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BROOK MINING CO., LLC.
BROOK MINE
VOLUME 7 OF 12
TFN 6 2/025

Brook Mine
Permit Application
Volume VII

VOLUME VII

Appendix D8

BROOK MINING CO., LLC.
BROOK MINE
VOLUME 7 OF 12
TFN 6 2/025

Brook Mine
Permit Application
Volume VII

Appendix D8

DEQ Exhibit 8

RAMACO

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February 2016

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APPENDIX D-8 TEXT

VEGETATION INVENTORY

Appendix D8

Prepared by:
WWC Engineering

July 2015

TFN 6 2/025
RECD JUL 30,2015

D8 VEGETATION INVENTORY

A vegetation assessment of RAMACO's Brook Mine was conducted by BKS Environmental Associates, Inc. (BKS) of Gillette, Wyoming in 2013. The vegetation assessment by BKS is reported in Addendum D8-1 (Baseline Vegetation Assessment).

D8.1 Survey Methodology

D8.1.1 General

All sampling procedures were designed according to the Wyoming Department of Environmental Quality, Land Quality Division (WDEQ/LQD) Rules and Regulations for Coal Permitting, Chapter 2 (WDEQ/LQD, 2012), and multiple consultations with the WDEQ/LQD. Baseline vegetation assessment sampling methodology derived by BKS was approved by WDEQ/LQD prior to fieldwork. All sampling procedures outlined in the approved WDEQ baseline vegetation sampling methodology were executed as approved.

D8.1.2 Vegetation Community Mapping

Vegetation communities were mapped using 2011 U.S. Department of Agriculture National Agricultural Imagery Program (NAIP) True Color aerial imagery, and were later verified through field surveys. All areas within a ½-mile buffer boundary were mapped, but field verification of the vegetation communities within the ½-mile buffer was not necessary, and vegetation sampling was not conducted within the buffer.

D8.1.3 Selection of Sample Point Locations

A computerized systematic grid (through ArcGIS) was used to randomly locate the maximum number of sample points within each vegetation community occurring within the Brook Mine Study Area as defined in Addendum D8-1. These computer generated random locations were uploaded to a hand-held Global Positioning System (GPS) for location in the field. Samples were taken in numerical order until the minimum sample size was

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attained, and then until either sample adequacy was met or the required maximum number of samples had been collected. The Rabbitbrush Shrubland (less than two acres in size) and disturbed areas were excluded from quantitative vegetation sampling.

D8.1.4 Cover Sampling of Vegetation Communities

Line-transect point-intercept methods were used to collect percent absolute cover data within the vegetation communities. Percent cover measurements were taken from point-intercepts at 1-meter intervals along a 50-meter cover transect using a laser point device at each sample location. Each 50-meter cover transect began at its specified random origin point and extended in a random compass direction. Transects that exceeded the boundaries of the vegetation community being sampled were redirected back into its vegetation community at a 90-degree angle from the original transect direction at the point of intercept. In instances where a 90-degree angle of reflection did not place the transect within the sampled vegetation community, a 45-degree angle of reflection was used.

Each 50-meter cover transect represented a single sample point within the given vegetation community. Each point-intercept represented 2% of the cover measurement. Percent cover measurements recorded "first-hit" point-intercepts by live foliar vegetation species, litter, rock, or bare ground. "Second-hits" on vegetation were recorded, but used only for the purpose of constructing a plant species list for each vegetation community.

Percent vegetation cover is the vertical projection of the general outline of plants to the ground surface. All "first-hit" point-intercepts of living vegetation and growth, produced during the current growing season, were counted toward total vegetation cover. Lichen and moss were not included in total vegetation cover. Total vegetation cover data was summarized by computing absolute (mean) cover, relative cover (% of total vegetation cover), frequency, and relative frequency (% of total plot occurrences for each plant species).

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Total ground cover equals the sum of cover values for percent vegetation, percent litter, and percent rock. Litter included all non-living organic material that was recognizable. Rock fragments were recorded when equal to or greater than two centimeters in size (i.e., sheet flow, minimum non-erodible particle size). Total ground cover measurements were expressed in absolute percentages for each sample point.

D8.1.5 Shrub and Tree Density

Shrub density data was collected in conjunction with the randomly selected cover sampling, wherever possible. Shrub density sampling was accomplished by counting each individual full, half-, and sub-shrub species within a 1-meter wide belt transect centered over the 50-meter cover transect, yielding a 100-m^2 belt transect. Shrub density belt transects were sampled until either sample adequacy was achieved or the maximum number of samples were reached for a given vegetation community. General approximations of shrub heights were recorded; however, shrub height measurements were not summarized for purposes of this report.

Tree counts were conducted using 2011 NAIP True Color aerial imagery. Trees counts were only conducted within vegetation communities which had trees present.

D8.1.6 Species Diversity and Composition

Species diversity was assessed by recording all plant species observed within the same 100-m^2 belt transect used for determining shrub density. These observations provide a measurement of the total species diversity for each vegetation community.

D8.1.7 Sample Adequacy

Sample adequacy for absolute total vegetation ground cover was tested for each of the sampled vegetation communities using the formula and confidence levels outlined in Addendum D8-1 Section D8-1.2.9.

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D8.1.8 Extended Reference Area

For the purposes of this permit, Extended Reference Area (EXREFA) is a native land unit that will be used to evaluate revegetation success for each of the same native vegetation communities affected by the proposed activities. The EXREFA is all of the unaffected area for each native vegetation community.

D8.1.9 Cropland and Pastureland Productivity

No prime cropland or pastureland lands of state-wide importance are within the Brook Mine Permit Area.

D8.2 Vegetation Survey Results

Table D8.2-1 presents the vegetation unit mapping acreages for the Brook Mine. Exhibit D8.2-1 provides the vegetation polygons on a photo base for the Brook Mine. Addendum D8-1 gives the detailed report by BKS of the vegetation assessment for the Brook Mine.

D8.3 References

Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD). (2012, December). *Chapter 2: Permit Application Requirements*. Retrieved 2014, from http://soswy.state.wy.us/Rules/RULES/8881.pdf

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DEQ 8-011

APPENDIX D-8 TABLES

Table D8.2-1. Vegetation Survey Summary

Vegetation Community	Brook Mine Permit Area	
	Acres	% of Area
Agricultural Land	4.5	0.1
Big Sagebrush Shrubland	913.7	20.1
Bottomland Sagebrush Grassland	50.6	1.1
Pine and Juniper Woodland	67.7	1.5
Prairie Dog Modified Grassland	436.7	9.6
Rabbitbrush Shrubland	1.3	<0.1
Reclaimed Grassland	596.7	13.1
Riparian Woodland	57.2	1.3
Rough Breaks Mixed Shrubland	576.0	12.7
Scoria Grassland	726.0	16.0
Upland Grassland	995.9	21.9
Disturbance	109.7	2.4
Water	12.8	0.3
Total	**4,548.8**	**100.1**

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TWN57N, RNG85W TWN57N, RNG84W

TWN57N, RNG85W TWN57N, RNG84W

Coordinate System: NAD 1983 UTM Zone 13N FEET, 2012 NAIP True Color Image Scale: 1 in = 1,000 ft

0 1,500 3,000 6,000 Feet

0 0.25 0.5 1 Kilometers

Legend

- Cover, Density Sample Location
- Cover, Density, Production Sample Location
- Density Sample Location
- Production Sample Location
- Density, Production Sample Location
- Sheridan County Declared Weed Location
- Wyoming Designated Weed Location
- Vegetation Communities
- Disturbed Land
- Permit Boundary
- Study Area
- Half-Mile Buffer
- Section Boundary
- Township/Range Boundary

Vegetation Communities

Map Symbol	Name
AG	Agricultural Land
BSG	Bottomland Sagebrush Grassland
BSS	Big Sagebrush Shrubland
D	Disturbed
PDMG	Prairie Dog Modified Grassland
PJW	Pine and Juniper Woodland
RBMS	Rough Breaks Mixed Shrubland
RG	Reclaimed Grassland
RS	Rabbitbrush Shrubland
RW	Riparian Woodland
SG	Scoria Grassland
UG	Upland Grassland
W	Water

General Location Map

BROOK MINE
SHERIDAN COUNTY, WY
1101 SUGARVIEW DR, STE. 201
SHERIDAN, WY 82801

REVISIONS		
Date	Description	
7/30/13	BKS/JB	
1/23/14	BKS/JB	
7/31/14	BKS/TS	
10/28/14	BKS/JB	
6/15	Round 1 Comments	
12/15	Round 3 Comments	

EXHIBIT D8.2-1

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RECD DEC 18, 2015

VEGETATION SUMMARY

Drawn By: BKS/TS
Checked By: BKS/DG
Date: 12/4/2015

FILE: EX_D8-2-1_VEG_SUMMARY

RER Environmental Associates, Inc.

ADDENDUM D8-1

Baseline Vegetation Assessment

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D8-1 BASELINE VEGETATION ASSESSMENT

D8-1.1 Introduction

RAMACO proposes to open-pit mine coal in north central Sheridan County, Wyoming, at the Brook Mine. The proposed Brook Mine is located approximately 15 miles northwest of Sheridan, Wyoming, between Ranchester and Acme, Wyoming.

At the time of 2013 quantitative baseline vegetation assessments, the proposed Brook Mine Permit Area encompassed approximately 5,994.7 acres. However, the Brook Mine Permit Area proposed by RAMACO for the Wyoming Mine Permit Application only includes approximately 4,548.8 acres of the 5,994.7 acre permit area (referenced within this report as the proposed Brook Mine Permit Area). As a result, the entire 5,994.7 acre permit area was evaluated during baseline vegetation assessments (referenced within this report as the Brook Mine Study Area). Attachment D8-1-G contains a map of the Brook Mine Study Area and proposed Brook Mine Permit Area evaluated during 2013 baseline vegetation assessments. Attachment D8-1-K contains the sampling plan as approved by WDEQ/LQD on August 28, 2013.

The Brook Mine Study Area is located in all or portions of:

- Sections 10, 11, 12, 13, 14, 15, 21, 22, 23, 24, 26, 27, and 28 T57N R85W
- Sections 7, 8, 9, 10, 15, 17, 18, 19, 20, and 22 T57N R84W

The proposed Brook Mine Permit Area is located in all or portions of:

- Sections 10, 11, 12, 13, 14, and 15 T57N R85W
- Sections 7, 8, 9, 10, 15, 17, 18, 19, 20, 21, 22, and 27 T57N R84W

This report presents baseline information on the vegetation communities occurring within the approximately 5,994.7 acre Brook Mine Study Area which includes the majority of the 4,548.8 acre proposed Brook Mine Permit Area.

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Portions of the proposed Brook Mine Permit Area not included in the Brook Mine Study Area were added during an October 2014 permit boundary change following completion of the baseline vegetation study.

D8-1.2 Methodology

All sampling procedures were designed according to the Wyoming Department of Environmental Quality – Land Quality Division (WDEQ) Rules and Regulations for Coal Permitting, Chapter 2 (December 2012) and multiple consultation with the WDEQ from April 2013 to May 2014. Baseline vegetation sampling methods for the Brook Mine Study Area were derived by BKS Environmental Associates, Inc. (BKS), of Gillette, Wyoming, in April 2013, prior to the on-site visit with WDEQ and was revised in May 2013, prior to grazing enclosure placement. A final revision was submitted in June 2013, prior to baseline vegetation sampling, due to an extension in the permit area from the time grazing enclosure placement occurred till quantitative baseline vegetation sampling occurred. WDEQ approved the baseline vegetation sampling methodologies and subsequent revisions derived by BKS in May, June, and July 2013.

All sampling procedures outlined in the approved WDEQ baseline vegetation sampling methodologies were executed as approved with the following exceptions:

- Maximum number of production plots sampled in the Riparian Woodland vegetation community was 48 vs 50,
- Maximum number of shrub density belt transects sampled in the Riparian Woodland was 46 vs 50, and
- Maximum number of shrub density belt transects sampled in the Rough Breaks Mixed Shrubland was 49 vs 50.

WDEQ was consulted immediately following completion of baseline vegetation field sampling to gain approval of the above exceptions to the approved baseline vegetation sampling methodology. In addition, the WDEQ

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was consulted to determining if additional shrub density or production sampling was required due to sample adequacy not being attained after maximum sample numbers were sampled for all other vegetation communities. WDEQ approved the exceptions to the approved baseline vegetation sampling methodology and determined additional sampling to acquire sample adequacy was not required.

D8-1.2.1 Timing of Baseline Vegetation Assessments

BKS conducted:

- Vegetation community mapping in April and June 2013,
- Grazing enclosure placement April 30-May 2, 2013,
- Blowout penstemon (*Penstemon haydenii*) surveys June 4, 2013,
- Baseline vegetation sampling July 1-12, 2013, and
- Ute ladies'-tresses (*Spiranthes diluvialis*) surveys July 31, 2013.

D8-1.2.2 Vegetation Community Mapping

Eleven vegetation communities were identified within the Brook Mine Study Area: Agricultural Land, Big Sagebrush Shrubland, Bottomland Sagebrush Grassland, Pine and Juniper Woodland, Prairie Dog Modified Grassland, Rabbitbrush Shrubland, Reclaimed Grassland, Riparian Woodland, Rough Breaks Mixed Shrubland, Scoria Grassland, and Upland Grassland. Vegetation communities were mapped using 2011 National Agricultural Imagery Program (NAIP) True Color aerial imagery and verified through field surveys in April and June 2013. Extent and number of vegetation communities throughout the Brook Mine Study Area were agreed upon by WDEQ, RAMACO, and BKS personnel during the on-site visit in April 2013, and additional consultation with the WDEQ following an extension of the permit area in June 2013.

Disturbed areas within the Brook Mine Study Area were identified and mapped, based on the scale of the available mapping. All areas within a half-mile of the Brook Mine Study Area and proposed Brook Mine Permit Area were

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mapped based on review of 2011 NAIP True Color ortho aerial imagery image and known expressions of the aerial imagery within the Brook Mine Study Area. Field verification of the vegetation communities within the half-mile buffer was not necessary, and vegetation sampling was not conducted within the half-mile buffer.

D8-1.2.3 Selection of Sample Point Location

A computerized systematic grid (through ArcGIS) was used to randomly locate the maximum number of sample points, as outlined in the WDEQ approved baseline vegetation sampling methodology, within the 10 vegetation community which were quantitatively sampled within the Brook Mine Study Area, prior to grazing enclosure placement: Agricultural Lands (n=20); Bottomland Sagebrush Grassland (n=25); Pine and Juniper Woodland (n=15); Reclaimed Grassland (n=10); and Big Sagebrush Shrubland, Prairie Dog Modified Grassland, Rough Breaks Mixed Shrubland, Riparian Woodland, Scoria Grassland, and Upland Grassland (n=50).

Due to an extension in the permit area between grazing enclosure placement and quantitative vegetation sampling, additional sample point locations were generated, through the same manner described above, in all vegetation communities except the Pine and Juniper Woodland and Scoria Grassland to ensure cover, production, and shrub density sampling were conducted in all portions of these vegetation communities.

These computer generated random locations were uploaded to a hand-held Global Positioning System (GPS) unit for actual location in the field. Sample point locations were sampled in numerical order until the minimum sample size was attained and then, until either sample adequacy was met or the required maximum number of samples had been collected.

The Rabbitbrush Shrubland (less than two acres in size) and disturbed areas were excluded from quantitative vegetation sampling.

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D8-1.2.4 Sample Intensity

Where possible, cover, production, and shrub density sampling was conducted at the same sample point location. Therefore, a total of 457 locations were sampled within 10 vegetation communities within the Brook Mine Study Area (Table D8-1): Agricultural Lands and Bottomland Sagebrush Grassland (n=25); Big Sagebrush Shrubland (n=90); Pine and Juniper Woodland (n=15); Prairie Dog Modified Grassland (n=40); Reclaimed Grassland (n=10); Riparian Woodland (n=49); Rough Breaks Mixed Shrubland (n=69); Scoria Grassland (n=50); and Upland Grassland (n=84).

Of the 457 locations sampled within the Brook Mine Study Area, 358 locations occurred within the proposed Brook Mine Permit Area (Table D8-1): Big Sagebrush Shrubland (n=74); Bottomland Sagebrush Grassland (n=17); Prairie Dog Modified (n=34); Riparian Woodland (n=25); Rough Breaks Mixed Shrubland (n=53); Reclaimed Grassland (n=8); and Upland Grassland (n=81). All Pine and Juniper Woodland (n=15) and Scoria Grassland (n=50) sample locations occurred within both the Brook Mine Study and proposed Brook Mine Permit Areas. No Agricultural Land sample locations occurred within the Brook Mine Permit Area.

D8-1.2.5 Cover Sampling of Vegetation Communities

Line-transect point-intercept methods were used to collect percent absolute cover data within all vegetation communities (Table D8-1). Percent cover measurements were taken from point-intercepts at 1-meter intervals along a 50-meter cover transect using a laser point device at each sample location. Each 50-meter cover transect began at its specified random origin point and extended in a random compass direction. Transects that exceed the boundaries of the vegetation community being sampled were redirected back into its vegetation community at a 90 degree angle from the original transect direction at the point of intercept. In instances where a 90 degree angle of

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reflection did not place the transect within the sampled vegetation community, a 45 degree angle of reflection was used.

Each 50-meter cover transect represented a single sample point within the given vegetation community. Each point-intercept represented 2% of the cover measurement. Percent cover measurements recorded "first-hit" point-intercepts by live foliar vegetation species, litter, rock, or bare ground. "Second-hits" on vegetation were recorded, but used only for the purpose of constructing a plant species list for each vegetation community.

Percent vegetation cover is the vertical projection of the general outline of plants to the ground surface. All "first-hit" point-intercepts of living vegetation and growth, produced during the current growing season, were counted toward total vegetation cover. Lichen and moss were not included in total vegetation cover. Total vegetation cover data was summarized by computing absolute (mean) cover, relative cover (% of total vegetation cover), frequency, and relative frequency (% of total plot occurrences for each plant species).

Total ground cover equals the sum of cover values for percent vegetation, percent litter, percent cryptograms, and percent rock. Litter included all non-living organic material that was recognizable. Rock fragments were recorded when equal to or greater than 2-centimeters in size (i.e., sheet flow, minimum non-erodible particle size). Total ground cover measurements were expressed in absolute percentages for each sample point.

D8-1.2.6 Production Sampling of Vegetation Communities

Annual herbaceous production was quantitatively sampled within each vegetation community except (Table D8-1): Agricultural Land, Prairie Dog Modified Grassland, Pine and Juniper Woodland, and Reclaimed Grassland. Each production quadrat covered an area of 1-square meter. All 2013 aboveground biomass was clipped, as close to the ground as possible, and placed in paper bags. Major species (contributing greater than 2% relative

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cover) were collected and bagged by species. Minor species (contributing less than 2% relative cover) were collected by life form, and relative percent contribution was estimated by species. Species lacking creditable value (SLCV), full shrubs, succulents, *Yucca* species, cushion plants, mosses, lichens, and trees were not clipped. Although clipping annual forbs is not required, annual forbs were collected in the field.

Clipped biomass was dried in a forced air oven at 105° C for 24 hours and weighed on an electronic balance scale to the nearest 0.10 gram. Clipped samples contributing less than 0.10 gram of matter were considered trace samples and calculated at 0.03 grams of weight. The bag weight was calculated and subtracted from the sample weight to yield only the dry weight of the vegetative matter. The final results were reported in grams/m^2, pounds/acre, and relative production (% of total production).

All production quadrats, in the proposed Brook Mine Permit Area, were sampled within grazing enclosures. Each enclosure exceeded the quadrat size to accommodate the production quadrat and a buffer area. Permanent fences used to control livestock grazing were considered a type of grazing enclosure. Grazing enclosures were not utilized in the southern portion of the Brook Mine Study Area, due to cattle grazing occurring prior to the extension of the permit area. Although cattle grazing occurred within the southern portion of the Brook Mine Study Area prior to quantitative production sampling, regrowth between grazing and quantitative sampling negated the early season grazing effects on herbaceous production in the affected vegetation communities: Big Sagebrush Shrubland, Bottomland Sagebrush Grassland, Riparian Woodland, and Rough Breaks Mixed Shrubland.

Production within the Agricultural Land vegetation community was not quantitatively sampled, but an 11 year county-wide productivity mean (2003-2013) based on National Agriculture Statistics Service (NASS) yield data for Sheridan County, Wyoming, was calculated.

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D8-1.2.7 Shrub and Tree Density Sampling of Vegetation Communities

Shrub density was collected in conjunction with randomly selected cover transects, wherever possible. Shrub density sampling was accomplished by counting each individual full, half-, and sub-shrub species within a 1-meter wide belt transect centered over the 50-meter cover transect, yielding a 100-square meter belt transect. Shrub density belt transects were sampled until either sample adequacy was achieved or the maximum number of samples were reached for a given vegetation community. General approximations of shrub heights were recorded; however, shrub height measurements were not summarized for purposes of this report.

Tree counts were conducted using 2011 NAIP True Color aerial imagery. Trees counts were only conducted within vegetation communities which had trees present: Pine and Juniper Woodland, Rough Breaks Mixed Shrubland, and Riparian Woodland.

D8-1.2.8 Species Diversity and Composition

Species diversity was assessed by recording all plant species observed within the same 100-square meter belt transect used for shrub density. These observations provide a measurement of the total species diversity for each vegetation community. Species diversity data was reported as the average number of species per 100-square meter belt transect and total number of species within each vegetation community, based on the comprehensive list of sampled and observed plant species. Species diversity calculations did not include SLCV: halogeton (*Halogeton glomeratus*), Japanese brome (*Bromus japonicus*), cheatgrass (*Bromus tectorum*), summercypress (*Bassia sieversiana*), Russian thistle (*Salsola tragus*), State Designated Noxious Weeds, or Sheridan County Declared Weeds. The number of species diversity belt transects equaled the number of 50-meter cover transects within each vegetation community. Sample adequacy was not required for species diversity and composition.

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Based on the cover transect data, the total number of plant species and the total number of plant species with greater than 2% relative vegetation cover, by life form, was determined for each vegetation community.

A comprehensive plant species list of all plant species encountered during 2013 quantitative vegetation assessment was compiled. Plant species encountered during other on-site vegetation assessments conducted in April, May, June, July, and late October 2013, were also included in the comprehensive plant species list. Plant species were compiled by life form and vegetation community. Scientific nomenclature follows the Rocky Mountain Vascular Plants of Wyoming (Dorn 2001).

D8-1.2.9 Sample Adequacy

Sample adequacy for absolute total vegetation cover, total ground cover, production, and shrub density was evaluated for each of the sampled vegetation communities, using the following formula:

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

Where n_{min} = the number of sample points needed in a given vegetation community

s = sample standard deviation
z = 1.28 for cover, shrub density, and grassland production, or
z = 0.84 for shrubland production
d = 0.1 for cover, shrub density, and grassland production, or
d = 0.2 for shrubland production
x = sample mean

Confidence levels were determined when sample adequacy was not attained.

