peabody

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Kayenta, Arizona USA 86033

Map 3.2.3 Reference Areas Bond Release Phase II Sampling Locatoins

Produced by
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Professional
Engineer

August 10, 2022
Revision
1 inch = 100 feet
10 foot contour interval
Index contours at 50 feet



File: C:\GIS\Projects\BondRelease\19071_Peabody\Map\Map 3.2.3 Reference Area.mxd