D8-1.2.10 Extended Reference Area

For the purposes of this permit Extended Reference Area (EXREFA) means a native land unit which will be used to evaluate revegetation success

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for each of the same vegetation communities which were affected by the proposed activities. All Agricultural Land, Bottomland Sagebrush Grassland, Big Sagebrush Shrubland, Prairie Dog Modified Grassland, Pine and Juniper Woodland, Reclaimed Grassland, Riparian Woodland, Rough Breaks Mixed Shrubland, Scoria Grassland, and Upland Grassland vegetation communities unaffected by the proposed activities within the proposed Brook Mine Permit Area will serve as the EXREFA. The EXREFA will remain unaffected over the course of the project and will be as large as practical, at least two acres, considering land ownership patterns and land management history.

D8-1.2.11 Cropland and Pastureland Productivity

Cropland and pastureland were identified within the Brook Mine Study Area. However, the Natural Resource Service, Web Soil Survey, indicates areas of prime farmland or pastureland only exist within the Brook Mine Study Area with the application of irrigation. Prime cropland or pastureland, if the application of irrigation is present, occur in Sections 13, 23, and 24 T57N R85W and Sections 18 and 19 T57N R84W. No prime cropland or pastureland of statewide importance were indicated as occurring within the proposed Brook Mine Permit Area (NRCS 2014).

D8-1.3 Results

Tables are located in Attachment D8-1-A. Refer to Attachment D8-1-B for the comprehensive plant species list. Refer to Attachment D8-1-C for the cover summaries, Attachment D8-1-D for production summaries, and Attachment D8-1-E for shrub density summaries. Refer to Attachment D8-1-F for photographs. Refer to Attachment D8-1-G for a map illustrating the vegetation communities, sample locations, and weeds present within the Brook Mine Study and proposed Brook Mine Permit Areas. Cover, production, and shrub density raw data are presented in Attachments D8-1-H, D8-1-I, and D8-1-J, respectively. Table D8-3 and the raw summaries in Attachments D8-1-H, D8-1-I, and D8-J provide mean data for the proposed

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Brook Mine Permit Area. The following results are based on 2013 baseline vegetation assessments for the Brook Mine Study Area.

D8-1.3.1 Vegetation Community Mapping

The Brook Mine Study Area was approximately 5,994.7 acres (Table D8-2). The following 11 vegetation communities were present at the following approximate acreages: Agricultural Land 409.9 acres (6.8%), Big Sagebrush Shrubland 1,185.8 acres (19.8%), Bottomland Sagebrush Grassland 132.5 acres (2.2%), Pine and Juniper Woodland 66.8 acres (1.1%), Prairie Dog Modified Grassland 597.6 acres (10.0%), Rabbitbrush Shrubland 0.7 acres (<0.1%), Reclaimed Grassland 713.5 acres (11.9%), Riparian Woodland 143.4 acres (2.4%), Rough Breaks Mixed Shrubland 794.9 acres (13.3%), Scoria Grassland 726.1 acres (12.1%), and Upland Grassland 1,025.8 acres (17.1%). Disturbed areas, defined as lands disturbed by human activities, encompassed approximately 181.1 acres (3.0%), and water covered approximately 16.6 acres (0.3%).

The proposed Brook Mine Permit Area was approximately 4,548.8 acres (Table D8-2). The following 11 vegetation communities were present at the following approximate acreages: Agricultural Land 4.5 acres (0.1%), Big Sagebrush Shrubland 913.7 acres (20.1%), Bottomland Sagebrush Grassland 50.6 acres (1.1%), Pine and Juniper Woodland 67.7 acres (1.5%), Prairie Dog Modified Grassland 436.7 acres (9.6%), Rabbitbrush Shrubland 1.3 acres (<0.1%), Reclaimed Grassland 596.7 acres (13.1%), Riparian Woodland 57.2 acres (1.3%), Rough Breaks Mixed Shrubland 576.0 acres (12.7%), Scoria Grassland 726.0 acres (16.0%), and Upland Grassland vegetation communities occupied approximately 995.9 acres (21.9%). Disturbed areas encompassed approximately 109.7 acres (2.4%), and water covered approximately 12.8 acres (0.3%). Note: Acreages for the Pine and Juniper Woodland, Rabbitbrush Shrubland, and Scoria Grassland were the same in both the Brook Mine and proposed Brook Mine Permit Area; however, percentages were different.

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D8-1.3.2 Agricultural Land

This vegetation community comprised 409.9 of the 5,994.7 acre (6.8%) Brook Mine Study Area and 4.5 of the 4,548.8 acre (0.1%) proposed Brook Mine Permit Area (Table D8-2). The Agricultural Land vegetation community was primarily located along the Tongue River in the southern portion of the Brook Mine Study and proposed Brook Mine Permit Areas. Alfalfa (*Medicago sativa*) and forage grasses were dominant in the multiple fields that comprised this vegetation community. Evidence of regular harvest and irrigation were observed within this vegetation community.

D8-1.3.2.1 Cover

Twenty-five, 50-meter cover transects were sampled within the Agricultural Land vegetation community (Table D8-1). Absolute total vegetation cover was 83.8%. Absolute total ground cover was 97.5% (Table D8-3). Absolute bare soil and litter/rock percentages were 2.5% and 13.7%, respectively. Cryptograms were not observed within this vegetation community (Table D8-5). Introduced biennial/perennial forbs were the dominant life form with 36.2% relative vegetation cover, followed by native cool season perennial grasses with 30.5% relative vegetation cover (Table D8-4). Alfalfa provided the highest relative vegetation cover at 32.7%, while slender wheatgrass (*Elymus trachycaulus*) provided the next highest relative vegetation cover at 18.6% (Table D8-5).

D8-1.3.2.2 Production

Production within the Agricultural Land vegetation community was not quantitatively sampled. The 11 year county-wide productivity mean (2003-2013), based on NASS yield data, was hay including alfalfa averaged 2.5 tons per acre and hay excluding alfalfa averaged 1.59 tons per acre within Sheridan County (NASS 2014).

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D8-1.3.2.3 Shrub and Tree Density

A few shrubs were observed along unmowed field edges. No trees were observed within the Agricultural Land vegetation community.

D8-1.3.2.4 Species Diversity and Composition

Excluding SLCV, 12 life forms and 43 plant species were sampled or observed within the Agricultural Land vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=25) was 8.7 (Attachment D8-1-H). Native cool season perennial grasses were the most common life form encountered with 10 plant species sampled or observed. Native perennial forbs were the second most common life form with eight plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: native cool season perennial grasses, introduced perennial grasses, and introduced biennial/perennial forbs (Table D8-8).

D8-1.3.3 Big Sagebrush Shrubland

This vegetation community comprised 1,185.8 of the 5,994.7 acre (19.8%) Brook Mine Study Area and 913.7 of the 4,548.8 acre (20.1%) proposed Brook Mine Permit Area (Table D8-2). The Big Sagebrush Shrubland vegetation community was characterized by greater than 20% big sagebrush (*Artemisia tridentata*) cover. This vegetation community was found on alluvial aprons, hills, ridges, and terraces. Topography of these sites captures snow during the winter months, creating persistent drifts resulting in different vegetation types than adjacent sites where snow blows free.

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D8-1.3.3.1 Cover

Twenty-three, 50-meter cover transects were sampled within the Big Sagebrush Shrubland vegetation community (Table D8-1). Absolute total vegetation cover was 57.8%. Absolute total ground cover was 88.3%

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(Table D8-3). Absolute bare soil and litter/rock percentages were 11.7% and 29.1%, respectively. Cryptograms provided 1.4% absolute cover (Table D8-5). Native full shrubs were the dominant life form with 44.1% relative vegetation cover, followed by native cool season perennial grasses with 23.7% relative vegetation cover (Table D8-4). Big sagebrush provided the highest relative vegetation cover at 42.2%, while western wheatgrass (*Elymus smithii*) provided the next highest relative vegetation cover at 6.4% (Table D8-5).

D8-1.3.3.2 Production

Fifty, 1-square meter quadrats were sampled within the Big Sagebrush Shrubland vegetation community (Table D8-1). Total production was 37.5 g/m^2 or 663.0 pounds/acre. Native cool season perennial grasses was the dominant life form and contributed 57.6% of the relative production at 21.6 g/m^2. Introduced annual grasses was the second most dominant life form and contributed 16.8% of the relative production at 6.3 g/m^2 (Table D8-6). Bluebunch wheatgrass (*Elymus spicatus*) was the dominant plant species and contributed 23.7% of the relative production at 8.9 g/m^2 (Attachment D8-1-D).

D8-1.3.3.3 Shrub and Tree Density

Fifty, 100-square meter belt transects were sampled within the Big Sagebrush Shrubland vegetation community (Table D8-1). Shrub density was 1.2 shrubs/m^2 or 4,926.0 shrubs/acre. Big sagebrush contributed 74.5% of the relative density at 0.9 shrubs/m^2 (Table D8-7). No trees were observed in the Big Sagebrush Shrubland vegetation community.

D8-1.3.3.4 Species Diversity and Composition

Excluding SLCV, 12 life forms and 77 plant species were sampled or observed within the Big Sagebrush Shrubland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=23) was 14.4 (Attachment D8-1-H). Native perennial forbs

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were the most common life form encountered with 32 plant species sampled or observed. Native cool season perennial grasses were the second most common life form with eight plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, introduced annual forbs, native perennial forbs, and native full shrubs (Table D8-8).

D8-1.3.4 Bottomland Sagebrush Grassland

This vegetation community comprised 132.5 of the 5,994.7 acre (2.2%) Brook Mine Study Area and 50.6 of the 4,548.8 acre (1.1%) proposed Brook Mine Permit Area (Table D8-2). The Bottomland Sagebrush Grassland was characterized by highly productive grasses and grasslike plant species. Sagebrush and other shrubs were, but composed less than 20% of the canopy cover. This vegetation community occurred primarily on the eastern and southern portions of the proposed Brook Mine Study Area on deeper, fine-textured soils in low-lying areas occurring in drainage floodplains primarily along Hidden Water Creek.

D8-1.3.4.1 Cover

Twenty-five, 50-meter cover transects were sampled within the Bottomland Sagebrush Grassland vegetation community (Table D8-1). Absolute total vegetation cover was 72.8%. Absolute total ground cover was 95.5% (Table D8-3). Absolute bare soil and litter/rock percentages were 4.5% and 22.7%, respectively. Cryptograms were not observed within this vegetation community (Table D8-5). Native cool season perennial grasses were the dominant life form with 31.7% relative vegetation cover, followed by native grasslikes and introduced perennial grasses with 15.0% relative vegetation cover, each (Table D8-4). Western wheatgrass provided the highest relative

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vegetation cover at 18.3%, while crested wheatgrass (*Agropyron cristatum*) provided the next highest relative vegetation cover at 9.9% (Table D8-5).

D8-1.3.4.2 Production

Twenty-five, 1-square meter quadrats were sampled within the Bottomland Sagebrush Grassland vegetation community (Table D8-1). Total production was 120.0 g/m^2 or 2,139.7 pounds/acre. Native cool season perennial grasses was the dominant life form and contributed 33.5% of the relative production at 40.2 g/m^2. Introduced perennial grasses was the second most dominant life form and contributed 24.0% of the relative production at 28.8 g/m^2 (Table D8-6). Western wheatgrass was the dominant plant species and contributed 28.3% of the relative production at 34.0 g/m^2 (Attachment D8-1-D).

D8-1.3.4.3 Shrub and Tree Density

Twenty-five, 100-square meter belt transects were sampled within the Bottomland Sagebrush Grassland vegetation community (Table D8-1). Shrub density was 0.5 shrubs/m^2 or 2,216.1 shrubs/acre. White sagebrush (*Artemisia ludoviciana*) contributed 57.3% of the relative density at 0.3 shrubs/m^2 (Table D8-7). No trees were observed within the Bottomland Sagebrush Grassland vegetation community.

D8-1.3.4.4 Species Diversity and Composition

Excluding SLCV, 13 life forms and 92 plant species were sampled or observed within the Bottomland Sagebrush Grassland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=25) was 12.5 (Attachment D8-1-H). Native perennial forbs were the most common life form encountered with 14 plant species sampled or observed. Native cool season perennial grasses were the second most common life forms with 13 plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life

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forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, introduced perennial grasses, native grasslikes, introduced annual forbs (Table D8-8).

D8-1.3.5 Pine and Juniper Woodland

This vegetation community comprised 66.8 of the 5,994.7 acre (1.1%) Brook Mine Study Area and 4,548.8 acre (1.5%) proposed Brook Mine Permit Area (Table D8-2). The Pine and Juniper Woodland vegetation community was occurred in areas with diverse topography, generally on higher-elevation slopes. The presence of Rocky Mountain juniper (*Juniperus scopulorum*) and ponderosa pine (*Pinus ponderosa*) distinguish this vegetation community from the Rough Breaks Mixed Shrubland vegetation community.

D8-1.3.5.1 Cover

Fifteen, 50-meter cover transects were sampled within the Pine and Juniper Woodland vegetation community (Table D8-1). Absolute total vegetation cover was 43.6%. Absolute total ground cover was 89.0% (Table D8-3). Absolute bare soil and litter/rock percentages were 11.0% and 44.1%, respectively. Cryptograms provided 1.3% absolute cover (Table D8-5). Native cool season perennial grasses were the dominant life form with 46.3% relative vegetation cover, followed by native trees with 18.3% relative vegetation cover (Table D8-4). Bluebunch wheatgrass provided the highest relative vegetation cover at 32.8%, while cheatgrass provided the next highest relative vegetation cover at 13.1% (Table D8-5).

D8-1.3.5.2 Production

Production was not measured within the Pine and Juniper Woodland vegetation community.

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D8-1.3.5.3 Shrub and Tree Density

Fifteen, 100-square meter cover transects were sampled within the Pine and Juniper Woodland vegetation community (Table D8-1). Shrub density was 0.6 shrubs/m^2 or 2,320.3 shrubs/acre. Broom snakeweed (*Gutierrezia sarothrae*) contributed 24.6% of the relative density at 0.1 shrubs/m^2 (Table D8-7). Rocky Mountain juniper and ponderosa pine were both observed in this vegetation community. Approximately 405 trees were counted within the Pine and Juniper Woodland vegetation community.

D8-1.3.5.4 Species Diversity and Composition

Excluding SLCV, 12 life forms and 56 plant species were sampled or observed within the Pine and Juniper Woodland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=15) was 14.2 (Attachment D8-1-H). Native perennial forbs were the most common life form encountered with 18 plant species sampled or observed. Native cool season perennial grasses and native full shrubs were the second most common life forms with six plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, native perennial forbs, and native trees (Table D8-8).

D8-1.3.6 Prairie Dog Modified Grassland

This vegetation community comprised 597.6 of the 5,994.7 acre (10.0%) Brook Mine Study Area and 436.7 of the 4,548.8 acre (9.6%) proposed Brook Mine Permit Area (Table D8-2). The Prairie Dog Modified Grassland vegetation community was naturally disturbed by prairie dogs. As a result, this vegetation community had high bare soil, low vegetation height and cover, and a high percentage of introduced annual grasses. This vegetation community occurred throughout the Brook Mine Study Area in relatively flat areas.

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D8-1.3.6.1 Cover

Forty, 50-meter cover transects were sampled within the Prairie Dog Modified Grassland vegetation community (Table D8-1). Absolute total vegetation cover was 48.9%. Absolute total ground cover was 72.5% (Table D8-3). Absolute bare soil and litter/rock percentages were 27.5% and 23.5%, respectively. Cryptograms provided 0.1% absolute cover (Table D8-5). Introduced annual grasses were the dominant life form with 28.6% relative vegetation cover, followed by native cool season perennial grasses with 23.5% relative vegetation cover (Table D8-4). Cheatgrass provided the highest relative vegetation cover at 25.6%, while western wheatgrass provided the next highest relative vegetation cover at 19.9% (Table D8-5).

D8-1.3.6.2 Production

Production was not measured within the Prairie Dog Modified Grassland vegetation community.

D8-1.3.6.3 Shrub and Tree Density

Forty, 100-square meter belt transects were sampled within the Prairie Dog Modified Grassland vegetation community (Table D8-1). Shrub density was 0.4 shrubs/m^2 or 1,561.1 shrubs/acre. Fringed sagewort (*Artemisia frigida*) contributed 67.3% of the relative density at 0.3 shrubs/m^2 (Table D8-7). No trees were observed in the Prairie Dog Modified Grassland vegetation community.

D8-1.3.6.4 Species Diversity and Composition

Excluding SLCV, 13 life forms and 74 plant species were sampled or observed within the Prairie Dog Modified Grassland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=40) was 10.0 (Attachment D8-1-H). Native perennial forbs were the most common life form encountered with 20 plant species sampled or observed. Introduced annual forbs were the second most common life form

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with 11 plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, native warm season perennial grasses, introduced perennial grasses, native annual forbs, introduced annual forbs, native perennial forbs, and introduced biennial/perennial forbs (Table D8-8).

D8-1.3.7 Reclaimed Grassland

This vegetation community comprised 713.5 of the 5,994.7 acre (11.9%) Brook Mine Study Area and 596.7 of the 4,548.8 acre (13.1%) proposed Brook Mine Permit Area (Table D8-2). The Reclaimed Grassland vegetation community was located in the eastern and southern portions of the Brook Mine Study Area on reclaimed coal mines.

D8-1.3.7.1 Cover

Ten, 50-meter cover transects were sampled within the Reclaimed Grassland vegetation community (Table D8-1). Absolute total vegetation cover was 63.6%. Absolute total ground cover was 90.4% (Table D8-3). Absolute bare soil and litter/rock percentages were 9.6% and 26.8%, respectively. Cryptograms were not observed within this vegetation community (Table D8-5). Native cool season perennial grasses were the dominant life form with 45.3% relative vegetation cover, followed by introduced perennial grasses with 27.7% relative vegetation cover (Table D8-4). Western wheatgrass provided the highest relative vegetation cover at 39.3%, while smooth brome (*Bromus inermis*) provided the next highest relative vegetation cover at 24.8% (Table D8-5).

D8-1.3.7.2 Production

Production was not measured within the Reclaimed Grassland vegetation community.

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D8-1.3.7.3 Shrub and Tree Density

Ten, 100-square meter belt transects were sampled within the Reclaimed Grassland vegetation community (Table D8-1). Shrub density was less than 0.1 shrubs/m^2 or 194.3 shrubs/acre. Four-wing saltbush (*Atriplex canescens*) contributed 79.2% of the relative density at less than 0.1 shrubs/m^2 (Table D8-7). No trees were observed within the Reclaimed Grassland vegetation community.

D8-1.3.7.4 Species Diversity and Composition

Excluding SLCV, 10 life forms and 26 plant species were sampled or observed within the Reclaimed Grassland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=10) was 7.2 (Attachment D8-1-H). Native cool season perennial grasses were the most common life form encountered with five plant species sampled or observed. Introduced annual forbs, native perennial forbs, and native full shrubs were the second most common life forms with four plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, introduced perennial grasses, introduced annual forbs, and introduced biennial/perennial forbs (Table D8-8).

D8-1.3.8 Riparian Woodland

This vegetation community comprised 143.4 of the 5,994.7 acre (2.4%) Brook Mine Study Area and 57.2 of the 4,548.8 acre (1.3%) proposed Brook Mine Permit Area (Table D8-2). The Riparian Woodland vegetation community occurs primarily along the Tongue River and Slater Creek in alluvial floodplains and stream terraces. Soils in these areas are typically very deep and well drained. Multiple trees and shrub species were present and abundant in the Riparian Woodland vegetation community due to the presence and proximity of water.

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D8-1.3.8.1 Cover

Twenty-five, 50-meter cover transects were sampled within the Riparian Woodland vegetation community (Table D8-1). Absolute total vegetation cover was 82.0%. Absolute total ground cover was 97.9% (Table D8-3). Absolute bare soil and litter/rock percentages were 2.1% and 15.9%, respectively. Cryptograms were not observed within this vegetation community (Table D8-5). Native cool season perennial grasses were the dominant life form with 23.8% relative vegetation cover, followed by native full shrubs with 17.6% relative vegetation cover (Table D8-4). Common snowberry (*Symphoricarpos albus*) provided the highest relative vegetation cover at 14. 0%, while western wheatgrass provided the next highest relative vegetation cover at 12.0% (Table D8-5).

D8-1.3.8.2 Production

Forty-eight, 1-square meter quadrats were sampled within the Riparian Woodland vegetation community (Table D8-1). Total production was 143.3 g/m^2 or 2,556.9 pounds/acre. Introduced perennial grasses was the dominant life form and contributed 30.9% of the relative production at 44.3 g/m^2. Native cool season perennial grasses was the second most dominant life form and contributed 27.8% of the relative production at 39.8 g/m^2 (Table D8-6). Crested wheatgrass was the dominant plant species and contributed 21.7% of the relative production at 31.1 g/m^2 (Attachment D8-1-D).

D8-1.3.8.3 Shrub and Tree Density

Forty-six, 100-square meter belt transects were sampled within the Riparian Woodland vegetation community (Table D8-1). Shrub density was 1.8 shrubs/m^2 or 7,298.7 shrubs/acre. Common snowberry contributed 70.0% of the relative density at 1.3 shrubs/m^2 (Table D8-7). Native trees eastern cottonwood (*Populus deltoides*), green ash (*Fraxinus pennsylvanica*), Greene's mountain ash (*Sorbus scopulina*), and peachleaf willow (*Salix amygdaloides*) as well as the introduced tree Russian olive (*Elaeagnus angustifolia*) were present.

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Approximately 820 trees were counted within the Riparian Woodland vegetation community.

D8-1.3.8.4 Species Diversity and Composition

Excluding SLCV, 12 life forms and 103 plant species were sampled or observed within the Riparian Woodland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=25) was 13.1 (Attachment D8-1-H). Native perennial forbs were the most common life form encountered with 23 plant species sampled or observed. Native full shrubs were the second most common life form with 14 plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, native warm season perennial grasses, introduced perennial grasses, native grasslikes, native perennial forbs, introduced biennial/perennial forbs, native full shrubs, and native trees (Table D8-8).

D8-1.3.9 Rough Breaks Mixed Shrubland

This vegetation community comprised 794.9 of the 5,994.7 acre (13.3%) Brook Mine Study Area and 576.0 of the 4,548.8 acre (12.7%) proposed Brook Mine Permit Area (Table D8-2). The Rough Breaks Mixed Shrubland vegetation community was characterized by greater than 20% shrub cover of a high diversity of full, half- and sub-shrub species. The vegetation community was located along the edges of Big Sagebrush Shrubland and Upland Grassland vegetation communities throughout the Brook Mine Study Area, typically, in shallower soils and on greater topographic reliefs.

D8-1.3.9.1 Cover

Thirty, 50-meter cover transects were sampled within the Rough Breaks Mixed Shrubland vegetation community (Table D8-1). Absolute total vegetation

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cover was 41.8%. Absolute total ground cover was 69.7% (Table D8-3). Absolute bare soil and litter/rock percentages were 30.3% and 26.5%, respectively. Cryptograms provided 1.4% absolute cover (Table D8-5). Native cool season perennial grasses were the dominant life form with 35.4% relative vegetation cover, followed by native full shrubs with 29.9% relative vegetation cover (Table D8-4). Big sagebrush provided the highest relative vegetation cover at 22.7%, while bluebunch wheatgrass provided the next highest relative vegetation cover at 16.7% (Table D8-5).

D8-1.3.9.2 Production

Fifty, 1-square meter quadrats were sampled within the Rough Breaks Mixed Shrubland vegetation community (Table D8-1). Total production was 37.7 g/m^2 or 673.5 pounds/acre. Native cool season perennial grasses was the dominant life form and contributed 53.3% of the relative production at 20.1 g/m^2. Native perennial forbs was the second most dominant life form and contributed 24.9% of the relative production at 9.4 g/m^2 (Table D8-6). Bluebunch wheatgrass was the dominant plant species and contributed 35.0% of the relative production at 13.2 g/m^2 (Attachment D8-1-D).

D8-1.3.9.3 Shrub and Tree Density

Forty-nine, 100-square meter belt transects were sampled within the Rough Breaks Mixed Shrubland vegetation community (Table D8-1). Shrub density was 1.6 shrubs/m^2 or 6,434.7 shrubs/acre. Big sagebrush contributed 39.3% of the relative density at 0.6 shrubs/m^2 (Table D8-7). Rocky Mountain juniper was observed in the Rough Breaks Mixed Shrubland vegetation community. Approximately 60 trees were counted within the Rough Breaks Mixed Shrubland vegetation community.

D8-1.3.9.4 Species Diversity and Composition

Excluding SLCV, 12 life forms and 97 plant species were sampled or observed within the Rough Breaks Mixed Shrubland vegetation community

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(Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=30) was 15.5 (Attachment D8-1-H). Native perennial forbs were the most common life form encountered with 38 plant species sampled or observed. Native full shrubs were the second most common life form with 11 plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, native perennial forbs, native full shrubs, and native half- and sub-shrubs (Table D8-8).

D8-1.3.10 Scoria Grassland

This vegetation community comprised 726.1 of the 5,994.7 acre (12.1%) Brook Mine Study Area and 4,548.8 acre (16.0%) proposed Brook Mine Permit Area (Table D8-2). The Scoria Grassland vegetation community was located on hill slopes and ridges throughout the Brook Mine Study Area with a high percentage of scoria derived soils. Vegetation within the Scoria Grassland vegetation community was predominantly composed of bunchgrasses and less than 20% canopy cover of low growing shrubs such as skunkbush sumac (*Rhus aromatica*). Burned areas within this vegetation community were included in the Upland Grassland vegetation community due to the absence of low growing shrubs. Areas within this vegetation community with greater than 20% shrub cover were included in the Rough Breaks Mixed Shrubland vegetation community due to the density and diversity of shrubs.

D8-1.3.10.1 Cover

Twenty-eight, 50-meter cover transects were sampled within the Scoria Grassland vegetation community (Table D8-1). Absolute total vegetation cover was 58.1%. Absolute total ground cover was 89.2% (Table D8-3). Absolute bare soil and litter/rock percentages were 10.8% and 30.7%, respectively. Cryptograms provided 0.4% absolute cover (Table D8-5). Introduced annual grasses were the dominant life form with 37.3% relative vegetation cover,

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followed by native cool season perennial grasses with 27.9% relative vegetation cover (Table D8-4). Cheatgrass provided the highest relative vegetation cover at 32.4%, while bluebunch wheatgrass provided the next highest relative vegetation cover at 11.0% (Table D8-5).

D8-1.3.10.2 Production

Fifty, 1-square meter quadrats were sampled within the Scoria Grassland vegetation community (Table D8-1). Total production was 60.8 g/m^2 or 1,083.7 pounds/acre. Native cool season perennial grasses was the dominant life form and contributed 40.1% of the relative production at 24.4 g/m^2. Introduced annual grasses was the second most dominant life form and contributed 35.0% of the relative production at 21.3 g/m^2 (Table D8-6). Cheatgrass was the dominant plant species and contributed 32.4% of the relative production at 19.7 g/m^2 (Attachment D8-1-D).

D8-1.3.10.3 Shrub and Tree Density

Fifty, 100-square meter belt transects were sampled within the Scoria Grassland vegetation community (Table D8-1). Shrub density was 0.5 shrubs/m^2 or 1,849.5 shrubs/acre. Big Sagebrush contributed 40.2% of the relative density at 0.2 shrubs/m^2 (Table D8-7). No trees were observed within this vegetation community.

D8-1.3.10.4 Species Diversity and Composition

Excluding SLCV, 13 life forms and 93 plant species were sampled or observed within the Scoria Grassland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=28) was 13.8 (Attachment D8-1-H). Native perennial forbs were the most common life form encountered with 34 plant species sampled or observed. Native full shrubs were the second most common life form with nine plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one

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plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, introduced biennial/perennial forbs, and native full shrubs (Table D8-8).

D8-1.3.11 Upland Grassland

This vegetation community comprised 1,025.8 of the 5,994.7 acre (17.1%) Brook Mine Study Area and 995.9 of the 4,548.8 acre (21.9%) proposed Brook Mine Permit Area (Table D8-2). The Upland Grassland vegetation community was characterized by a predominance of native cool season perennial grasses and less than 20% shrub cover. This vegetation community occurred throughout the Brook Mine Study Area primarily in areas with deep soils.

D8-1.3.11.1 Cover

Twenty-eight, 50-meter cover transects were sampled within the Upland Grassland vegetation community (Table D8-1). Absolute total vegetation cover was 58.0%. Absolute total ground cover was 90.7% (Table D8-3). Absolute bare soil and litter/rock percentages were 9.3% and 32.5%, respectively. Cryptograms provided 0.2% absolute cover (Table D8-5). Native cool season perennial grasses were the dominant life form with 42.1% relative vegetation cover, followed by introduced annual grasses with 30.9% relative vegetation cover (Table D8-4). Cheatgrass provided the highest relative vegetation cover at 22.6%, while western wheatgrass provided the next highest relative vegetation cover at 17.9% (Table D8-5).

D8-1.3.11.2 Production

Fifty, 1-square meter quadrats were sampled within the Upland Grassland vegetation community (Table D8-1). Total production was 64.4 g/m^2 or 1,150.5 pounds/acre. Native cool season perennial grasses was the dominant life form and contributed 57.5% of the relative production at 37.0 g/m^2. Introduced annual grasses was the second most dominant life form and

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contributed 24.4% of the relative production at 15.7 g/m^2 (Table D8-6). Western wheatgrass was the dominant plant species and contributed 31.5% of the relative production at 20.3 g/m^2 (Attachment D8-1-D).

D8-1.3.11.3 Shrub and Tree Density

Fifty-two, 50-meter cover transects were sampled within the Upland Grassland vegetation community (Table D8-1). Shrub density was 0.3 shrubs/m^2 or 1,412.6 shrubs/acre. Fringed sagewort contributed 62.8% of the relative density at 0.2 shrubs/m^2 (Table D8-7). No trees were observed within this vegetation community.

D8-1.3.11.4 Species Diversity and Composition

Excluding SLCV, 12 life forms and 96 plant species were sampled or observed within the Upland Grassland vegetation community (Attachment D8-1-B). The mean number of plant species sampled or observed per belt transect (n=28) was 15.0 (Attachment D8-1-H). Native perennial forbs were the most common life form encountered with 32 plant species sampled or observed. Native full shrubs were the second most common life form with 10 plant species sampled or observed (Attachment D8-1-B). Based on all plant species sampled on the cover transects, the following life forms had at least one plant species with greater than 2% relative vegetation cover: introduced annual grasses, native cool season perennial grasses, introduced annual forbs, and introduced biennial/perennial forbs (Table D8-8).

D8-1.3.12 Rabbitbrush Shrubland

This vegetation community comprised 0.7 of the 5,994.7 acre (<0.1%) Brook Mine Study Area and 4,548.8 acre (<0.1%) proposed Brook Mine Permit Area (Table D8-2). The Rabbitbrush Shrubland vegetation community had greater than 20% rubber rabbitbrush (*Chrysothamnus viscidiflorus)* and yellow rabbitbrush (*Ericameria nauseosa*) canopy cover. The understory was similar to the Upland Grassland vegetation community which surrounded it. No

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quantitative vegetation sampling was conducted within this vegetation community due to its limited size.

D8-1.3.13 Sample Adequacy

Sample adequacy was met for total vegetation cover in all 10 vegetation communities quantitatively sampled except the Pine and Juniper Woodland (Confidence Level = 67.7%) (Table D8-9). Sample adequacy for total ground cover was met in all 10 of the vegetation communities quantitatively sampled. Sample adequacy for production was met in the two shrubland vegetation communities sampled: Big Sagebrush Shrubland and Rough Breaks Mixed Shrubland. Sample adequacy for production was not met in the three grassland and one woodland vegetation communities quantitatively sampled: Bottomland Sagebrush Grassland (Confidence Level = 63.7%), Scoria Grassland (Confidence Level = 73.9%), Upland Grassland (Confidence Level = 77.9%), and Riparian Woodland (Confidence Level = 72.6%). Sample adequacy for shrub density was not met in all vegetation communities quantitatively sampled. Shrub density confidence levels ranged from 52.8% to 74.9%.

D8-1.4 Threatened and Endangered Habitat and Species Surveys

Refer to Table D8-10 for a tabular summary of potential occurrence determinations for Threatened and Endangered plant species within the proposed Brook Mine Permit Area.

D8-1.4.1 Ute ladies'-tresses (*Spiranthes diluvialis*)

Habitat suitability for Ute ladies'-tresses (*Spiranthes diluvialis*), within the Brook Mine Permit Area, was evaluated based on the presence of the following characteristics: late season perennial water source, associated vegetation species, sandy or loamy textured soils, gradual transitions between uplands and water bodies or drainages, vegetation density between 75% and 90%, vegetation height less than 18 inches, and non-alkaline soils. Based on late July field evaluations, late season perennial water sources were present within the Brook Mine Permit Area. However, where late season perennial

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water sources were present, associated vegetation species, appropriate soil textures, gradual transitions, vegetation cover and density, and non-alkaline sandy or loamy textured soils were not present or not present in sufficient combination to provide suitable habitat. No individuals or populations of Ute ladies'-tresses were found during field surveys, and based on the lack of suitable habitat characteristics, local habitat was confirmed unsuitable for Ute ladies'-tresses.

D8-1.4.2 Blowout Penstemon (Penstemon Haydenii)

Habitat suitability for blowout penstemon (*Penstemon haydenii*), within the Brook Mine Permit Area, was evaluated based on the presence of the following characteristics: eolian sand deposits or sand deposits greater than three feet in depth, fine sandy textured soils absent of rocks and coarse fragments, wind or gravity erosion versus water erosion, slopes greater than 25%, slope elevation changes of 60 to 120 feet, vegetation cover of less than 40%, and associated plant species. No individuals or populations of blowout penstemon were found during late June field surveys, and based on the lack of suitable habitat characteristics, local habitat was confirmed unsuitable for blowout penstemon.

D8-1.5 Other Special Status Plant Species

WYNDD reports no special status plant species within the Brook Mine Study Area (WYNDD 2013).

D8-1.6 Selenium Indicators

One selenium indicator, two-grooved milkvetch (*Astragalus bisulcatus*), was observed within the Pine and Juniper Woodland and Scoria Grassland vegetation communities.

D8-1.7 Noxious Weeds

Surveys for Wyoming State Designated Noxious Weeds (Wyoming Weed and Pest Council 2013a) and Sheridan County Declared Weeds (Wyoming Weed

and Pest Council 2013b) were conducted in conjunction with baseline vegetation mapping, sampling, and threatened and endangered plant species surveys. All State Designated Noxious Weeds and Sheridan County Declared Weeds observed during these surveys were GPS located and mapped. Refer to Attachment D8-1-G for a map illustrating weed location within the Brook Mine Study Area and proposed Brook Mine Permit Area.

Eight Wyoming State Designated Noxious Weeds were encountered: skeletonleaf bur ragweed, (*Ambrosia tomentosa*), whitetop (*Cardaria draba*), Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), western houndstongue (*Cynoglossum officinale*), perennial pepperweed (*Lepidium latifolium*), common tansy (*Tanacetum vulgare*), and Russian olive (Attachment D8-1-B). Skeletonleaf bur ragweed was present within the Bottomland Sagebrush Grassland, Scoria Grassland, and Upland Grassland vegetation communities. Canada thistle was present within the Agricultural Land, Bottomland Sagebrush Grassland, Riparian Woodland, Rough Breaks Mixed Shrubland, and Upland Grassland vegetation communities. Field bindweed was present within the Agricultural Land, Bottomland Sagebrush Grassland, Prairie Dog Modified Grassland, Reclaimed Grassland, Riparian Woodland, Rough Breaks Mixed Shrubland, Scoria Grassland, and Upland Grassland vegetation communities. Western houndstongue was present within the Prairie Dog Modified Grassland and Riparian Woodland vegetation communities. Common tansy was present within the Bottomland Sagebrush Grassland vegetation community. Whitetop, perennial pepperweed, and Russian olive were present within the Riparian Woodland vegetation community.

Five Sheridan County Declared Weeds were encountered: showy milkweed (*Asclepias speciosa*), wild licorice (*Glycyrrhiza lepidota*), plains pricklypear (*Opuntia polyacantha*), curly dock (*Rumex crispus*), and common cocklebur (*Xanthium strumarium*) (Attachment D8-1-B). Showy milkweed was

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present within the Bottomland Sagebrush Grassland and Riparian Woodland vegetation communities. Wild licorice was present within the Agricultural Land, Bottomland Sagebrush Grassland, Pine and Juniper Woodland, Riparian Woodland, Rough Breaks Mixed Shrubland, Scoria Grassland, and Upland Grassland vegetation communities. Plains pricklypear was present within the Agricultural Land, Big Sagebrush Shrubland, Bottomland Sagebrush Grassland, Prairie Dog Modified Grassland, Rough Breaks Mixed Shrubland, Scoria Grassland, and Upland Grassland vegetation communities. Curly dock was present within the Agricultural Land, Bottomland Sagebrush Grassland, Prairie Dog Modified Grassland, Riparian Woodland, and Upland Grassland vegetation communities. Common cocklebur was present within the Bottomland Sagebrush Grassland, Riparian Woodland, and Scoria Grassland vegetation communities.

Five other SLCV were encountered: cheatgrass, Japanese brome, summercypress, halogeton, and Russian thistle (Attachment D8-1-B). Cheatgrass and Japanese brome were present in all vegetation communities. Summercypress was present within the Agricultural Land, Bottomland Sagebrush Grassland, Prairie Dog Modified Grassland, Reclaimed Grassland, Riparian Woodland, and Upland Grassland vegetation communities. Halogeton was present within the Reclaimed Grassland and Riparian Woodland vegetation communities. Russian thistle was present within the Bottomland Sagebrush Shrubland, Prairie Dog Modified Grassland, and Upland Grassland vegetation communities.

Over weeds were observed in small isolated patches or as isolated individuals. However, large patches of cheatgrass and Japanese brome were observed.

D8-1.8 Summary of Vegetation Surveys

The approximately 5,994.7 acre Brook Mine Study Area and 4,548.8 acre proposed Brook Mine Permit Area consisted of 11 vegetation communities:

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Agricultural Land, Big Sagebrush Shrubland, Bottomland Sagebrush Grassland, Pine and Juniper Woodland, Prairie Dog Modified Grassland, Rabbitbrush Shrubland, Reclaimed Grassland, Riparian Woodland, Rough Breaks Mixed Shrubland, Scoria Grassland, and Upland Grassland. Shrubland vegetation communities covered approximately 35.3% and 32.8% of the Brook Mine Study Area and proposed Brook Mine Permit Area, respectively (Table D8-2). Big Sagebrush Shrubland was the dominant shrubland vegetation community. Native grassland vegetation communities covered approximately 39.2% and 48.6% of the Brook Mine Study Area and proposed Brook Mine Permit Area, respectively. Upland Grassland was the dominant grassland vegetation community. Woodland vegetation communities covered 3.5% and 2.7% of the Brook Mine Study Area and proposed Brook Mine Permit Area, respectively. Riparian Woodland was the dominant woodland vegetation. Reclaimed areas occupied approximately 11.9% and 13.1% of the Brook Mine Study Area and proposed Brook Mine Permit Area, respectively. Agricultural lands occupied approximately 6.8% and 0.1% of the Brook Mine Study Area and proposed Brook Mine Permit Area, respectively.

Within the Brook Mine Study Area, total vegetation cover ranged from 41.8% to 83.8%. Total ground cover ranged from 69.7% to 97.9%. Excluding SLCV, species diversity ranged from 26 to 103 plant species sampled or observed, with a total of 187 plant species sampled or observed. Western wheatgrass, green needlegrass (*Nassella viridula*), Sandberg bluegrass (*Poa secunda*), crested wheatgrass, and smooth brome were the most common perennial grasses. The most common perennial forb species were western yarrow (*Achillea millefolium*) and American vetch (*Vicia americana*). Big sagebrush, silver sagebrush (*Artemisia cana*), and skunkbrush were the most common native shrub species. Fringed sagewort and broom snakeweed were the most common native half- and sub-shrubs.

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No special status plant species or suitable habitats were encountered within the proposed Brook Mine Permit Area. Eight Wyoming State Designated Noxious Weeds, five Sheridan County Declared Weeds, and five other SLCV were observed throughout the Brook Mine Study Area.

D8-1.9 References

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Tables

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Table D8-1. Summary of Sample Points within Each Vegetation Community for the Brook Mine Study Area and Proposed Brook Mine Permit Area

Vegetation Communities	Brook Mine Study Area			Proposed Brook Mine Permit Area		
	Cover	Production	Shrub Density	Cover	Production	Shrub Density
Agricultural Land	25	--	25	--	--	--
Big Sagebrush Shrubland	23	50	50	19	43	38
Bottomland Sagebrush Grassland	25	25	25	17	17	17
Pine and Juniper Woodland	15	--	15	15	--	15
Prairie Dog Modified Grassland	40	--	40	34	--	34
Reclaimed Grassland	10	--	10	8	--	8
Riparian Woodland	25	48	46	14	24	23
Rough Breaks Mixed Shrubland	30	50	49	23	38	35
Scoria Grassland	28	50	50	28	50	50
Upland Grassland	28	50	52	28	50	50
Total	**249**	**273**	**362**	**186**	**222**	**270**

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Table D8-2. Summary of Acreages and Percent of the Brook Mine Study Area, Proposed Brook Mine Permit Area, and Half-Mile Buffer Composed of Each Vegetation Community

Vegetation Community	Brook Mine Study Area		Proposed Brook Mine Permit Area		Half-Mile Buffer	
	Acres	% of Area	Acres	% of Area	Acres	% of Area
Agricultural Land	409.9	6.8	4.5	0.1	1,575.3	13.6
Big Sagebrush Shrubland	1,185.8	19.8	913.7	20.1	1,931.8	16.7
Bottomland Sagebrush Grassland	132.5	2.2	50.6	1.1	500.0	4.3
Pine and Juniper Woodland	66.8	1.1	67.7	1.5	295.0	2.5
Prairie Dog Modified Grassland	597.6	10.0	436.7	9.6	1,059.2	9.1
Rabbitbrush Shrubland	0.7	<0.1	1.3	<0.1	--	--
Reclaimed Grassland	713.5	11.9	596.7	13.1	1,221.4	10.5
Riparian Woodland	143.4	2.4	57.2	1.3	1,083.9	9.4
Rough Breaks Mixed Shrubland	794.9	13.3	576.0	12.7	1,678.8	14.5
Scoria Grassland	726.1	12.1	726.0	16.0	792.4	6.8
Upland Grassland	1,025.8	17.1	995.9	21.9	787.8	6.8
Disturbance	181.1	3.0	109.7	2.4	549.2	4.7
Water	16.6	0.3	12.8	0.3	105.4	0.9
Total	**5,994.7**	**100.0**	**4,548.8**	**100.1**	**11,580.2**	**99.8**

NOTE: % of Area Totals shown in this table do not sum to 100.0 due to rounding errors.

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Table D8-3. Summary of 2013 Major Vegetation Parameters for the Brook Mine Study Area and Proposed Brook Mine Permit Area

Vegetation Community	Total Vegetation Cover (Absolute %)		Total Ground Cover (Absolute %)		Production (g/m^2)		Shrub Density ($\#/m^2$)	
	Permit Area	Study Area	Permit Area	Study Area	Permit Area	Study Area	Permit Area	Study Area
Agricultural Land	--	83.8	--	97.5	--	--	--	0.0
Big Sagebrush Shrubland	54.1	57.8	88.0	88.3	34.4	37.5	1.1	1.2
Bottomland Sagebrush Grassland	67.1	72.8	95.3	95.5	93.3	120.0	0.7	0.5
Pine and Juniper Woodland	43.6	43.6	89.0	89.0	--	--	0.6	0.6
Prairie Dog Modified Grassland	46.7	48.9	72.6	72.5	--	--	0.4	0.4
Reclaimed Grassland	64.8	63.6	95.0	90.4	--	--	0.1	<0.1
Riparian Woodland	80.3	82.0	97.6	97.9	159.9	143.3	2.6	1.8
Rough Breaks Mixed Shrubland	40.7	41.8	71.0	69.7	41.3	37.7	1.6	1.6
Scoria Grassland	58.1	58.1	89.2	89.2	60.8	60.8	0.5	0.5
Upland Grassland	58.0	58.0	90.7	90.7	64.4	64.4	0.3	0.3

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Table D8-4. Summary of 2013 Mean Vegetation Cover Data, by Life Form, for the Brook Mine Study Area

Life Form	Agricultural Land		Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland		Prairie Dog Modified Grassland	
	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Annual Grasses	--	--	0.9	1.6	--	--	--	--	0.2	0.4
Introduced Annual Grasses	1.3	1.6	4.9	8.5	6.0	8.2	6.9	15.8	14.0	28.6
Native Cool Season Perennial Grasses[1]	25.6	30.5	13.7	23.7	23.1	31.7	20.2	46.3	11.5	23.5
Native Warm Season Perennial Grasses	0.3	0.4	1.2	2.1	0.9	1.2	0.3	0.7	2.2	4.5
Introduced Perennial Grasses	21.5	25.7	0.8	1.4	10.9	15.0	--	--	2.7	5.5
Native Grasslikes	0.5	0.6	0.3	0.5	10.9	15.0	0.8	1.8	--	--
Native Annual Forbs	0.3	0.4	0.1	0.2	0.4	0.5	0.1	0.2	2.4	4.9
Introduced Annual Forbs	1.4	1.7	3.0	5.2	2.7	3.7	1.1	2.5	4.4	9.0
Native Perennial Forbs[2]	0.7	0.8	5.5	9.5	6.1	8.4	4.0	9.2	4.8	9.8
Introduced Biennial/Perennial Forbs	30.3	36.2	0.1	0.2	7.7	10.6	0.2	0.5	5.3	10.8
Native Half- and Sub-Shrubs	0.7	0.8	1.6	2.8	1.3	1.8	0.4	0.9	0.9	1.8
Native Full Shrubs	1.2	1.4	25.5	44.1	2.8	3.8	1.6	3.7	0.4	0.8
Native Trees	--	--	--	--	--	--	8.0	18.3	--	--
Introduced Trees	--	--	--	--	--	--	--	--	--	--
Native Succulents	--	--	0.2	0.3	--	--	--	--	0.1	0.2
Total	**83.8**	**100.1**	**57.8**	**100.1**	**72.8**	**99.9**	**43.6**	**99.9**	**48.9**	**99.8**

[1] Native Cool Season Perennial Grasses' and Unknown Grasses' absolute percentages have been combined.
[2] Native Perennial Forbs' and Unknown Forb Species' absolute percentages have been combined.
NOTE: Relative percentages shown in this table do not sum to 100.0 due to rounding errors.

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Table D8-4. Summary of 2013 Mean Vegetation Cover Data, by Life Form, for the Brook Mine Study Area (Cont.)

Life Form	Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Annual Grasses	--	--	--	--	--	--	0.2	0.3	0.8	1.4
Introduced Annual Grasses	5.2	8.2	2.7	3.3	2.7	6.5	21.7	37.3	17.9	30.9
Native Cool Season Perennial Grasses[1]	28.8	45.3	19.5	23.8	14.8	35.4	16.2	27.9	24.4	42.1
Native Warm Season Perennial Grasses	--	--	3.2	3.9	0.3	0.7	1.1	1.9	1.0	1.7
Introduced Perennial Grasses	17.6	27.7	8.3	10.1	0.3	0.7	0.5	0.9	0.4	0.7
Native Grasslikes	0.4	0.6	5.0	6.1	0.1	0.2	0.1	0.2	0.1	0.2
Native Annual Forbs	0.2	0.3	0.2	0.2	1.1	2.6	0.2	0.3	0.8	1.4
Introduced Annual Forbs	2.4	3.8	1.4	1.7	0.5	1.2	2.2	3.8	1.9	3.3
Native Perennial Forbs[2]	1.6	2.5	8.4	10.2	6.0	14.4	6.2	10.7	4.8	8.3
Introduced Biennial/Perennial Forbs	7.0	11.0	5.6	6.8	0.9	2.2	1.6	2.8	2.9	5.0
Native Half- and Sub-Shrubs	--	--	--	--	2.5	6.0	0.7	1.2	1.2	2.1
Native Full Shrubs	0.4	0.6	14.4	17.6	12.5	29.9	7.4	12.7	1.7	2.9
Native Trees	--	--	12.7	15.5	0.1	0.2	--	--	--	--
Introduced Trees	--	--	0.6	0.7	--	--	--	--	--	--
Native Succulents	--	--	--	--	--	--	--	--	0.1	0.2
Total	**63.6**	**100.0**	**82.0**	**99.9**	**41.8**	**100.0**	**58.1**	**100.0**	**58.0**	**100.2**

[1] Native Cool Season Perennial Grasses' and Unknown Grasses' absolute percentages have been combined.
[2] Native Perennial Forbs' and Unknown Forb Species' absolute percentages have been combined.
NOTE: Relative percentages shown in this table do not sum to 100.0 due to rounding errors.

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area

Life Form/ Scientific Name	Common Name	Agricultural Land		Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland		Prairie Dog Modified Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Annual Grasses											
Echinochloa muricata	Rough barnyardgrass	--	--	0.9	1.6	--	--	--	--	--	--
Vulpia octoflora	Sixweeks fescue	--	--	--	--	--	--	--	--	0.2	0.4
Subtotal		--	--	0.9	1.6	--	--	--	--	0.2	0.4
Introduced Annual Grasses											
Bromus japonicus	Japanese brome	1.0	1.2	3.2	5.5	2.5	3.4	1.2	2.8	1.5	3.1
Bromus tectorum	Cheatgrass	0.2	0.2	1.7	2.9	3.5	4.8	5.7	13.1	12.5	25.6
Triticum aestivum	Common wheat	0.1	0.1	--	--	--	--	--	--	--	--
Subtotal		1.3	1.6	4.9	8.5	6.0	8.2	6.9	15.8	14.0	28.6
Native Cool Season Perennial Grasses											
Elymus elymoides	Bottlebrush squirreltail	--	--	--	--	0.2	0.3	--	--	--	--
Elymus lanceolatus	Thickspike wheatgrass	0.7	0.8	--	--	0.7	1.0	--	--	--	--
Elymus smithii	Western wheatgrass	4.2	5.0	3.7	6.4	13.3	18.3	3.3	7.6	9.7	19.9
Elymus spicatus	Bluebunch wheatgrass	0.2	0.2	3.5	6.1	0.2	0.3	14.3	32.8	0.4	0.8
Elymus trachycaulus	Slender wheatgrass	15.6	18.6	--	--	0.6	0.8	--	--	--	--
Festuca spp.	Fescue	2.3	2.7	--	--	--	--	--	--	--	--
Glyceria grandis	American mannagrass	0.2	0.2	--	--	--	--	--	--	--	--
Hesperostipa comata	Needleandthread	0.2	0.2	3.7	6.4	0.6	0.8	0.5	1.1	0.4	0.8
Hordeum jubatum	Foxtail barley	0.6	0.7	--	--	4.4	6.0	--	--	--	--
Nassella viridula	Green needlegrass	0.1	0.1	1.5	2.6	2.3	3.2	0.5	1.1	0.2	0.4
Phalaris arundinacea	Reed canarygrass	0.1	0.1	--	--	0.2	0.3	--	--	--	--
Poa secunda	Sandberg bluegrass	1.4	1.7	1.3	2.2	0.6	0.8	1.6	3.7	0.8	1.6
Subtotal		25.6	30.5	13.7	23.7	23.1	31.7	20.2	46.3	11.5	23.5
Native Warm Season Perennial Grasses											
Aristida purpurea	Purple threeawn	--	--	0.2	0.3	--	--	--	--	0.9	1.8
Bouteloua gracilis	Blue grama	0.2	0.2	1.0	1.7	0.2	0.3	0.3	0.7	1.0	2.0
Buchloe dactyloides	Buffalograss	--	--	--	--	0.2	0.3	--	--	--	--
Spartina pectinata	Prairie cordgrass	0.1	0.1	--	--	0.5	0.7	--	--	--	--
Sporobolus cryptandrus	Sand dropseed	--	--	--	--	--	--	--	--	0.3	0.6
Subtotal		0.3	0.4	1.2	2.1	0.9	1.2	0.3	0.7	2.2	4.5
Introduced Perennial Grasses											
Agropyron cristatum	Crested wheatgrass	8.1	9.7	0.3	0.5	7.2	9.9	--	--	2.6	5.3
Bromus inermis	Smooth brome	9.4	11.2	--	--	2.0	2.7	--	--	0.1	0.2
Dactylis glomerata	Orchardgrass	2.0	2.4	--	--	--	--	--	--	--	--

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Agricultural Land		Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland		Prairie Dog Modified Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Introduced Perennial Grasses (Cont.)											
Elymus junceus	Russian wildrye	--	--	--	--	0.2	0.3	--	--	--	--
Festuca ovina	Sheep fescue	--	--	0.5	0.9	--	--	--	--	--	--
Phleum pratensis	Timothy	0.6	0.7	--	--	0.3	0.4	--	--	--	--
Poa pratensis	Kentucky bluegrass	1.4	1.7	--	--	1.2	1.6	--	--	--	--
Subtotal		21.5	25.7	0.8	1.4	10.9	15.0	--	--	2.7	5.5
Native Grasslikes											
Carex filifolia	Threadleaf sedge	--	--	0.3	0.5	--	--	0.8	1.8	--	--
Carex nebrascensis	Nebraska sedge	0.5	0.6	--	--	6.8	9.3	--	--	--	--
Carex praegracilis	Clustered field sedge	--	--	--	--	1.2	1.6	--	--	--	--
Juncus balticus	Baltic rush	--	--	--	--	0.5	0.7	--	--	--	--
Schoenoplectus pungens	Common threesquare	--	--	--	--	2.4	3.3	--	--	--	--
Subtotal		0.5	0.6	0.3	0.5	10.9	15.0	0.8	1.8	--	--
Native Annual Forbs											
Chamaesyce glyptosperma	Ribseed sandmat	--	--	--	--	--	--	--	--	0.1	0.2
Chenopodium berlandieri	Pitseed goosefoot	0.1	0.1	--	--	0.1	0.1	--	--	--	--
Descurainia pinnata	Western tansymustard	0.1	0.1	--	--	--	--	--	--	--	--
Logfia arvensis	Field cottonrose	--	--	--	--	--	--	--	--	0.2	0.4
Lappula redowskii	Bluebur stickseed	--	--	--	--	0.1	0.1	--	--	0.7	1.4
Plantago patagonica	Pursh's plantain	0.1	0.1	0.1	0.2	0.2	0.3	0.1	0.2	1.3	2.7
Solanum triflorum	Cutleaf nightshade	--	--	--	--	--	--	--	--	0.1	0.2
Subtotal		0.3	0.4	0.1	0.2	0.4	0.5	0.1	0.2	2.4	4.9
Introduced Annual Forbs											
Alyssum desertorum	Desert alyssum	0.3	0.4	2.9	5.0	1.6	2.2	0.4	0.9	2.4	4.9
Amaranthus albus	Prostrate pigweed	--	--	--	--	--	--	--	--	0.3	0.6
Bassia sieversiana	Summercypress	0.9	1.1	--	--	0.2	0.3	--	--	0.1	0.2
Brassica juncea	Brown mustard	--	--	--	--	--	--	--	--	0.1	0.2
Camelina microcarpa	Littleseed falseflax	--	--	--	--	0.2	0.3	0.3	0.7	--	--
Descurainia sophia	Flixweed	--	--	--	--	0.2	0.3	--	--	--	--
Halogeton glomeratus	Halogeton	--	--	--	--	--	--	--	--	--	--
Lepidium perfoliatum	Shieldcress	--	--	--	--	--	--	--	--	--	--
Medicago lupulina	Black medic	--	--	0.1	0.2	--	--	--	--	0.5	1.0

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Agricultural Land		Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland		Prairie Dog Modified Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Introduced Annual Forbs (Cont.)											
Polygonum argyrocoleon	Silversheath knotweed	--	--	--	--	--	--	--	--	0.1	0.2
Polygonum aviculare	Prostrate knotweed	--	--	--	--	--	--	--	--	0.6	1.2
Polygonum convolvulus	Black bindweed	0.2	0.2	--	--	--	--	--	--	0.2	0.4
Sisymbrium altissimum	Tumble mustard	--	--	--	--	0.2	0.3	--	--	0.1	0.2
Thlaspi arvense	Field pennycress	--	--	--	--	0.3	0.4	0.4	0.9	--	--
	Subtotal	1.4	1.7	3.0	5.2	2.7	3.7	1.1	2.5	4.4	9.0
Native Perennial Forbs											
Achillea millefolium	Western yarrow	0.1	0.1	0.2	0.3	0.8	1.1	0.7	1.6	0.2	0.4
Allium textile	Textile onion	--	--	0.1	0.2	--	--	--	--	--	--
Ambrosia psilostachya	Western ragweed	--	--	--	--	0.3	0.4	--	--	0.1	0.2
Ambrosia tomentosa	Skeletonleaf bur ragweed	--	--	--	--	0.7	1.0	--	--	--	--
Antennaria microphylla	Littleleaf pussytoes	--	--	--	--	--	--	--	--	0.2	0.4
Asclepias speciosa	Showy milkweed	--	--	--	--	0.2	0.3	--	--	--	--
Astragalus spp.	Milkvetch	--	--	--	--	0.1	0.1	--	--	0.2	0.4
Cirsium spp.	Thistle	--	--	--	--	--	--	--	--	0.1	0.2
Comandra umbellata	Bastard toadflax	--	--	0.7	1.2	--	--	--	--	--	--
Dalea purpurea	Purple prairie clover	--	--	0.4	0.7	--	--	0.3	0.7	0.1	0.2
Echinacea angustifolia	Purple coneflower	--	--	--	--	0.1	0.1	--	--	--	--
Equisetum laevigatum	Smooth horsetail	--	--	--	--	0.4	0.5	--	--	--	--
Eriogonum ovalifolium	Cushion wild buckwheat	--	--	0.1	0.2	--	--	--	--	--	--
Eriogonum pauciflorum	Fewflower buckwheat	--	--	0.1	0.2	--	--	--	--	--	--
Evolvulus nuttallianus	Shaggy dwarf morning-glory	--	--	0.1	0.2	--	--	--	--	0.2	0.4
Gaura coccinea	Scarlet gaura	--	--	0.1	0.2	--	--	--	--	0.1	0.2
Glycyrrhiza lepidota	Wild licorice	--	--	--	--	0.6	0.8	--	--	--	--
Grindelia squarrosa	Curlycup gumweed	--	--	--	--	--	--	--	--	0.1	0.2
Heterotheca villosa	Hairy golden aster	--	--	--	--	--	--	--	--	0.3	0.6
Linum lewisii	Blue flax	--	--	--	--	--	--	--	--	0.1	0.2
Lygodesmia juncea	Rush skeletonplant	--	--	--	--	--	--	--	--	0.3	0.6
Pediomelum argophyllum	Silverleaf Indian breadroot	--	--	0.6	1.0	--	--	--	--	0.1	0.2
Penstemon spp.	Penstemon	--	--	--	--	--	--	--	--	0.1	0.2
Phlox hoodii	Hoods phlox	0.2	0.2	1.4	2.4	--	--	1.6	3.7	0.7	1.4
Polygonum spp.	Knotweed	--	--	--	--	1.0	1.4	--	--	--	--
Psoralidium tenuiflorum	Slimflower scurfpea	0.1	0.1	0.5	0.9	0.1	0.1	0.5	1.1	0.1	0.2

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Agricultural Land		Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland		Prairie Dog Modified Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Perennial Forbs (Cont.)											
Rumex spp.	Dock	--	--	--	--	0.1	0.1	--	--	0.1	0.2
Sonchus spp.	Sowthistle	--	--	--	--	0.4	0.5	--	--	--	--
Sphaeralcea coccinea	Scarlet globemallow	--	--	--	--	1.2	1.6	0.4	0.9	1.4	2.9
Symphyotrichum falcatum	White prairie aster	0.2	0.2	0.1	0.2	--	--	--	--	0.2	0.4
Vicia americana	American vetch	0.1	0.1	1.1	1.9	0.1	0.1	0.5	1.1	0.1	0.2
Subtotal		0.7	0.8	5.5	9.5	6.1	8.4	4.0	9.2	4.8	9.8
Introduced Biennial/Perennial Forbs											
Cirsium arvense	Canada thistle	--	--	--	--	1.0	1.4	--	--	--	--
Cerastium arvense	Field chickweed	--	--	--	--	--	--	0.1	0.2	--	--
Convolvulus arvensis	Field bindweed	1.0	1.2	--	--	3.8	5.2	--	--	5.1	10.4
*Lactuca serriola**	Prickly lettuce	--	--	--	--	0.2	0.3	--	--	--	--
Medicago sativa	Alfalfa	27.4	32.7	--	--	0.2	0.3	--	--	--	--
*Melilotus officinalis**	Yellow sweetclover	0.2	0.2	--	--	0.6	0.8	--	--	0.2	0.4
Rumex crispus	Curly dock	0.1	0.1	--	--	0.3	0.4	--	--	--	--
Taraxacum officinale	Common dandelion	0.6	0.7	--	--	1.4	1.9	--	--	--	--
*Tragopogon dubius**	Western salsify	0.4	0.5	0.1	0.2	0.2	0.3	0.1	0.2	--	--
Trifolium pratense	Red clover	0.6	0.7	--	--	--	--	--	--	--	--
Subtotal		30.3	36.2	0.1	0.2	7.7	10.6	0.2	0.5	5.3	10.8
Native Half- and Sub-Shrubs											
Artemisia frigida	Fringed sagewort	0.7	0.8	1.1	1.9	0.2	0.3	0.3	0.7	0.8	1.6
Artemisia ludoviciana	White sagebrush	--	--	--	--	1.1	1.5	--	--	0.1	0.2
Gutierrezia sarothrae	Broom snakeweed	--	--	0.4	0.7	--	--	0.1	0.2	--	--
Yucca glauca	Yucca	--	--	0.1	0.2	--	--	--	--	--	--
Subtotal		0.7	0.8	1.6	2.8	1.3	1.8	0.4	0.9	0.9	1.8
Native Full Shrubs											
Artemisia cana	Silver sagebrush	--	--	--	--	1.1	1.5	--	--	--	--
Artemisia tridentata	Big sagebrush	1.0	1.2	24.4	42.2	--		0.7	1.6	0.2	0.4
Chrysothamnus viscidiflorus	Yellow rabbitbrush	0.2	0.2	0.3	0.5	--	--	0.1	0.2	0.2	0.4
Ericameria nauseosa	Rubber rabbitbrush	--	--	0.2	0.3	--	--	0.4	0.9	--	--
Rhus aromatica	Skunkbush sumac	--	--	0.6	1.0	0.2	0.3	0.4	0.9	--	--
Symphoricarpos albus	Common snowberry	--	--	--	--	0.2	0.3	--	--	--	--
Symphoricarpos occidentalis	Western snowberry	--	--	--	--	0.3	0.4	--	--	--	--

*Introduced Biennial Forbs

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Agricultural Land		Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland		Prairie Dog Modified Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Full Shrubs (Cont.)											
Symphoricarpos spp.	Snowberry	--	--	--	--	1.0	1.4	--	--	--	--
	Subtotal	1.2	1.4	25.5	44.1	2.8	3.8	1.6	3.7	0.4	0.8
Native Succulents											
Opuntia polycantha	Plains pricklypear	--	--	0.2	0.3	--	--	--	--	0.1	0.2
	Subtotal	--	--	0.2	0.3	--	--	--	--	0.1	0.2
Native Trees											
Juniperus scopulorum	Rocky Mountain juniper	--	--	--	--	--	--	3.3	7.6	--	--
Pinus ponderosa	Ponderosa pine	--	--	--	--	--	--	4.7	10.8	--	--
	Subtotal	--	--	--	--	--	--	8.0	18.3	--	--
Total Vegetation Cover		**83.8**	**--**	**57.8**	**--**	**72.8**	**--**	**43.6**	**--**	**48.9**	**--**
Cryptograms		**0.0**	**--**	**1.4**	**--**	**0.0**	**--**	**1.3**	**--**	**0.1**	**--**
Litter		**13.0**	**--**	**21.9**	**--**	**22.1**	**--**	**17.8**	**--**	**19.8**	**--**
Rock		**0.7**	**--**	**7.2**	**--**	**0.6**	**--**	**26.3**	**--**	**3.7**	**--**
Total Ground Cover		**97.5**	**--**	**88.3**	**--**	**95.5**	**--**	**89.0**	**--**	**72.5**	**--**
Bare Ground		**2.5**	**--**	**11.7**	**--**	**4.5**	**--**	**11.0**	**--**	**27.5**	**--**

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Annual Grasses											
Cenchrus longispinus	Mat sandbar	--	--	--	--	--		--	--	0.1	0.2
Echinochloa muricata	Rough barnyardgrass	--	--	--	--	--	--	0.1	0.2	0.6	1.0
Vulpia octoflora	Sixweeks fescue	--	--	--	--	--	--	0.1	0.2	0.1	0.2
Subtotal		--	--	--	--	--	--	0.2	0.3	0.8	1.4
Introduced Annual Grasses											
Bromus japonicus	Japanese brome	3.8	6.0	1.7	2.1	2.4	5.7	2.9	5.0	4.8	8.3
Bromus tectorum	Cheatgrass	1.4	2.2	1.0	1.2	0.3	0.7	18.8	32.4	13.1	22.6
Triticum aestivum	Common wheat	--	--	--	--	--	--	--	--	--	--
Subtotal		5.2	8.2	2.7	3.3	2.7	6.5	21.7	37.3	17.9	30.9
Native Cool Season Perennial Grasses											
Achnatherum hymenoides	Indian ricegrass	--	--	--	--	0.1	0.2	--	--	--	--
Elymus cinereus	Basin wildrye	--	--	0.2	0.2	--	--	--	--	--	--
Elymus lanceolatus	Thickspike wheatgrass	1.8	2.8	1.3	1.6	0.5	1.2	0.1	0.2	0.6	1.0
Elymus smithii	Western wheatgrass	25.0	39.3	9.8	12.0	4.1	9.8	2.8	4.8	10.4	17.9
Elymus spicatus	Bluebunch wheatgrass	--	--	--	--	7.0	16.7	6.4	11.0	3.9	6.7
Elymus trachycaulus	Slender wheatgrass	1.4	2.2	1.8	2.2	--	--	--	--	0.1	0.2
Festuca spp.	Fescue	--	--	0.2	0.2	--	--	--	--	--	--
Hesperostipa comata	Needleandthread	--	--	--	--	0.7	1.7	4.4	7.6	5.4	9.3
Hordeum jubatum	Foxtail barley	--	--	4.6	5.6	--	--	--	--	--	--
Koeleria macrantha	Prairie junegrass	--	--	--	--	0.1	0.2	0.1	0.2	--	--
Nassella viridula	Green needlegrass	0.4	0.6	1.0	1.2	1.4	3.3	0.9	1.5	1.1	1.9
Poa secunda	Sandberg bluegrass	0.2	0.3	0.6	0.7	0.9	2.2	1.5	2.6	2.9	5.0
Subtotal		28.8	45.3	19.5	23.8	14.8	35.4	16.2	27.9	24.4	42.1
Native Warm Season Perennial Grasses											
Aristida purpurea	Purple threeawn	--	--	--	--	0.1	0.2	0.4	0.7	0.1	0.2
Bouteloua gracilis	Blue grama	--	--	0.2	0.2	0.1	0.2	0.7	1.2	0.5	0.9
Distichlis stricta	Inland saltgrass	--	--	--	--	--	--	--	--	0.4	0.7
Schizachyrium scoparium	Little bluestem	--	--	--	--	0.1	0.2	--	--	--	--
Spartina pectinata	Prairie cordgrass	--	--	3.0	3.7	--	--	--	--	--	--
Subtotal		--	--	3.2	3.9	0.3	0.7	1.1	1.9	1.0	1.7
Introduced Perennial Grasses											
Agropyron cristatum	Crested wheatgrass	1.8	2.8	2.7	3.3	0.1	0.2	--	--	0.3	0.5
Bromus inermis	Smooth brome	15.8	24.8	3.1	3.8	0.1	0.2	0.1	0.2	--	--

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Introduced Perennial Grasses (Cont.)											
Dactylis glomerata	Orchardgrass	--	--	0.3	0.4	--	--	--	--	--	--
Festuca ovina	Sheep fescue	--	--	--	--	--	--	0.4	0.7	--	--
Phleum pratensis	Timothy	--	--	0.4	0.5	--	--	--	--	--	--
Poa bulbosa	Bulbous bluegrass	--	--	--	--	0.1	0.2	--	--	0.1	0.2
Poa pratensis	Kentucky bluegrass	--	--	1.8	2.2	--	--	--	--	--	--
Subtotal		17.6	27.7	8.3	10.1	0.3	0.7	0.5	0.9	0.4	0.7
Native Grasslikes											
Carex filifolia	Threadleaf sedge	0.4	0.6	0.4	0.5	0.1	0.2	0.1	0.2	0.1	0.2
Carex nebrascensis	Nebraska sedge	--	--	3.5	4.3	--	--	--	--	--	--
Juncus balticus	Baltic rush	--	--	1.0	1.2	--	--	--	--	--	--
Schoenoplectus pungens	Common threesquare	--	--	0.1	0.1	--	--	--	--	--	--
Subtotal		0.4	0.6	5.0	6.1	0.1	0.2	0.1	0.2	0.1	0.2
Native Annual Forbs											
Atriplex suckleyi	Suckley's endolepis	--	--	--	--	0.7	1.7	--	--	--	--
Chenopodium berlandieri	Pitseed goosefoot	--	--	0.1	0.1	0.1	0.2	--	--	--	--
Erigeron strigosus	Rough fleabane	--	--	--	--	--	--	--	--	0.1	0.2
Galium aparine	Stickywilly	--	--	0.1	0.1	--	--	--	--	--	--
Helianthus annuus	Annual sunflower	--	--	--	--	--	--	0.1	0.2		
Lappula redowskii	Bluebur stickseed	--	--	--	--	--	--	0.1	0.2	0.1	0.2
Plantago patagonica	Pursh's plantain	0.2	0.3	--	--	0.3	0.7	--	--	0.6	1.0
Subtotal		0.2	0.3	0.2	0.2	1.1	2.6	0.2	0.3	0.8	1.4
Introduced Annual Forbs											
Alyssum desertorum	Desert alyssum	1.4	2.2	0.4	0.5	0.4	1.0	0.7	1.2	1.3	2.2
Bassia sieverisana	Summercypress	--	--	0.3	0.4	--	--	--	--	--	--
Camelina microcarpa	Littleseed falseflax	0.6	0.9	--	--	--	--	0.9	1.5	0.1	0.2
Descurainia sophia	Flixweed	--	--	--	--	--	--	0.1	0.2	--	--
Halogeton glomeratus	Halogeton	0.2	0.3	--	--	--	--	--	--	--	--
Lepidium perfoliatum	Shieldcress	--	--	0.2	0.2	--	--	0.1	0.2	--	--
Medicago lupulina	Black medic	0.2	0.3	0.3	0.4	--	--	0.1	0.2	--	--
Sisymbrium altissimum	Tumble mustard	--	--	--	--	--	--	0.3	0.5	0.4	0.7
Thlaspi arvense	Field pennycress	--	--	0.2	0.2	0.1	0.2	--	--	0.1	0.2
Subtotal		2.4	3.8	1.4	1.7	0.5	1.2	2.2	3.8	1.9	3.3

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Perennial Forbs											
Achillea millefolium	Western yarrow	--	--	1.8	2.2	0.4	1.0	0.1	0.2	0.6	1.0
Ambrosia tomentosa	Skeletonleaf bur ragweed	--	--	--	--	--	--	0.1	0.2	--	--
Asclepias speciosa	Showy milkweed	--	--	0.2	0.2	--	--	--	--	--	--
Asteraceae spp.	Asteraceae	--	--	1.0	1.2	--	--	--	--	--	--
Astragalus spp.	Milkvetch	--	--	0.8	1.0	--	--	0.1	0.2	0.2	0.3
Cirsium spp.	Thistle	--	--	--	--	0.1	0.2	--	--	0.1	0.2
Comandra umbellata	Bastard toadflax	0.2	0.3	0.3	0.4	0.3	0.7	0.1	0.2	--	--
Dalea candida	White prairie clover	--	--	--	--	0.2	0.5	--	--	--	--
Dalea purpurea	Purple prairie clover	--	--	--	--	0.1	0.2	1.0	1.7	--	--
Equisetum laevigatum	Smooth horsetail	--	--	0.2	0.2	--	--	--	--	--	--
Eriogonum pauciflorum	Fewflower buckwheat	--	--	--	--	0.1	0.2	--	--	--	--
Evolvulus nuttallianus	Shaggy dwarf morning-glory	--	--	0.1	0.1	0.2	0.5	0.3	0.5	0.1	0.2
Galium boreale	Northern bedstraw	--	--	0.1	0.1	--	--	0.1	0.2	--	--
Gaura coccinea	Scarlet gaura	--	--	--	--	0.2	0.5	0.1	0.2	0.1	0.2
Glycyrrhiza lepidota	Wild licorice	--	--	0.2	0.2	--	--	0.1	0.2	--	--
Grindelia squarrosa	Curlycup gumweed	1.0	1.6	1.5	1.8	0.1	0.2	--	--	0.1	0.2
Heterotheca villosa	Hairy golden aster	--	--	--	--	0.1	0.2	0.2	0.3	--	--
Lactuca oblongifolia	Blue lettuce	--	--	--	--	--	--	0.4	0.7	0.1	0.2
Lappula spp.	Stickseed	--	--	--	--	--	--	--	--	0.1	0.2
Lygodesmia juncea	Rush skeletonplant	--	--	--	--	--	--	--	--	0.1	0.2
Machaeranthera tanacetifolia	Tansyleaf tansy aster	--	--	--	--	0.1	0.2	--	--	--	--
Musineon divaricatum	Leafy wildparsely	--	--	--	--	0.1	0.2	--	--	0.1	0.2
Pediomelum argophyllum	Silverleaf Indian breadroot	--	--	--	--	0.1	0.2	0.3	0.5	0.2	0.3
Pediomelum esculentum	Large Indian breadroot	--	--	--	--	0.2	0.5	0.2	0.3	--	--
Phlox hoodii	Hoods phlox	--	--	--	--	1.3	3.1	0.1	0.2	0.9	1.6
Polygonum spp.	Knotweed	--	--	--	--	--	--	--	--	0.1	0.2
Psoralidium tenuiflorum	Slimflower scurfpea	--	--	--	--	1.1	2.6	1.1	1.9	0.5	0.9
Ratibida columnifera	Prairie coneflower	--	--	--	--	0.1	0.2	0.1	0.2	--	--
Sonchus spp.	Sowthistle	--	--	1.8	2.2	--	--	--	--	--	--
Sphaeralcea coccinea	Scarlet globemallow	--	--	0.2	0.2	0.5	1.2	1.1	1.9	0.8	1.4
Symphyotrichum falcatum	White prairie aster	--	--	--	--	--	--	--	--	0.1	0.2
Thermopsis rhombifolia	Golden banner	--	--	--	--	0.2	0.5	0.1	0.2	--	--
Vicia americana	American vetch	0.4	0.6	0.2	0.2	0.5	1.2	0.6	1.0	0.5	0.9

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Perennial Forbs (Cont.)											
Zigadenus venenosus	Death camas	--	--	--	--	--	--	--	--	0.1	0.2
Subtotal		1.6	2.5	8.4	10.2	6.0	14.4	6.2	10.7	4.8	8.3
Introduced Biennial/Perennial Forbs											
Cardaria draba	Whitetop	--	--	0.1	0.1	--	--	--	--	--	--
Cirsium arvense	Canada thistle	--	--	0.4	0.5	0.1	0.2	--	--	--	--
Cerastium arvense	Field chickweed	--	--	--	--	--	--	--	--	--	--
Convolvulus arvensis	Field bindweed	1.0	1.6	1.1	1.3	0.5	1.2	1.2	2.1	1.7	2.9
*Cynoglossum officinale**	Western houndstongue	--	--	0.1	0.1	--	--	--	--	--	--
*Lactuca serriola**	Prickly lettuce	--	--	1.0	1.2	--	--	--	--	--	--
Medicago sativa	Alfalfa	0.2	0.3	0.1	0.1	--	--	--	--	--	--
*Melilotus officinalis**	Yellow sweetclover	2.8	4.4	0.2	0.2	--	--	0.1	0.2	0.2	0.3
Taraxacum officinale	Common dandelion	2.4	3.8	2.3	2.8	--	--	--	--	0.6	1.0
*Tragopogon dubius**	Western salsify	0.6	0.9	0.2	0.2	0.3	0.7	0.3	0.5	0.4	0.7
Trifolium repens	White clover	--	--	0.1	0.1	--	--	--	--	--	--
Subtotal		7.0	11.0	5.6	6.8	0.9	2.2	1.6	2.8	2.9	5.0
Native Half- and Sub-Shrubs											
Artemisia frigida	Fringed sagewort	--	--	--	--	1.1	2.6	0.2	0.3	0.8	1.4
Artemisia ludoviciana	White sagebrush	--	--	--	--	0.1	0.2	--	--	--	--
Artemisia pedatifida	Birdfoot sagebrush	--	--	--	--	0.1	0.2	--	--	--	--
Atriplex gardneri	Gardner saltbush	--	--	--	--	0.1	0.2	--	--	--	--
Gutierrezia sarothrae	Broom snakeweed	--	--	--	--	1.1	2.6	0.2	0.3	0.4	0.7
Linanthus pungens	Granite pricklygila	--	--	--	--	--	--	0.1	0.2	--	--
Yucca glauca	Yucca	--	--	--	--	--	--	0.2	0.3	--	--
Subtotal		--	--	--	--	2.5	6.0	0.7	1.2	1.2	2.1
Native Full Shrubs											
Artemisia cana	Silver sagebrush	0.2	0.3	2.3	2.8	0.3	0.7	0.3	0.5	0.3	0.5
Artemisia tridentata	Big sagebrush	--	--	0.2	0.2	9.5	22.7	4.1	7.1	0.9	1.6
Atriplex canescens	Four-wing saltbush	--	--	0.2	0.2	0.1	0.2	--	--	--	--
Ericameria nauseosa	Rubber rabbitbrush	0.2	0.3	--	--	0.6	1.4	--	--	--	--
Rhus aromatica	Skunkbrush sumac	--	--	--	--	0.3	0.7	3.0	5.2	0.2	0.3
Ribes cereum	Wax currant	--	--	--	--	0.1	0.2	--	--	0.1	0.2
Rosa woodsii	Woods rose	--	--	0.2	0.2	0.7	1.7	--	--	--	--
Sarcobatus vermiculatus	Greasewood	--	--	--	--	0.9	2.2	--	--	0.1	0.2

*Introduced Biennial Forbs

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Table D8-5. Summary of 2013 Mean Vegetation Cover Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
		Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %	Absolute %	Relative %
Native Full Shrubs (Cont.)											
Symphoricarpos albus	Common snowberry	--	--	11.5	14.0	--	--	--	--	--	--
Symphoricarpos spp.	Snowberry	--	--	--	--	--	--	--	--	0.1	0.2
Subtotal		0.4	0.6	14.4	17.6	12.5	29.9	7.4	12.7	1.7	2.9
Native Succulents											
Opuntia polycantha	Plains pricklypear	--	--	--	--	--	--	--	--	0.1	0.2
Subtotal		--	--	--	--	--	--	--	--	0.1	0.2
Native Trees											
Fraxinus pennsylvanica	Green ash	--	--	1.3	1.6	--	--	--	--	--	--
Juniperus scopulorum	Rocky Mountain juniper			--	--	0.1	0.2	--	--	--	--
Populus deltoids	Eastern cottonwood	--	--	6.6	8.0	--	--	--	--	--	--
Pinus ponderosa	Ponderosa pine	--	--	--	--	--	--	--	--	--	--
Salix amygdaloides	Peachleaf willow	--	--	0.2	0.2	--	--	--	--	--	--
Sorbus scopulina	Greene's mountain ash	--	--	4.6	5.6	--	--	--	--	--	--
Subtotal		--	--	12.7	15.5	0.1	0.2	--	--	--	--
Introduced Trees											
Elaeagnus angustifolia	Russian olive	--	--	0.6	0.7	--	--	--	--	--	--
Subtotal		--	--	0.6	0.7	--	--	--	--	--	--
Total Vegetation Cover		**63.6**	**--**	**82.0**	**--**	**41.8**	**--**	**58.1**	**--**	**58.0**	**--**
Cryptograms		**0.0**	**--**	**0.0**	**--**	**1.4**	**--**	**0.4**	**--**	**0.2**	**--**
Litter		**25.4**	**--**	**15.0**	**--**	**15.7**	**--**	**19.7**	**--**	**28.2**	**--**
Rock		**1.4**	**--**	**0.9**	**--**	**10.8**	**--**	**11.0**	**--**	**4.3**	**--**
Total Ground Cover		**90.4**	**--**	**97.9**	**--**	**69.7**	**--**	**89.2**	**--**	**90.7**	**--**
Bare Ground		**9.6**	**--**	**2.1**	**--**	**30.3**	**--**	**10.8**	**--**	**9.3**	**--**

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Table D8-6. Summary of 2013 Mean Herbaceous Production Data, by Life Form, for the Brook Mine Study Area

Life Form	Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
	Mean (g/m^2)	Relative %	Mean (g/m^2)	Relative %	Mean (g/m^2)	Relative %	Mean (g/m^2)	Relative %	Mean (g/m^2)	Relative %	Mean (g/m^2)	Relative %
Native Annual Grasses	0.3	0.8	--	--	--	--	--	--	<0.1	<0.1	--	--
Introduced Annual Grasses	6.3	16.8	5.1	4.3	7.8	5.4	4.7	12.5	21.3	35.0	15.7	24.4
Native Cool Season Perennial Grasses[1]	21.6	57.6	40.2	33.5	39.8	27.8	20.1	53.3	24.4	40.1	37.0	57.5
Native Warm Season Perennial Grasses	0.4	1.1	1.7	1.4	7.8	5.4	0.2	0.5	0.4	0.7	1.0	1.6
Introduced Perennial Grasses	1.0	2.7	28.8	24.0	44.3	30.9	--	--	<0.1	<0.1	0.7	1.1
Native Grasslikes[2]	0.2	0.5	16.8	14.0	12.3	8.6	0.1	0.3	--	--	0.5	0.8
Native Annual Forbs	0.4	1.1	0.1	0.1	1.0	0.7	0.1	0.3	1.5	2.5	1.5	2.3
Introduced Annual Forbs	2.0	5.3	2.0	1.7	4.9	3.4	0.5	1.3	2.9	4.8	0.4	0.6
Native Perennial Forbs[3]	4.9	13.1	10.8	9.0	10.5	7.3	9.4	24.9	9.5	15.6	6.4	9.9
Introduced Biennial/Perennial Forbs	0.4	1.1	14.5	12.1	14.9	10.4	2.6	6.9	0.8	1.3	1.2	1.9
Total	**37.5**	**100.1**	**120.0**	**100.1**	**143.3**	**99.9**	**37.7**	**100.0**	**60.8**	**100.0**	**64.4**	**100.1**
Total (pounds/acre)	**663.0**	--	**2,139.7**	--	**2,556.9**	--	**673.5**	--	**1,083.7**	--	**1,150.5**	--

[1] Native Cool Season Grasses' and Unknown Grass Species' absolute percents have been combined
[2] Native Grasslike Species' and Unknown Grasslike Species' absolute percents have been combined.
[3] Native Perennial Fobs' and Unknown Forb Species' absolute percents have been combined.
NOTE: Relative percentages shown in this table do not sum to 100.0 due to rounding errors.

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Table D8-7. Summary of 2013 Mean Shrub Density Data, by Species, for the Brook Mine Study Area

Life Form/ Scientific Name	Common Name	Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland		Prairie Dog Modified Grassland	
		Mean (#/m²)	Relative %	Mean (#/m²)	Relative %	Mean (#/m²)	Relative %	Mean (#/m²)	Relative %
Native Half- and Sub-Shrubs									
Artemisia frigida	Fringed sagewort	0.2	12.5	<0.1	3.5	0.1	24.2	0.3	67.3
Artemisia ludoviciana	White sagebrush	--	--	0.3	57.3	0.1	15.7	<0.1	8.0
Artemisia pedatifida	Birdfoot sagebrush	--	--	--	--	--	--	--	--
Atriplex gardneri	Gardner saltbush	--	--	--	--	--	--	--	--
Gutierrezia sarothrae	Broom snakeweed	0.1	8.1	--	--	0.1	24.6	<0.1	6.4
Juniperus horizontalis	Creeping juniper	--	--	--	--	--	--	--	--
Linanthus pungens	Granite pricklygila	--	--	--	--	--	--	--	--
Yucca glauca	Yucca	<0.1	<0.1	--	--	--	--	--	--
Subtotal		0.3	20.6	0.3	60.8	0.4	64.5	0.3	81.7
Native Full Shrubs[1]									
Artemisia cana	Silver sagebrush	<0.1	2.7	0.1	21.9	--	--	<0.1	0.1
Artemisia tridentata	Big sagebrush	0.9	74.5	--	--	0.1	14.1	<0.1	8.5
Atriplex canescens	Four-wing saltbush	--	--	--	--	--	--	--	--
Chrysothamnus viscidiflorus	Yellow rabbitbrush	<0.1	0.9	--	--	<0.1	1.9	<0.1	5.2
Ericameria nauseosa	Rubber rabbitbrush	<0.1	0.9	--	--	<0.1	5.7	<0.1	3.9
Rhus aromatica	Skunkbrush sumac	<0.1	0.2	<0.1	0.4	<0.1	5.7	<0.1	0.1
Ribes cereum	Wax currant	<0.1	<0.1	--	--	<0.1	3.3	--	--
Rosa woodsii	Woods rose	--	--	<0.1	0.2	<0.1	4.7	--	--
Sarcobatus vermiculatus	Greasewood	--	--	--	--	--	--	--	--
Symphoricarpos albus	Common snowberry	<0.1	0.1	<0.1	2.0	--	--	<0.1	0.5
Symphoricarpos occidentalis	Western snowberry	--	--	0.1	14.1	--	--	--	--
Symphoricarpos spp.	Snowberry	--	--	<0.1	0.7	--	--	--	--
Subtotal		1.0	79.4	0.2	39.2	0.2	35.5	0.1	18.3
Total		**1.2**	**100.0**	**0.5**	**100.0**	**0.6**	**100.0**	**0.4**	**100.0**
Total (#/acre)		**4,926.0**	**--**	**2,216.1**	**--**	**2,320.3**	**--**	**1,561.1**	**--**

[1] Native Full Shrubs' and Unknown Native Full Shrub's mean number per square meter values have been combined.
NOTE: #/m² values do not always equal the subtotals and totals shown due to rounding errors generated from the conversion of #/100m² to #/m².

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Table D8-7. Summary of 2013 Mean Shrub Density Data, by Species, for the Brook Mine Study Area (Cont.)

Life Form/ Scientific Name	Common Name	Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland		Scoria Grassland		Upland Grassland	
		Mean (#/m²)	Relative %	Mean (#/m²)	Relative %	Mean (#/m²)	Relative %	Mean (#/m²)	Relative %	Mean (#/m²)	Relative %
Native Half- and Sub-Shrubs											
Artemisia frigida	Fringed sagewort	<0.1	2.1	<0.1	1.1	0.2	12.8	0.1	22.4	0.2	62.8
Artemisia ludoviciana	White sagebrush	--	--	0.1	4.1	<0.1	0.4	<0.1	2.9	--	--
Artemisia pedatifida	Birdfoot sagebrush	--	--	--	--	<0.1	0.1	--	--	<0.1	0.1
Atriplex gardneri	Gardner saltbush					<0.1	0.2	--	--	--	--
Gutierrezia sarothrae	Broom snakeweed	--	--	<0.1	<0.1	0.3	16.9	<0.1	8.1	<0.1	4.9
Juniperus horizontalis	Creeping juniper					<0.1	<0.1	--	--	--	--
Krascheninnikovia lanata	Winterfat	--	--	--	--	--	--	<0.1	0.1	<0.1	2.6
Lianthus pungens	Granite pricklygila					<0.1	0.1	--	--	--	--
Yucca glauca	Yucca	--	--	--	--	<0.1	0.2	<0.1	1.1	<0.1	1.1
Subtotal		<0.1	2.1	0.1	5.2	0.5	30.6	0.2	34.5	0.2	71.3
Native Full Shrubs[1]											
Artemisia cana	Silver sagebrush	<0.1	8.3	0.2	11.6	<0.1	0.9	<0.1	5.9	<0.1	3.7
Artemisia tridentata	Big sagebrush	<0.1	2.1	<0.1	0.5	0.6	39.3	0.2	40.2	<0.1	11.7
Atriplex canescens	Four-wing saltbush	<0.1	79.2	--	--	<0.1	<0.1	--	--	--	--
Chrysothamnus viscidiflorus	Yellow rabbitbrush	--	--	--	--	<0.1	0.3	<0.1	0.2	<0.1	4.6
Ericameria nauseosa	Rubber rabbitbrush	<0.1	8.3	<0.1	0.1	0.2	11.2	<0.1	2.0	<0.1	1.7
Rhus aromatica	Skunkbrush sumac	--	--	<0.1	<0.1	<0.1	0.6	0.1	13.4	<0.1	1.1
Ribes cereum	Wax currant	--	--	<0.1	0.1	--	--	<0.1	0.1	<0.1	0.3
Rosa woodsii	Woods rose	--	--	0.1	4.5	0.2	15.3	<0.1	3.3	<0.1	1.1
Sarcobatus vermiculatus	Greasewood	--	--	--	--	<0.1	1.6	--	--	<0.1	0.9
Shepherdia canadensis	Russet buffaloberry	--	--	<0.1	0.2	--	--	--	--	--	--
Symphoricarpos albus	Common snowberry	--	--	1.3	70.0	<0.1	0.1	<0.1	0.2	<0.1	3.4
Symphoricarpos occidentalis	Western snowberry	--	--	0.1	7.9	<0.1	0.1	<0.1	<0.1	--	--
Subtotal		<0.1	97.9	1.7	94.8	1.1	69.4	0.3	65.5	0.1	28.7
Total		**<0.1**	**100.0**	**1.8**	**100.0**	**1.6**	**100.0**	**0.5**	**100.0**	**0.3**	**100.0**
Total (#/acre)		**194.3**	**--**	**7,298.7**	**--**	**6,434.7**	**--**	**1,849.5**	**--**	**1,412.6**	**--**

[1] Native Full Shrubs' and Unknown Native Full Shrub's mean number per square meter values have been combined.
NOTE: #/m² values do not always equal the subtotals and totals shown due to rounding errors generated from the conversion of #/100m² to #/m².

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Table D8-8. Number of Species Sampled and Number of Species Sampled with Greater Than 2% Relative Vegetation Cover, on the Cover Transects, within the Brook Mine Study Area

Life Form	Agricultural Land		Big Sagebrush Shrubland		Bottomland Sagebrush Grassland		Pine and Juniper Woodland	
	Total # of Species Sampled	# of Species ≥ 2%	Total # of Species Sampled	# of Species ≥ 2%	Total # of Species Sampled	# of Species ≥ 2%	Total # of Species Sampled	# of Species ≥ 2%
Native Annual Grasses	--	--	1	--	--	--	--	--
Introduced Annual Grasses*	3	--	2	2	2	2	2	2
Native Cool Season Perennial Grasses[1]	11	3	5	5	10	3	5	3
Native Warm Season Perennial Grasses	2	--	2	--	3	--	1	--
Introduced Perennial Grasses	5	3	2	--	5	2	--	--
Native Grasslike Species	1	--	1	--	4	2	1	--
Native Annual Forbs	3	--	1	--	3	--	1	--
Introduced Annual Forbs*	3	--	2	1	6	1	3	--
Native Perennial Forbs[2]	5	--	13	1	14	--	6	1
Introduced Biennial/Perennial Forbs*	7	1	1	--	8	1	2	--
Native Half- and Sub-Shrubs	1	--	3	--	2	--	2	--
Native Full Shrubs[3]	2	--	4	1	4	--	4	--
Native Succulents	--	--	1	--	--	--	--	--
Native Trees	--	--	--	--	--	--	2	2
Introduced Trees	--	--	--	--	--	--	--	--
Total	**43**	**7**	**38**	**10**	**61**	**11**	**29**	**8**

[1] Native Cool Season Perennial Grasses and Unknown Grasses have been combined.
[2] Native Perennial Forbs and Unknown Forbs have been combined.
[3] Does not include *Symphoricarpos* spp. when *Symphoricarpos albus* and *Symphoricarpos occidentalis* are both present.
* Includes Species Lacking Creditable Value.

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Table D8-8. Number of Species Sampled and Number of Species Sampled with Greater Than 2% Relative Vegetation Cover, on the Cover Transects, within the Brook Mine Study Area (Cont.)

Life Form	Prairie Dog Modified Grassland		Reclaimed Grassland		Riparian Woodland		Rough Breaks Mixed Shrubland	
	Total # of Species Sampled	# of Species ≥ 2%	Total # of Species Sampled	# of Species ≥ 2%	Total # of Species Sampled	# of Species ≥ 2%	Total # of Species Sampled	# of Species ≥ 2%
Native Annual Grasses	1	--	--	--	--	--	--	--
Introduced Annual Grasses*	2	2	2	2	2	1	2	1
Native Cool Season Perennial Grasses[1]	5	1	5	3	8	3	8	4
Native Warm Season Perennial Grasses	3	1	--	--	2	1	3	--
Introduced Perennial Grasses	2	1	2	2	5	3	3	--
Native Grasslike Species	--	--	1	--	4	1	1	--
Native Annual Forbs	5	1	1	--	2	--	3	--
Introduced Annual Forbs*	9	1	4	1	5	--	2	--
Native Perennial Forbs[2]	20	1	3	--	13	2	20	2
Introduced Biennial/Perennial Forbs*	2	1	5	2	10	1	3	--
Native Full Shrubs[3]	2	--	2	--	5	2	8	2
Native Half- and Sub-Shrubs	2	--	--	--	--	--	5	2
Native Succulents	1	--	--	--	--	--	--	--
Native Trees	--	--	--	--	4	2	1	--
Introduced Trees	--	--	--	--	1	--	--	--
Total	**54**	**9**	**25**	**10**	**61**	**16**	**59**	**11**

[1] Native Cool Season Perennial Grasses and Unknown Grasses have been combined.
[2] Native Perennial Forbs and Unknown Forbs have been combined.
[3] Does not include *Symphoricarpos* spp. when *Symphoricarpos albus* and *Symphoricarpos occidentalis* are both present.
* Includes Species Lacking Creditable Value.

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Table D8-8. Number of Species Sampled and Number of Species Sampled with Greater Than 2% Relative Vegetation Cover, on the Cover Transects, within the Brook Mine Study Area (Cont.)

Life Form	Scoria Grassland		Upland Grassland	
	Total # of Species Sampled	# of Species ≥ 2%	Total # of Species Sampled	# of Species ≥ 2%
Native Annual Grasses	2	--	3	--
Introduced Annual Grasses*	2	2	2	2
Native Cool Season Perennial Grasses[1]	7	4	7	4
Native Warm Season Perennial Grasses	2	--	3	--
Introduced Perennial Grasses	2	--	2	--
Native Grasslike Species	1	--	1	--
Native Annual Forbs	2	--	3	--
Introduced Annual Forbs*	6	--	4	1
Native Perennial Forbs[2]	19	--	18	--
Introduced Biennial/Perennial Forbs*	3	1	4	1
Native Half- and Sub-Shrubs	4	--	2	--
Native Full Shrubs[3]	3	2	6	--
Native Succulents	--	--	1	--
Native Trees	--	--	--	--
Introduced Trees	--	--	--	--
Total	**53**	**9**	**56**	**8**

[1] Native Cool Season Perennial Grasses and Unknown Grasses have been combined.
[2] Native Perennial Forbs and Unknown Forbs have been combined.
[3] Does not include *Symphoricarpos* spp. when *Symphoricarpos albus* and *Symphoricarpos occidentalis* are both present.
* Includes Species Lacking Creditable Value.

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Table D8-9. Summary of 2013 Sample Adequacy Calculations for the Brook Mine Study Area

Vegetation Community	Mean	Standard Deviation	Actual Sample #	Computed Adequate Sample Size	Computed Z-Value	Confidence Level Achieved
Agricultural Land						
Total Vegetation Cover	83.8	22.6	25	24	0.93	N/A
Total Ground Cover	97.5	5.0	25	1	4.86	N/A
Density	0.0	0.0	25	N/A	N/A	N/A
Big Sagebrush Shrubland						
Total Vegetation Cover	57.8	10.5	23	11	1.33	N/A
Total Ground Cover	88.3	7.3	23	2	2.89	N/A
Production	37.5	23.7	50	14	1.12	N/A
Density	1.2	64.5	50	92	0.67	74.9
Bottomland Sagebrush Grassland						
Total Vegetation Cover	72.8	13.4	25	11	1.36	N/A
Total Ground Cover	95.5	5.0	25	1	4.79	N/A
Production	120.0	85.2	25	165	0.35	63.7
Density	0.5	68.3	25	509	0.20	57.9
Pine and Juniper Woodland						
Total Vegetation Cover	43.6	18.5	15	59	0.46	67.7
Total Ground Cover	89.0	12.1	15	6	1.42	N/A
Density	0.6	62.2	15	385	0.18	57.1
Prairie Dog Modified Grassland						
Total Vegetation Cover	48.9	16.2	40	36	0.95	N/A
Total Ground Cover	72.5	20.0	40	25	1.15	N/A
Density	0.4	73.0	40	1,172	0.17	56.8

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Table D8-9. Summary of 2013 Sample Adequacy Calculations for the Brook Mine Study Area (Cont.)

Vegetation Community	Mean	Standard Deviation	Actual Sample #	Computed Adequate Sample Size	Computed Z-Value	Confidence Level Achieved
Reclaimed Grassland						
Total Vegetation Cover	63.6	9.1	10	7	1.11	N/A
Total Ground Cover	90.4	10.8	10	5	1.33	N/A
Density	<0.1	10.8	10	1,662	0.07	52.8
Riparian Woodland						
Total Vegetation Cover	82.0	14.8	25	11	1.38	N/A
Total Ground Cover	97.9	3.5	25	0	6.93	N/A
Production	143.3	78.1	48	109	0.60	72.6
Density	1.8	179.3	46	324	0.34	63.3
Rough Breaks Mixed Shrubland						
Total Vegetation Cover	41.8	12.0	30	27	0.95	N/A
Total Ground Cover	69.7	17.4	30	21	1.09	N/A
Production	37.7	24.0	50	14	1.13	N/A
Density	1.6	83.1	49	89	0.67	74.9
Scoria Grassland						
Total Vegetation Cover	58.1	9.3	28	8	1.65	N/A
Total Ground Cover	89.2	7.1	28	2	3.33	N/A
Production	60.8	33.8	50	101	0.64	73.9
Density	0.5	42.0	50	277	0.38	64.8
Upland Grassland						
Total Vegetation Cover	58.0	12.7	28	16	1.21	N/A
Total Ground Cover	90.7	9.2	28	3	2.62	N/A
Production	65.4	27.9	50	69	0.77	77.9
Density	0.3	36.7	52	362	0.34	63.3

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Table D8-10. Threatened and Endangered Plant Species Surveyed for and Potential Occurrence within the Brook Mine Study Area

Common Name	Scientific Name	Status	Habitat	Potential Occurrence within the Proposed Brook Mine Permit Area
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened	Seasonally moist soils and wet meadows of drainages below 7,000ft. in elevation	Habitat Confirmed Unsuitable
Blowout penstemon	*Penstemon haydenii*	Endangered	Sand blowouts or dunes	Habitat Confirmed Unsuitable

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ATTACHMENT D8-1-B

Comprehensive Plant Species List

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DEQ 8-079

Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Native Annual Grasses												
CENLON	*Cenchrus longispinus*	Mat sandbur										X
ECHMUR	*Echinochloa muricata*	Rough barnyardgrass		X							X	X
VULOCT	*Vulpia octoflora*	Sixweeks fescue		X			X				X	X
Introduced Annual Grasses												
BROJAP*	*Bromus japonicus*	Japanese brome	X	X	X	X	X	X	X	X	X	X
BROTEC*	*Bromus tectorum*	Cheatgrass	X	X	X	X	X	X	X	X	X	X
POLMON	*Polypogon monspeliensis*	Annual rabbitfoot grass										
TRIAES	*Triticum aestivum*	Common wheat	X									
Native Cool Season Perennial Grasses												
ACHHYM	*Achnatherum hymenoides*	Indian ricegrass		X	X					X		
ELYCIN	*Elymus cinereus*	Basin wildrye							X			
ELYELY	*Elymus elymoides*	Bottlebrush squirreltail			X							
ELYHIS	*Elymus hispidus*	Intermediate wheatgrass										
ELYLAN	*Elymus lanceolatus*	Thickspike wheatgrass	X		X			X	X	X	X	X
ELYSMI	*Elymus smithii*	Western wheatgrass	X	X	X	X	X	X	X	X	X	X
ELYSPI	*Elymus spicatus*	Bluebunch wheatgrass	X	X	X	X	X			X	X	X
ELYTRA	*Elymus trachycaulus*	Slender wheatgrass	X		X			X	X			X
FESIDA	*Festuca idahoensis*	Idaho fescue		X							X	
GLYGRA	*Glyceria grandis*	American mannagrass	X									
HESCOM	*Hesperostipa comata*	Needleandthread	X	X	X	X	X			X	X	X
HORJUB	*Hordeum jubatum*	Foxtail barley	X		X				X			
KOEMAC	*Koeleria macrantha*	Prairie junegrass								X	X	
NASVIR	*Nassella viridula*	Green needlegrass	X	X	X	X	X	X	X	X	X	X
PHAARU	*Phalaris arundinacea*	Reed canarygrass	X		X							
POASEC	*Poa secunda*	Sandberg bluegrass	X	X	X	X	X	X	X	X	X	X
Native Warm Season Perennial Grasses												
ARIPUR	*Aristida purpurea*	Purple threeawn		X			X			X	X	X
BOUGRA	*Bouteloua gracilis*	Blue grama	X	X	X	X	X		X	X	X	X
BUCDAC	*Buchloe dactyloides*	Buffalograss			X						X	
DISSTR	*Distichlis stricta*	Inland saltgrass										X
SCHSCO	*Schizachyrium scoparium*	Little bluestem								X		
SPAPEC	*Spartina pectinata*	Prairie cordgrass	X		X				X			
SPOAIR	*Sporobolus airoides*	Alkali sacaton										
SPOCRY	*Sporobolus cryptandrus*	Sand dropseed					X					X
X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.											
	Species observed, but not sampled.											

*** Species Lacking Credible Value (SLCV)**
NOTE: For species diversity calculations: (1) unknown plant species shown in this table were counted toward the total number of species observed or sampled, but were not counted toward the total number of life forms observed or sampled and (2) species lacking credible value (SLCV) were not counted toward the total number of species or the total number of life forms observed or sampled.

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Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Introduced Perennial Grasses												
AGRCRI	*Agropyron cristatum*	Crested wheatgrass	X	X	X		X	X	X	X		X
AGRCAP	*Agrostis capillaris*	Colonial bentgrass							X			
BROINE	*Bromus inermis*	Smooth brome	X	X	X		X	X	X	X	X	X
DACGLO	*Dactylis glomerata*	Orchardgrass	X						X			
ELYJUN	*Elymus junceus*	Russian wildrye			X							
FESOVI	*Festuca ovina*	Sheep fescue		X							X	X
PHLPRA	*Phleum pratense*	Timothy	X		X				X			
POABUL	*Poa bulbosa*	Bulbous bluegrass		X	X					X		X
POAPRA	*Poa pratensis*	Kentucky bluegrass	X		X				X			
Perennial Grass Species Unknown Origin												
FESSPP	*Festuca* spp.	Fescue	X						X			
Native Grasslike Species												
CARFIL	*Carex filifolia*	Threadleaf sedge		X		X		X	X	X	X	X
CARNEB	*Carex nebrascensis*	Nebraska sedge	X		X				X			
CARPRA	*Carex praegracilis*	Clustered field sedge			X							
CARPRA	*Carex prairea*	Prairie sedge										
CARSPP	*Carex* spp.	Sedge			X							
JUNBAL	*Juncus balticus*	Baltic rush			X				X			
JUNINT	*Juncus interior*	Inland rush										
SCHACU	*Schoenoplectus acutus*	Hardstem clubrush										
SCHMAR	*Schoenoplectus maritimus*	Cosmopolitan bulrush										
SCHPUN	*Schoenoplectus pungens*	Common threesquare			X				X			
SCHTAB	*Schoenoplectus tabernaemontani*	Softstem bulrush										
SCIPAL	*Scirpus pallidus*	Greenscale bulrush										
Native Annual Forbs												
ATRSUC	*Atriplex suckleyi*	Suckley's endolepis								X		
CHAGLY	*Chamaesyce glyptosperma*	Ribseed sandmat					X					
CHEBER	*Chenopodium berlandieri*	Pitseed goosefoot	X		X				X	X		
CHELEP	*Chenopodium leptophyllum*	Narrowleaf goosefoot										
CLESER	*Cleome serrulata*	Rocky mountain beeplant										
DESPIN	*Descurainia pinnata*	Western tansymustard	X						X	X	X	X
ERISTR	*Erigeron strigosus*	Rough fleabane										X
GALAPA	*Galium aparine*	Stickywilly							X			
LOGARV	*Logfia arvensis*	Field cottonrose		X			X			X	X	X

X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.
	Species observed, but not sampled.

*** Species Lacking Credible Value (SLCV)**

NOTE: For species diversity calculations: (1) unknown plant species shown in this table were counted toward the total number of species observed or sampled, but were not counted toward the total number of life forms observed or sampled and (2) species lacking credible value (SLCV) were not counted toward the total number of species or the total number of life forms observed or sampled.

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Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Native Annual Forbs (Cont.)												
HELANN	*Helianthus annuus*	Annual sunflower							X		X	
LAPRED	*Lappula redowskii*	Bluebur stickseed		X	X		X				X	X
PLAPAT	*Plantago patagonica*	Pursh's plantain	X	X	X	X	X	X		X		X
SOLTRI	*Solanum triflorum*	Cutleaf nightshade					X					
XANSTR*	*Xanthium strumarium*	Common cocklebur									X	
Introduced Annual Forbs												
ALYDES	*Alyssum desertorum*	Desert alyssum	X	X	X	X	X	X	X	X	X	X
AMAALB	*Amaranthus albus*	Prostrate pigweed					X					
ATRHET	*Atriplex heterosperma*	Twoscale saltbush							X			
BASSIE*	*Bassia sieversiana*	Summercypress	X		X		X		X			X
BRAJUN	*Brassica juncea*	Brown mustard					X					
CAMMIC	*Camelina microcarpa*	Littleseed falseflax		X	X	X		X	X		X	X
CHEALB	*Chenopodium album*	Common lambsquarter								X		
DESSOP	*Descurainia sophia*	Flixweed		X	X				X		X	
HALGLO*	*Halogeton glomeratus*	Halogeton						X				
LEPCAM	*Lepidium campestre*	Field pepperweed										
LEPPER	*Lepidium perfoliatum*	Shieldcress			X				X		X	
LOGARV	*Logfia arvensis*	Fluffweed		X								
MEDLUP	*Medicago lupulina*	Black medic		X			X	X	X	X	X	
POLARG	*Polygonum argyrocoleon*	Silversheath knotweed					X					
POLAVI	*Polygonum aviculare*	Prostrate knotweed					X					
POLCON	*Polygonum convolvulus*	Black bindweed	X				X		X			
SALTRA*	*Salsola tragus*	Russian thistle										
SISALT	*Sisymbrium altissimum*	Tumble mustard			X		X				X	X
THLARV	*Thlaspi arvense*	Field pennycress		X	X	X			X	X		X
Native Biennial Forbs												
LACLUD	*Lactuca ludoviciana*	Wild lettuce										
Introduced Biennial Forbs												
CIRVUL	*Cirsium vulgare*	Bull thistle										
CYNOFF*	*Cynoglossum officinale*	Western houndstongue							X			
LACSER	*Lactuca serriola*	Prickly lettuce			X				X	X		
MELOFF	*Melilotus officinalis*	Yellow sweetclover	X	X	X		X	X	X	X	X	X
TRADUB	*Tragopogon dubius*	Western salsify	X	X	X	X		X	X	X	X	X

X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.
	Species observed, but not sampled.

*** Species Lacking Credible Value (SLCV)**

NOTE: For species diversity calculations: (1) unknown plant species shown in this table were counted toward the total number of species observed or sampled, but were not counted toward the total number of life forms observed or sampled and (2) species lacking credible value (SLCV) were not counted toward the total number of species or the total number of life forms observed or sampled.

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Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Native Perennial Forbs												
ACHMIL	*Achillea millefolium*	Western yarrow	X	X	X	X	X		X	X	X	X
AGOAUR	*Agoseris aurantiaca*	Orange agoseris							X			
AGOGLA	*Agoseris glauca*	Pale agoseris								X		X
ALLTEX	*Allium textile*	Textile onion		X						X		
AMBPSI	*Ambrosia psilostachya*	Western ragweed			X		X				X	X
AMBTOM*	*Ambrosia tomentosa*	Skeletonleaf bur ragweed			X						X	X
ANTMIC	*Antennaria microphylla*	Littleleaf pussytoes		X			X			X		X
APOCAN	*Apocynum cannabinum*	Indianhemp							X			
ASCSPE*	*Asclepias speciosa*	Showy milkweed			X				X			
ASTSP1	*Asteraceae* spp.	Asteraceae							X			
ASTADS	*Astragalus adsurgens*	Prairie milkvetch										
ASTBAR	*Astragalus barrii*	Barr's milkvetch										
ASTBIS	*Astragalus bisulcatus*	Twogrooved milkvetch										
ASTMIS	*Astragalus miser*	Weedy milkvetch										
ASTSPA	*Astragalus spatulatus*	Spoonleaf milkvetch										X
BALSAG	*Balsamorhiza sagittata*	Arrowleaf balsamroot										
BRIEUP	*Brickellia eupatorioides*	Thoroughwort		X					X		X	
CALNUT	*Calochortus nuttallii*	Sego lily		X						X		
CIRFLO	*Cirsium flodmanii*	Flodman thistle										X
CIRUND	*Cirsium undulatum*	Wavyleaf thistle										
COMUMB	*Comandra umbellata*	Bastard toadflax		X				X	X	X	X	
DALCAN	*Dalea candida*	White prarie clover								X		
DALPUR	*Dalea purpurea*	Purple prarie clover		X		X	X			X	X	X
DODPUL	*Dodecatheon pulchellum*	Darkthroat shootingstar										
ECHANG	*Echinacea angustifolia*	Purple coneflower			X							
EQULAE	*Equisetum laevigatum*	Smooth horsetail			X				X			
ERIFLA	*Eriogonum flavum*	Alpine golden buckwheat										
ERIOVA	*Eriogonum ovalifolium*	Cushion wild buckwheat		X								
ERIPAU	*Eriogonum pauciflorum*	Fewflower buckwheat		X						X	X	
EVONUT	*Evolvulus nuttallianus*	Shaggy dwarf morning-glory		X			X		X	X	X	X
GALBOR	*Galium boreale*	Northern bedstraw							X		X	
GAUCOC	*Gaura coccinea*	Scarlet gaura		X			X			X	X	X
GLYLEP*	*Glycyrrhiza lepidota*	Wild licorice			X				X	X	X	
GRISQU	*Grindelia squarrosa*	Curlycup gumweed					X	X	X	X		X

X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.
	Species observed, but not sampled.

*** Species Lacking Credible Value (SLCV)**

NOTE: For species diversity calculations: (1) unknown plant species shown in this table were counted toward the total number of species observed or sampled, but were not counted toward the total number of life forms observed or sampled and (2) species lacking credible value (SLCV) were not counted toward the total number of species or the total number of life forms observed or sampled.

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Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Native Perennial Forbs (Cont.)												
HETVIL	*Heterotheca villosa*	Hairy golden aster		X			X			X	X	
HYMRIC	*Hymenoxys richardsonii*	Pingue rubberweed										
LACOBL	*Lactuca oblongifolia*	Blue lettuce							X		X	X
LEPFRE	*Lepidium fremontii*	Desert pepperweed							X			
LEUMON	*Leucocrinum montanum*	Sand lily										
LIAPUN	*Liatris punctata*	Dotted blazing star										
LINLEW	*Linum lewisii*	Blue flax					X		X			
LOMFOE	*Lomatium foeniculaceum*	Desert biscuitroot									X	
LYGJUN	*Lygodesmia juncea*	Rush skeletonplant		X	X		X				X	X
MACGRI	*Machaeranthera grindelioides*	Nutall's goldenweed								X		
MACTAN	*Machaeranthera tanacetifolia*	Tansyleaf tansy aster								X		
MERCIL	*Mertensia ciliata*	Mountain bluebells		X								
MUSDIV	*Musineon divaricatum*	Leafy wildparsley								X	X	X
OXYCAM	*Oxytropis campestris*	Field locoweed										
OXYLAM	*Oxytropis lambertii*	Lambert crazyweed								X		
OXYSER	*Oxytropis sericea*	White locoweed								X	X	
PACCAN	*Packera cana*	Woolly groundsel								X		
PEDARG	*Pediomelum argophyllum*	Silverleaf Indian breadroot		X			X			X	X	X
PEDESC	*Pediomelum esculentum*	Large Indian breadroot		X						X	X	X
PENALB	*Penstemon albidus*	White beardtongue										
PHLHOO	*Phlox hoodii*	Hoods phlox	X	X		X	X			X	X	X
PSOLAN	*Psoralidium lanceolatum*	Narrowleaf scurfpea								X		
PSOTEN	*Psoralidium tenuiflorum*	Slimflower scurfpea	X	X	X	X	X			X	X	X
RATCOL	*Ratibida columnifera*	Prairie coneflower								X	X	
SOLMIS	*Solidago missouriensis*	Missouri goldenrod										
SPHCOC	*Sphaeralcea coccinea*	Scarlet globemallow		X	X	X	X		X	X	X	X
STEARM	*Stenotus armerioides*	Thrifty goldenweed								X		
SYMFAL	*Symphyotrichum falcatum*	White prairie aster	X	X			X		X	X	X	X
THERHO	*Thermopsis rhombifolia*	Golden banner		X						X	X	X
TYPLAT	*Typha latifolia*	Common cattail							X			
VICAME	*Vicia americana*	American vetch	X	X	X	X	X	X	X	X	X	X
VIONUT	*Viola nuttallii*	Nuttall's violet										
WYEAMP	*Wyethia amplexicaulis*	Mulesears wyethia							X			
ZIGVEN	*Zigadenus venenosus*	Death camas										X
X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.											
	Species observed, but not sampled.											

*** Species Lacking Credible Value (SLCV)**
NOTE: For species diversity calculations: (1) unknown plant species shown in this table were counted toward the total number of species observed or sampled, but were not counted toward the total number of life forms observed or sampled and (2) species lacking credible value (SLCV) were not counted toward the total number of species or the total number of life forms observed or sampled.

TFN 6 2/025
RECD NOV 14, 2014

Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Introduced Perennial Forbs												
ASTCIC	*Astragalus cicer*	Cicer milkvetch								X	X	
CARDRA*	*Cardaria draba*	Whitetop							X			
CERARV	*Cerastium arvense*	Field chickweed				X						
CIRARV*	*Cirsium arvense*	Canada thistle	X		X				X	X		X
CONARV*	*Convolvulus arvensis*	Field bindweed	X		X		X	X	X	X	X	X
LEPLAT*	*Lepidium latifolium*	Perennial pepperweed										
MEDSAT	*Medicago sativa*	Alfalfa	X		X			X	X		X	
POTREC	*Potentilla recta*	Sulphur cinquefoil										
RUMCRI*	*Rumex crispus*	Curly dock	X		X				X			
TANVUL*	*Tanacetum vulgare*	Common tansy										
TAROFF	*Taraxacum officinale*	Common dandelion	X	X	X			X	X	X	X	X
TRIPRA	*Trifolium pratense*	Red clover	X									
TRIREP	*Trifolium repens*	White clover							X			
Unknown Forb Species												
ARESPP	*Arenaria* spp.	Sandwort										
ASTSPP	*Astragalus* spp.	Milkvetch			X		X		X		X	X
CASSPP	*Castilleja* spp.	Indian paintbrush										
CHESPP	*Chenopodium* spp.	Goosefoot							X			
CIRSPP	*Cirsium* spp.	Thistle					X			X		X
CRYSPP	*Cryptantha* spp.	Cryptantha									X	
DELSPP	*Delphinium* spp.	Larkspur										
ERISPP	*Eriogonum* spp.	Buckwheat								X	X	X
GEUSPP	*Geum* spp.	Avens										
LACSPP	*Lactuca* spp.	Lettuce										
LAPSPP	*Lappula* spp.	Stickseed										X
OXYSPP	*Oxytropis* spp.	Locoweed										
PENSPP	*Penstemon* spp.	Penstemon					X			X		X
PHYSPP	*Physaria* spp.	Twinpod										
POLSPP	*Polygonum* spp.	Knotweed			X					X		X
PSOSPP	*Psoralidium* spp.	Scurfpea										
RUMSPP	*Rumex* spp.	Dock			X		X					
SONSPP	*Sonchus* spp.	Sowthistle			X				X			
TRISPP	*Trifolium* spp.	Clover			X							
VIOSPP	*Viola* spp.	Violet										
X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.											
	Species observed, but not sampled.											

*** Species Lacking Credible Value (SLCV)**
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TFN 6 2/025
RECD NOV 14, 2014

Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Native Full Shrubs												
ARTCAN	*Artemisia cana*	Silver sagebrush		X	X		X	X	X	X	X	X
ARTTRI	*Artemisia tridentata*	Big sagebrush	X	X		X	X	X	X	X	X	X
ATRCAN	*Atriplex canescens*	Four-wing saltbush						X	X	X		
CHRVIS	*Chrysothamnus viscidiflorus*	Yellow rabbitbrush	X	X		X	X			X	X	X
ERINAU	*Ericameria nauseosa*	Rubber rabbitbrush		X		X	X	X	X	X	X	X
PRUVIR	*Prunus virginiana*	Chokecherry									X	
RHUARO	*Rhus aromatica*	Skunkbush sumac		X	X	X	X		X	X	X	X
RIBCER	*Ribes cereum*	Wax currant		X		X			X	X		X
RIBLAC	*Ribes lacustre*	Prickly currant										
ROSWOO	*Rosa woodsii*	Woods rose			X	X			X	X	X	X
SARVER	*Sarcobatus vermiculatus*	Greasewood								X		X
SHECAN	*Shepherdia canadensis*	Russet buffaloberry							X			
SYMALB	*Symphoricarpos albus*	Common snowberry		X	X		X		X	X	X	X
SYMOCC	*Symphoricarpos occidentalis*	Western snowberry			X				X	X	X	
SYMSPP	*Symphoricarpos spp.*	Snowberry			X				X			X
Native Half- and Sub-Shrubs												
ARTFRI	*Artemisia frigida*	Fringed sagewort	X	X	X	X	X	X	X	X	X	X
ARTLUD	*Artemisia ludoviciana*	White sagebrush			X	X	X		X	X	X	
ARTPED	*Artemisia pedatifida*	Birdfoot sagebrush								X		X
ATRGAR	*Atriplex gardneri*	Gardner saltbush								X		
GUTSAR	*Gutierrezia sarothrae*	Broom snakeweed		X		X	X		X	X	X	X
JUNHOR	*Juniperus horizontalis*	Creeping juniper								X		
KRALAN	*Krascheninnikovia lanata*	Winterfat									X	X
LINPUN	*Linanthus pungens*	Granite pricklygila								X	X	
YUCGLA	*Yucca glauca*	Yucca		X						X	X	X
Native Trees												
ACENEG	*Acer negundo*	Boxelder										
FRAPEN	*Fraxinus pennsylvanica*	Green ash							X			
JUNMON	*Juniperus monosperma*	One seeded juniper										
JUNSCO	*Juniperus scopulorum*	Rocky Mountain juniper				X				X	X	
PINPON	*Pinus ponderosa*	Ponderosa pine				X						
POPDEL	*Populus deltoides*	Eastern cottonwood							X			
X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.											
	Species observed, but not sampled.											

*** Species Lacking Credible Value (SLCV)**
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Acronym	Current Nomenclature	Common Name	Agricultural Land	Big Sagebrush Shrubland	Bottomland Sagebrush Grassland	Pine and Juniper Woodland	Prairie Dog Modified Grassland	Reclaimed Grassland	Riparian Woodland	Rough Breaks Mixed Shrubland	Scoria Grassland	Upland Grassland
Native Trees (Cont.)												
SALAMY	*Salix amygdaliodes*	Peachleaf willow							X			
SALEXI	*Salix exigua*	Narrowleaf willow										
SORSCO	*Sorbus scopulina*	Greene's mountain ash							X			
Introduced Trees												
ELAANG*	*Elaeagnus angustifolia*	Russian olive							X			
Native Succulents												
OPUPOL*	*Opuntia polyacantha*	Plains pricklypear		X			X					X
X	Species sampled on cover transects, shrub density belt transects, and/or in production plots.											
	Species observed, but not sampled.											

*** Species Lacking Credible Value (SLCV)**
NOTE: For species diversity calculations: (1) unknown plant species shown in this table were counted toward the total number of species observed or sampled, but were not counted toward the total number of life forms observed or sampled and (2) species lacking credible value (SLCV) were not counted toward the total number of species or the total number of life forms observed or sampled

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ATTACHMENT D8-1-C

Cover Summaries

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	AG	**Sample Size:**	1
Community Type:	Agricultural Land	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Grasses							
Bromus japonicus	1.0	1.2	2.6	16.0	2.5	3.8	12
Bromus tectorum	0.2	0.2	0.9	8.0	1.3	1.5	21
Triticum aestivum	0.1	0.1	0.4	4.0	0.6	0.7	25
Sub-Total	**1.3**	**1.6**	**2.6**				
Native Cool Season Perennial Grasses							
Elymus lanceolatus	0.7	0.8	3.2	8.0	1.3	2.1	18
Elymus smithii	4.2	5.0	5.5	44.0	7.0	12.0	5
Elymus spicatus	0.2	0.2	0.7	12.0	1.9	2.1	18
Elymus trachycaulus	15.6	18.6	17.6	64.0	10.2	28.8	2
Glyceria grandis	0.2	0.2	1.2	4.0	0.6	0.8	24
Hesperostipa comata	0.2	0.2	0.6	8.0	1.3	1.5	21
Hordeum jubatum	0.6	0.7	2.8	4.0	0.6	1.3	22
Nassella viridula	0.1	0.1	0.4	4.0	0.6	0.7	25
Phalaris arundinacea	0.1	0.1	0.4	4.0	0.6	0.7	25
Poa secunda	1.4	1.7	4.2	16.0	2.5	4.2	10
Sub-Total	**23.3**	**27.8**	**19.5**				
Native Warm Season Perennial Grasses							
Bouteloua gracilis	0.2	0.2	0.9	8.0	1.3	1.5	21
Spartina pectinata	0.1	0.1	0.4	4.0	0.6	0.7	25
Sub-Total	**0.3**	**0.4**	**0.9**				
Introduced Perennial Grasses							
Agropyron cristatum	8.1	9.7	13.5	40.0	6.4	16.1	4
Bromus inermis	9.4	11.2	15.4	52.0	8.3	19.5	3
Dactylis glomerata	2.0	2.4	4.0	28.0	4.5	6.9	6
Phleum pratense	0.6	0.7	2.0	12.0	1.9	2.6	17
Poa pratensis	1.4	1.7	4.6	20.0	3.2	4.9	8
Sub-Total	**21.5**	**25.7**	**21.8**				
Unknown Grass Species							
Festuca spp.	2.3	2.7	7.2	20.0	3.2	5.9	7
Sub-Total	**2.3**	**2.7**	**7.2**				
Native Grasslike Species							
Carex nebrascensis	0.5	0.6	2.4	4.0	0.6	1.2	23
Sub-Total	**0.5**	**0.6**	**2.4**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	AG	**Sample Size:**	1
Community Type:	Agricultural Land	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Annual Forbs							
Chenopodium berlandieri	0.1	0.1	0.4	4.0	0.6	0.7	25
Descurainia pinnata	0.1	0.1	0.4	4.0	0.6	0.7	25
Plantago patagonica	0.1	0.1	0.4	4.0	0.6	0.7	25
Sub-Total	**0.3**	**0.4**	**0.7**				
Introduced Annual Forbs							
Alyssum desertorum	0.3	0.4	0.7	16.0	2.5	2.9	16
Bassia sieversiana	0.9	1.1	4.4	4.0	0.6	1.7	20
Polygonum convolvulus	0.2	0.2	1.2	4.0	0.6	0.8	24
Sub-Total	**1.4**	**1.7**	**5.6**				
Introduced Biennial Forbs							
Melilotus officinalis	0.2	0.2	0.6	8.0	1.3	1.5	21
Tragopogon dubius	0.4	0.5	1.0	16.0	2.5	3.0	15
Sub-Total	**0.6**	**0.7**	**1.4**				
Native Perennial Forbs							
Achillea millefolium	0.1	0.1	0.4	4.0	0.6	0.7	25
Phlox hoodii	0.2	0.2	0.8	4.0	0.6	0.8	24
Psoralidium tenuiflorum	0.1	0.1	0.4	4.0	0.6	0.7	25
Symphyotrichum falcatum	0.2	0.2	0.9	8.0	1.3	1.5	21
Vicia americana	0.1	0.1	0.4	4.0	0.6	0.7	25
Sub-Total	**0.7**	**0.8**	**1.5**				
Introduced Perennial Forbs							
Convolvulus arvensis	1.0	1.2	3.0	20.0	3.2	4.4	9
Medicago sativa	27.4	32.7	30.8	72.0	11.5	44.2	1
Rumex crispus	0.1	0.1	0.4	4.0	0.6	0.7	25
Taraxacum officinale	0.6	0.7	1.2	20.0	3.2	3.9	11
Trifolium pratense	0.6	0.7	2.8	8.0	1.3	2.0	19
Sub-Total	**29.7**	**35.4**	**30.2**				
Native Full Shrubs							
Artemisia tridentata	1.0	1.2	3.4	12.0	1.9	3.1	14
Chrysothamnus viscidiflorus	0.2	0.2	0.6	8.0	1.3	1.5	21
Sub-Total	**1.2**	**1.4**	**3.9**				
Native Half &Sub-Shrubs							
Artemisia frigida	0.7	0.8	2.2	16.0	2.5	3.3	13
Sub-Total	**0.7**	**0.8**	**2.2**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	AG	**Sample Size:**	1
Community Type:	Agricultural Land	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	26
Lichen	0.0	0.0	0.0	0.0	0.0	0.0	26
Algae	0.0	0.0	0.0	0.0	0.0	0.0	26
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	26
Sub-Total	**0.0**	**0.0**	**0.0**				

Totals		Std. Dev.
Total Vegetation	83.8	22.6
Total Vegetation w/Cryptograms	83.8	22.6
Total Vegetation excluding SLCV	80.3	23.4
Litter	13.0	20.8
Rock	0.7	2.1
Total Ground Cover	97.5	5.0
Total Ground Cover excluding SLCV	94.0	8.1
Bare Soil	2.5	5.0

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	BSS	**Sample Size:**	1
Community Type:	Big Sagebrush Shrubland	**Number of Samples:**	23
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Annual Grasses							
Echinochloa muricata	0.9	1.6	0.4	4.3	0.5	2.1	18
Sub-Total	**0.9**	**1.6**	**0.4**				
Introduced Annual Grasses							
Bromus japonicus	3.2	5.5	4.3	47.8	5.7	11.2	6
Bromus tectorum	1.7	2.9	3.3	34.8	4.2	7.1	8
Sub-Total	**4.9**	**8.5**	**5.5**				
Native Cool Season Perennial Grasses							
Elymus smithii	3.7	6.4	5.7	52.2	6.3	12.7	5
Elymus spicatus	3.5	6.1	3.8	60.9	7.3	13.4	4
Hesperostipa comata	3.7	6.4	3.7	60.9	7.3	13.7	3
Nassella viridula	1.5	2.6	3.5	21.7	2.6	5.2	12
Poa secunda	1.3	2.2	2.2	34.8	4.2	6.4	10
Sub-Total	**13.7**	**23.7**	**5.6**				
Native Warm Season Perennial Grasses							
Aristida purpurea	0.2	0.3	0.8	4.3	0.5	0.8	23
Bouteloua gracilis	1.0	1.7	1.8	30.4	3.6	5.3	11
Sub-Total	**1.2**	**2.1**	**1.9**				
Introduced Perennial Grasses							
Agropyron cristatum	0.3	0.5	1.0	13.0	1.6	2.1	18
Festuca ovina	0.5	0.9	1.8	8.7	1.0	1.9	20
Sub-Total	**0.8**	**1.4**	**2.0**				
Native Grasslike Species							
Carex filifolia	0.3	0.5	1.2	8.7	1.0	1.5	21
Sub-Total	**0.3**	**0.5**	**1.2**				
Native Annual Forbs							
Plantago patagonica	0.1	0.2	0.4	4.3	0.5	0.7	24
Sub-Total	**0.1**	**0.2**	**0.4**				
Introduced Annual Forbs							
Alyssum desertorum	2.9	5.0	2.5	78.3	9.4	14.4	2
Medicago lupulina	0.1	0.2	0.4	4.3	0.5	0.7	24
Sub-Total	**3.0**	**5.2**	**2.8**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	BSS	**Sample Size:**	1
Community Type:	Big Sagebrush Shrubland	**Number of Samples:**	23
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Biennial Forbs							
Tragopogon dubius	0.1	0.2	0.4	4.3	0.5	0.7	29
Sub-Total	**0.1**	**0.2**	**0.4**				
Native Perennial Forbs							
Achillea millefolium	0.2	0.3	0.6	8.7	1.0	1.3	22
Allium textile	0.1	0.2	0.4	4.3	0.5	0.7	24
Comandra umbellata	0.7	1.2	2.0	13.0	1.6	2.8	18
Dalea purpurea	0.4	0.7	1.0	17.4	2.1	2.8	16
Eriogonum ovalifolium	0.1	0.2	0.4	4.3	0.5	0.7	24
Eriogonum pauciflorum	0.1	0.2	0.4	4.3	0.5	0.7	24
Evolvulus nuttallianus	0.1	0.2	0.4	4.3	0.5	0.7	24
Gaura coccinea	0.1	0.2	0.4	4.3	0.5	0.7	24
Phlox hoodii	1.4	2.4	2.1	43.5	5.2	7.6	7
Pediomelum argophyllum	0.6	1.0	1.5	17.4	2.1	3.2	15
Psoralidium tenuiflorum	0.5	0.9	1.1	21.7	2.6	3.5	14
Symphyotrichum falcatum	0.1	0.2	0.4	4.3	0.5	0.7	24
Vicia americana	1.1	1.9	3.4	21.7	2.6	4.5	13
Sub-Total	**5.5**	**9.5**	**4.8**				
Native Full Shrubs							
Artemisia tridentata	24.4	42.2	10.2	100.0	12.0	54.2	1
Chrysothamnus viscidiflorus	0.3	0.5	0.9	8.7	1.0	1.5	21
Ericameria nauseosa	0.2	0.3	0.6	8.7	1.0	1.3	22
Rhus aromatica	0.6	1.0	2.5	8.7	1.0	2.0	19
Sub-Total	**25.5**	**44.1**	**10.8**				
Native Half &Sub-Shrubs							
Artemisia frigida	1.1	1.9	1.7	39.1	4.7	6.6	9
Gutierrezia sarothrae	0.4	0.7	1.3	13.0	1.6	2.3	17
Yucca glauca	0.1	0.2	0.4	4.3	0.5	0.7	24
Sub-Total	**1.6**	**2.8**	**2.0**				
Native Succulents							
Opuntia polyacantha	0.2	0.3	0.6	8.7	1.0	1.3	22
Sub-Total	**0.2**	**0.3**	**0.6**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	BSS	**Sample Size:**	1
Community Type:	Big Sagebrush Shrubland	**Number of Samples:**	23
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	25
Lichen	1.4	2.4	2.4	39.1	4.7	7.1	8
Algae	0.0	0.0	0.0	0.0	0.0	0.0	25
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	25
Sub-Total	**1.4**	**2.4**	**2.4**				

Totals		Std. Dev.
Total Vegetation	57.8	10.5
Total Vegetation w/Cryptograms	59.2	10.0
Total Vegetation excluding SLCV	52.0	9.9
Litter	21.9	8.2
Rock	7.2	6.9
Total Ground Cover	88.3	7.3
Total Ground Cover excluding SLCV	82.5	7.4
Bare Soil	11.7	7.3

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	BSG	**Sample Size:**	1
Community Type:	Bottomland Sagebrush Grassland	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Grasses							
Bromus japonicus	2.5	3.4	2.8	52.0	5.6	9.0	7
Bromus tectorum	3.5	4.8	5.5	44.0	4.8	9.6	6
Sub-Total	**6.0**	**8.2**	**6.6**				
Native Cool Season Perennial Grasses							
Elymus elymoides	0.2	0.3	0.8	4.0	0.4	0.7	30
Elymus lanceolatus	0.7	1.0	3.2	8.0	0.9	1.9	22
Elymus smithii	13.3	18.3	10.5	76.0	8.2	26.5	1
Elymus spicatus	0.2	0.3	0.8	4.0	0.4	0.7	30
Elymus trachycaulus	0.6	0.8	2.5	8.0	0.9	1.7	24
Hesperostipa comata	0.6	0.8	2.1	8.0	0.9	1.7	24
Hordeum jubatum	4.4	6.0	8.5	36.0	3.9	9.9	5
Nassella viridula	2.3	3.2	3.9	44.0	4.8	8.0	8
Phalaris arundinacea	0.2	0.3	1.2	4.0	0.4	0.7	30
Poa secunda	0.6	0.8	1.5	20.0	2.2	3.0	17
Sub-Total	**23.1**	**31.7**	**16.4**				
Native Warm Season Perennial Grasses							
Bouteloua gracilis	0.2	0.3	1.2	4.0	0.4	0.7	30
Buchloe dactyloides	0.2	0.3	1.2	4.0	0.4	0.7	30
Spartina pectinata	0.5	0.7	1.8	8.0	0.9	1.6	25
Sub-Total	**0.9**	**1.2**	**2.3**				
Introduced Perennial Grasses							
Agropyron cristatum	7.2	9.9	11.4	44.0	4.8	14.7	2
Bromus inermis	2.0	2.7	5.5	24.0	2.6	5.3	11
Elymus junceus	0.2	0.3	0.9	8.0	0.9	1.2	27
Phleum pratense	0.3	0.4	1.6	4.0	0.4	0.8	29
Poa pratensis	1.2	1.6	2.2	28.0	3.0	4.6	13
Sub-Total	**10.9**	**15.0**	**12.1**				
Native Grasslike Species							
Carex nebrascensis	6.8	9.3	14.7	24.0	2.6	11.9	3
Carex praegracilis	1.2	1.6	6.0	4.0	0.4	2.0	21
Juncus balticus	0.5	0.7	1.3	12.0	1.3	2.0	21
Schoenoplectus pungens	2.4	3.3	12.0	4.0	0.4	3.7	14
Sub-Total	**10.9**	**15.0**	**22.5**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	BSG	**Sample Size:**	1
Community Type:	Bottomland Sagebrush Grassland	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Annual Forbs							
Chenopodium berlandieri	0.1	0.1	0.4	4.0	0.4	0.5	31
Lappula redowskii	0.1	0.1	0.4	4.0	0.4	0.5	31
Plantago patagonica	0.2	0.3	1.2	4.0	0.4	0.7	30
Sub-Total	**0.4**	**0.5**	**1.3**				
Introduced Annual Forbs							
Alyssum desertorum	1.6	2.2	2.9	32.0	3.5	5.7	10
Bassia sieversiana	0.2	0.3	0.8	4.0	0.4	0.7	30
Camelina microcarpa	0.2	0.3	0.6	8.0	0.9	1.2	27
Descurainia sophia	0.2	0.3	0.6	8.0	0.9	1.2	27
Sisymbrium altissimum	0.2	0.3	0.6	8.0	0.9	1.2	27
Thlaspi arvense	0.3	0.4	0.9	12.0	1.3	1.7	24
Sub-Total	**2.7**	**3.7**	**3.1**				
Introduced Biennial Forbs							
Lactuca serriola	0.2	0.3	0.9	8.0	0.9	1.2	27
Melilotus officinalis	0.6	0.8	1.8	16.0	1.7	2.5	18
Tragopogon dubius	0.2	0.3	0.6	8.0	0.9	1.2	27
Sub-Total	**1.0**	**1.4**	**2.4**				
Native Perennial Forbs							
Achillea millefolium	0.8	1.1	1.6	24.0	2.6	3.7	14
Ambrosia psilostachya	0.3	0.4	0.9	12.0	1.3	1.7	24
Ambrosia tomentosa	0.7	1.0	2.5	12.0	1.3	2.3	19
Asclepias speciosa	0.2	0.3	0.8	4.0	0.4	0.7	30
Echinacea angustifolia	0.1	0.1	0.4	4.0	0.4	0.5	31
Equisetum laevigatum	0.4	0.5	1.6	8.0	0.9	1.4	26
Glycyrrhiza lepidota	0.6	0.8	2.8	4.0	0.4	1.2	27
Psoralidium tenuiflorum	0.1	0.1	0.4	4.0	0.4	0.5	31
Sphaeralcea coccinea	1.2	1.6	2.2	32.0	3.5	5.1	12
Vicia americana	0.1	0.1	0.4	4.0	0.4	0.5	31
Sub-Total	**4.5**	**6.2**	**5.1**				
Introduced Perennial Forbs							
Cirsium arvense	1.0	1.4	3.4	16.0	1.7	3.1	16
Convolvulus arvensis	3.8	5.2	5.9	48.0	5.2	10.4	4
Medicago sativa	0.2	0.3	0.8	4.0	0.4	0.7	30
Rumex crispus	0.3	0.4	0.7	16.0	1.7	2.1	20
Taraxacum officinale	1.4	1.9	5.6	16.0	1.7	3.6	15
Sub-Total	**6.7**	**9.2**	**8.9**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	BSG	**Sample Size:**	1
Community Type:	Bottomland Sagebrush Grassland	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Unknown Forb Species							
Astragalus spp.	0.1	0.1	0.4	4.0	0.4	0.5	31
Polygonum spp.	1.0	1.4	4.8	4.0	0.4	1.8	23
Rumex spp.	0.1	0.1	0.4	4.0	0.4	0.5	31
Sonchus spp.	0.4	0.5	2.0	4.0	0.4	0.9	28
Sub-Total	**1.6**	**2.2**	**5.3**				
Native Full Shrubs							
Artemisia cana	1.1	1.5	2.9	20.0	2.2	3.7	14
Rhus aromatica	0.2	0.3	0.8	4.0	0.4	0.7	30
Symphoricarpos albus	0.2	0.3	0.6	8.0	0.9	1.2	27
Symphoricarpos occidentalis	0.3	0.4	1.6	4.0	0.4	0.8	29
Symphoricarpos spp.	1.0	1.4	3.2	16.0	1.7	3.1	16
Sub-Total	**2.8**	**3.8**	**4.4**				
Native Half &Sub-Shrubs							
Artemisia frigida	0.2	0.3	0.7	12.0	1.3	1.6	25
Artemisia ludoviciana	1.1	1.5	1.5	44.0	4.8	6.3	9
Sub-Total	**1.3**	**1.8**	**1.8**				
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	32
Lichen	0.0	0.0	0.0	0.0	0.0	0.0	32
Algae	0.0	0.0	0.0	0.0	0.0	0.0	32
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	32
Sub-Total	**0.0**	**0.0**	**0.0**				

Totals		Std. Dev.
Total Vegetation	72.8	13.4
Total Vegetation w/Cryptograms	72.8	13.4
Total Vegetation excluding SLCV	60.7	17.9
Litter	22.1	13.2
Rock	0.6	1.4
Total Ground Cover	95.5	5.0
Total Ground Cover excluding SLCV	83.4	11.0
Bare Soil	4.5	5.0

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	PJW	**Sample Size:**	1
Community Type:	Pine and Juniper Woodland	**Number of Samples:**	15
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Grasses							
Bromus japonicus	1.2	2.8	2.6	33.3	5.0	7.8	9
Bromus tectorum	5.7	13.1	9.5	46.7	7.0	20.1	2
Sub-Total	**6.9**	**15.8**	**10.2**				
Native Cool Season Perennial Grasses							
Elymus smithii	3.3	7.6	5.8	46.7	7.0	14.6	4
Elymus spicatus	14.3	32.8	8.1	100.0	15.0	47.8	1
Hesperostipa comata	0.5	1.1	1.2	20.0	3.0	4.1	13
Nassella viridula	0.5	1.1	1.2	20.0	3.0	4.1	13
Poa secunda	1.6	3.7	2.8	33.3	5.0	8.7	8
Sub-Total	**20.2**	**46.3**	**8.6**				
Native Warm Season Perennial Grasses							
Bouteloua gracilis	0.3	0.7	0.7	13.3	2.0	2.7	17
Sub-Total	**0.3**	**0.7**	**0.7**				
Native Grasslike Species							
Carex filifolia	0.8	1.8	1.8	20.0	3.0	4.8	12
Sub-Total	**0.8**	**1.8**	**1.8**				
Native Annual Forbs							
Plantago patagonica	0.1	0.2	0.5	6.7	1.0	1.2	19
Sub-Total	**0.1**	**0.2**	**0.5**				
Introduced Annual Forbs							
Alyssum desertorum	0.4	0.9	0.8	20.0	3.0	3.9	14
Camelina microcarpa	0.3	0.7	0.7	13.3	2.0	2.7	17
Thlaspi arvense	0.4	0.9	1.1	13.3	2.0	2.9	16
Sub-Total	**1.1**	**2.5**	**2.1**				
Introduced Biennial Forbs							
Tragopogon dubius	0.1	0.2	0.5	6.7	1.0	1.2	19
Sub-Total	**0.1**	**0.2**	**0.5**				
Native Perennial Forbs							
Achillea millefolium	0.7	1.6	1.2	26.7	4.0	5.6	10
Dalea purpurea	0.3	0.7	1.0	6.7	1.0	1.7	18
Phlox hoodii	1.6	3.7	2.7	40.0	6.0	9.7	6
Psoralidium tenuiflorum	0.5	1.1	0.9	26.7	4.0	5.1	11
Sphaeralcea coccinea	0.4	0.9	1.1	13.3	2.0	2.9	16
Vicia americana	0.5	1.1	1.2	20.0	3.0	4.1	13.0
Sub-Total	**4.0**	**9.2**	**3.5**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	PJW	**Sample Size:**	1
Community Type:	Pine and Juniper Woodland	**Number of Samples:**	15
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Perennial Forbs							
Cerastium arvense	0.1	0.2	0.5	6.7	1.0	1.2	19
Sub-Total	**0.1**	**0.2**	**0.5**				
Native Full Shrubs							
Artemisia tridentata	0.7	1.6	1.8	13.3	2.0	3.6	15
Chrysothamnus viscidiflorus	0.1	0.2	0.5	6.7	1.0	1.2	19
Ericameria nauseosa	0.4	0.9	1.1	13.3	2.0	2.9	16
Rhus aromatica	0.4	0.9	0.8	20.0	3.0	3.9	14
Sub-Total	**1.6**	**3.7**	**1.9**				
Native Half &Sub-Shrubs							
Artemisia frigida	0.3	0.7	0.7	13.3	2.0	2.7	17
Gutierrezia sarothrae	0.1	0.2	0.5	6.7	1.0	1.2	19
Sub-Total	**0.4**	**0.9**	**0.8**				
Native Trees							
Juniperus scopulorum	3.3	7.6	5.6	33.3	5.0	12.6	5
Pinus ponderosa	4.7	10.8	8.2	26.7	4.0	14.8	3
Sub-Total	**8.0**	**18.3**	**8.1**				
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	20
Lichen	1.3	3.0	1.8	40.0	6.0	9.0	7
Algae	0.0	0.0	0.0	0.0	0.0	0.0	20
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	20
Sub-Total	**1.3**	**3.0**	**1.8**				

Totals		Std. Dev.
Total Vegetation	43.6	18.5
Total Vegetation w/Cryptograms	44.9	17.5
Total Vegetation excluding SLCV	37.7	13.0
Litter	17.8	10.8
Rock	26.3	21.6
Total Ground Cover	89.0	12.1
Total Ground Cover excluding SLCV	83.1	12.5
Bare Soil	11.0	12.1

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	PDMG	**Sample Size:**	1
Community Type:	Prairie Dog Modified Grassland	**Number of Samples:**	40
Date:	7/1/2014	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Annual Grasses							
Vulpia octoflora	0.2	0.4	1.0	5.0	0.8	1.2	22
Sub-Total	**0.2**	**0.4**	**1.0**				
Introduced Annual Grasses							
Bromus japonicus	1.5	3.1	3.6	22.5	3.4	6.5	7
Bromus tectorum	12.5	25.6	15.1	60.0	9.1	34.7	1
Sub-Total	**14.0**	**28.6**	**14.7**				
Native Cool Season Perennial Grasses							
Elymus smithii	9.7	19.9	8.1	82.5	12.5	32.4	2
Elymus spicatus	0.4	0.8	1.0	12.5	1.9	2.7	16
Hesperostipa comata	0.4	0.8	1.0	12.5	1.9	2.7	16
Nassella viridula	0.2	0.4	1.0	5.0	0.8	1.6	19
Poa secunda	0.8	1.6	1.6	25.0	3.8	5.4	11
Sub-Total	**11.5**	**23.5**	**8.6**				
Native Warm Season Perennial Grasses							
Aristida purpurea	0.9	1.8	1.9	25.0	3.8	5.6	10
Bouteloua gracilis	1.0	2.0	2.2	25.0	3.8	5.8	9
Sporobolus cryptandrus	0.3	0.6	1.2	7.5	1.1	1.7	18
Sub-Total	**2.2**	**4.5**	**3.2**				
Introduced Perennial Grasses							
Agropyron cristatum	2.6	5.3	5.9	20.0	3.0	8.3	5
Bromus inermis	0.1	0.2	0.3	2.5	0.4	0.6	25
Sub-Total	**2.7**	**5.5**	**5.9**				
Native Annual Forbs							
Chamaesyce glyptosperma	0.1	0.2	0.6	2.5	0.4	0.6	25
Logfia arvensis	0.2	0.4	0.7	5.0	0.8	1.2	28
Lappula redowskii	0.7	1.4	1.9	15.0	2.3	3.7	22
Plantago patagonica	1.3	2.7	3.0	22.5	3.4	6.1	8
Solanum triflorum	0.1	0.2	0.4	5.0	0.8	1.0	23
Sub-Total	**2.4**	**4.9**	**4.0**				
Introduced Annual Forbs							
Alyssum desertorum	2.4	4.9	3.0	55.0	8.3	13.2	4
Amaranthus albus	0.3	0.6	1.9	2.5	0.4	1.0	23
Bassia sieversiana	0.1	0.2	0.3	2.5	0.4	0.6	25
Brassica juncea	0.1	0.2	0.6	2.5	0.4	0.6	25
Medicago lupulina	0.5	1.0	3.2	2.5	0.4	1.4	21
Polygonum argyrocoleon	0.1	0.2	0.3	2.5	0.4	0.6	25

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	PDMG	**Sample Size:**	1
Community Type:	Prairie Dog Modified Grassland	**Number of Samples:**	40
Date:	7/1/2014	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Polygonum aviculare	0.6	1.2	1.8	17.5	2.6	3.8	14
Polygonum convolvulus	0.2	0.4	1.3	2.5	0.4	0.8	24
Sisymbrium altissimum	0.1	0.2	0.4	5.0	0.8	1.0	23
Sub-Total	**4.4**	**9.0**	**6.8**				
Introduced Biennial Forbs							
Melilotus officinalis	0.2	0.4	0.5	7.5	1.1	1.4	22
Sub-Total	**0.2**	**0.4**	**0.5**				
Native Perennial Forbs							
Achillea millefolium	0.2	0.4	0.5	7.5	1.1	1.5	20
Ambrosia psilostachya	0.1	0.2	0.6	2.5	0.4	0.6	25
Antennaria microphylla	0.2	0.4	0.7	5.0	0.8	1.2	22
Dalea purpurea	0.1	0.2	0.3	2.5	0.4	0.6	25
Evolvulus nuttallianus	0.2	0.4	0.7	5.0	0.8	1.2	22
Gaura coccinea	0.1	0.2	0.3	2.5	0.4	0.6	25
Grindelia squarrosa	0.1	0.2	0.3	2.5	0.4	0.6	25
Heterotheca villosa	0.3	0.6	0.9	7.5	1.1	1.7	18
Linum lewisii	0.1	0.2	0.3	2.5	0.4	0.6	25
Lygodesmia juncea	0.3	0.6	0.9	12.5	1.9	2.5	17
Pediomelum argophyllum	0.1	0.2	0.3	2.5	0.4	0.6	25
Phlox hoodii	0.7	1.4	1.7	17.5	2.6	4.0	13
Psoralidium tenuiflorum	0.1	0.2	0.4	5.0	0.8	1.0	23
Sphaeralcea coccinea	1.4	2.9	2.8	35.0	5.3	8.2	6
Symphyotrichum falcatum	0.2	0.4	0.7	5.0	0.8	1.2	22
Vicia americana	0.1	0.2	0.6	2.5	0.4	0.6	25
Sub-Total	**4.3**	**8.8**	**4.1**				
Introduced Perennial Forbs							
Convolvulus arvensis	5.1	10.4	8.6	35.0	5.3	15.8	3
Sub-Total	**5.1**	**10.4**	**8.6**				
Unknown Forb Species							
Astragalus spp.	0.2	0.4	0.5	7.5	1.1	1.5	20
Cirsium spp.	0.1	0.2	0.3	2.5	0.4	0.6	25
Penstemon spp.	0.1	0.2	0.3	2.5	0.4	0.6	25
Rumex spp.	0.1	0.2	0.3	2.5	0.4	0.6	25
Sub-Total	**0.5**	**1.0**	**0.9**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	PDMG	**Sample Size:**	1
Community Type:	Prairie Dog Modified Grassland	**Number of Samples:**	40
Date:	7/1/2014	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Full Shrubs							
Artemisia tridentata	0.2	0.4	0.7	5.0	0.8	1.2	22
Chrysothamnus viscidiflorus	0.2	0.4	0.8	7.5	1.1	1.5	20
Sub-Total	**0.4**	**0.8**	**1.0**				
Native Half &Sub-Shrubs							
Artemisia frigida	0.8	1.6	1.6	22.5	3.4	5.0	12
Artemisia ludoviciana	0.1	0.2	0.6	2.5	0.4	0.6	25
Sub-Total	**0.9**	**1.8**	**1.8**				
Native Succulents							
Opuntia polyacantha	0.1	0.2	0.3	2.5	0.4	0.6	25
Sub-Total	**0.1**	**0.2**	**0.3**				
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	26
Lichen	0.1	0.2	0.3	2.5	0.4	0.6	25
Algae	0.0	0.0	0.0	0.0	0.0	0.0	26
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	26
Sub-Total	**0.1**	**0.1**	**0.3**				

Totals		Std. Dev.
Total Vegetation	48.9	16.2
Total Vegetation w/Cryptograms	49.0	16.2
Total Vegetation excluding SLCV	29.8	12.9
Litter	19.8	11.4
Rock	3.7	7.3
Total Ground Cover	72.5	20.0
Total Ground Cover excluding SLCV	53.4	21.3
Bare Soil	27.5	20.0

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RG	**Sample Size:**	1
Community Type:	Reclaimed Grassland	**Number of Samples:**	10
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Grasses							
Bromus japonicus	3.8	6.0	5.6	60.0	9.8	15.8	3
Bromus tectorum	1.4	2.2	3.1	30.0	4.9	7.1	8
Sub-Total	**5.2**	**8.2**	**7.6**				
Native Cool Season Perennial Grasses							
Elymus lanceolatus	1.8	2.8	5.7	10.0	1.6	4.4	11
Elymus smithii	25.0	39.3	21.3	80.0	13.1	52.4	1
Elymus trachycaulus	1.4	2.2	4.4	10.0	1.6	3.8	14
Nassella viridula	0.4	0.6	1.3	10.0	1.6	2.2	15
Poa secunda	0.2	0.3	0.6	10.0	1.6	1.9	16
Sub-Total	**28.8**	**45.3**	**21.8**				
Introduced Perennial Grasses							
Agropyron cristatum	1.8	2.8	2.7	40.0	6.6	9.4	5
Bromus inermis	15.8	24.8	21.4	60.0	9.8	34.6	2
Sub-Total	**17.6**	**27.7**	**20.9**				
Native Grasslike Species							
Carex filifolia	0.4	0.6	1.3	10.0	1.6	2.2	15
Sub-Total	**0.4**	**0.6**	**1.3**				
Native Annual Forbs							
Plantago patagonica	0.2	0.3	0.6	10.0	1.6	1.9	16
Sub-Total	**0.2**	**0.3**	**0.6**				
Introduced Annual Forbs							
Alyssum desertorum	1.4	2.2	1.9	50.0	8.2	10.4	4
Camelina microcarpa	0.6	0.9	1.3	20.0	3.3	4.2	12
Halogeton glomeratus	0.2	0.3	0.6	10.0	1.6	1.9	16
Medicago lupulina	0.2	0.3	0.6	10.0	1.6	1.9	16
Sub-Total	**2.4**	**3.8**	**1.8**				
Introduced Biennial Forbs							
Melilotus officinalis	2.8	4.4	5.9	30.0	4.9	9.3	6
Tragopogon dubius	0.6	0.9	1.0	30.0	4.9	5.8	9
Sub-Total	**3.4**	**5.3**	**5.7**				
Native Perennial Forbs							
Comandra umbellata	0.2	0.3	0.6	10.0	1.6	1.9	16
Grindelia squarrosa	1.0	1.6	2.2	20.0	3.3	4.9	10
Vicia americana	0.4	0.6	0.8	20.0	3.3	3.9	13
Sub-Total	**1.6**	**2.5**	**2.5**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RG	**Sample Size:**	1
Community Type:	Reclaimed Grassland	**Number of Samples:**	10
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Perennial Forbs							
Convolvulus arvensis	1.0	1.6	2.2	20.0	3.3	4.9	10
Medicago sativa	0.2	0.3	0.6	10.0	1.6	1.9	16
Taraxacum officinale	2.4	3.8	5.6	30.0	4.9	8.7	7
Sub-Total	**3.6**	**5.7**	**5.6**				
Native Full Shrubs							
Artemisia cana	0.2	0.3	0.6	10.0	1.6	1.9	16
Ericameria nauseosa	0.2	0.3	0.6	10.0	1.6	1.9	16
Sub-Total	**0.4**	**0.6**	**0.8**				
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	17
Lichen	0.0	0.0	0.0	0.0	0.0	0.0	17
Algae	0.0	0.0	0.0	0.0	0.0	0.0	17
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	17
Sub-Total	**0.0**	**0.0**	**0.0**				

Totals		Std. Dev.
Total Vegetation	63.6	9.1
Total Vegetation w/Cryptograms	63.6	9.1
Total Vegetation excluding SLCV	57.2	7.7
Litter	25.4	11.0
Rock	1.4	2.1
Total Ground Cover	90.4	10.8
Total Ground Cover excluding SLCV	84.0	14.9
Bare Soil	9.6	10.8

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RW	**Sample Size:**	1
Community Type:	Riparian Woodland	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Grasses							
Bromus japonicus	1.7	2.1	2.9	32.0	3.5	5.6	12
Bromus tectorum	1.0	1.2	3.1	16.0	1.7	2.9	19
Sub-Total	**2.7**	**3.3**	**5.4**				
Native Cool Season Perennial Grasses							
Elymus cinereus	0.2	0.2	0.7	12.0	1.3	1.5	29
Elymus lanceolatus	1.3	1.6	5.6	8.0	0.9	2.5	20
Elymus smithii	9.8	12.0	9.5	68.0	7.4	19.4	2
Elymus trachycaulus	1.8	2.2	4.4	24.0	2.6	4.8	15
Hordeum jubatum	4.6	5.6	9.8	28.0	3.1	8.7	4
Nassella viridula	1.0	1.2	3.4	8.0	0.9	2.1	24
Poa secunda	0.6	0.7	2.0	12.0	1.3	2.0	25
Sub-Total	**19.3**	**23.5**	**12.1**				
Native Warm Season Perennial Grasses							
Bouteloua gracilis	0.2	0.2	0.8	4.0	0.4	0.6	33
Spartina pectinata	3.0	3.7	7.6	16.0	1.7	5.4	13
Sub-Total	**3.2**	**3.9**	**7.5**				
Introduced Perennial Grasses							
Agropyron cristatum	2.7	3.3	6.5	44.0	4.8	8.1	6
Bromus inermis	3.1	3.8	5.1	44.0	4.8	8.6	5
Dactylis glomerata	0.3	0.4	1.2	8.0	0.9	1.3	30
Phleum pratense	0.4	0.5	1.3	12.0	1.3	1.8	26
Poa pratensis	1.8	2.2	3.3	28.0	3.1	5.3	14
Sub-Total	**8.3**	**10.1**	**9.9**				
Unknown Grass Species							
Festuca spp.	0.2	0.2	0.8	4.0	0.4	0.6	33
Sub-Total	**0.2**	**0.2**	**0.8**				
Native Grasslike Species							
Carex filifolia	0.4	0.5	2.0	4.0	0.4	0.9	32
Carex nebrascensis	3.5	4.3	8.1	28.0	3.1	7.4	8
Juncus balticus	1.0	1.2	2.9	12.0	1.3	2.5	20
Schoenoplectus pungens	0.1	0.1	0.4	4.0	0.4	0.5	34
Sub-Total	**5.0**	**6.1**	**9.8**				
Native Annual Forbs							
Chenopodium berlandieri	0.1	0.1	0.4	4.0	0.4	0.5	34
Galium aparine	0.1	0.1	0.4	4.0	0.4	0.5	34
Sub-Total	**0.2**	**0.2**	**0.6**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RW	**Sample Size:**	1
Community Type:	Riparian Woodland	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Forbs							
Alyssum desertorum	0.4	0.5	1.0	16.0	1.7	2.2	23
Bassia sieversiana	0.3	0.4	1.2	8.0	0.9	1.3	30
Lepidium perfoliatum	0.2	0.2	0.6	8.0	0.9	1.1	31
Medicago lupulina	0.3	0.4	1.2	8.0	0.9	1.3	30
Thlaspi arvense	0.2	0.2	0.7	12.0	1.3	1.5	29
Sub-Total	**1.4**	**1.7**	**2.0**				
Introduced Biennial Forbs							
Cynoglossum officinale	0.1	0.1	0.4	4.0	0.4	0.5	34
Lactuca serriola	1.0	1.2	3.2	16.0	1.7	2.9	19
Melilotus officinalis	0.2	0.2	0.7	12.0	1.3	1.5	29
Tragopogon dubius	0.2	0.2	0.6	8.0	0.9	1.1	31
Sub-Total	**1.5**	**1.8**	**3.5**				
Native Perennial Forbs							
Achillea millefolium	1.8	2.2	4.5	36.0	3.9	6.1	10
Asclepias speciosa	0.2	0.2	0.6	8.0	0.9	1.1	31
Asteraceae spp.	1.0	1.2	2.5	16.0	1.7	2.9	19
Comandra umbellata	0.3	0.4	0.9	12.0	1.3	1.7	27
Equisetum laevigatum	0.2	0.2	0.8	4.0	0.4	0.6	33
Evolvulus nuttallianus	0.1	0.1	0.4	4.0	0.4	0.5	34
Galium boreale	0.1	0.1	0.4	4.0	0.4	0.5	34
Glycyrrhiza lepidota	0.2	0.2	1.2	4.0	0.4	0.6	33
Grindelia squarrosa	1.5	1.8	4.4	12.0	1.3	3.1	18
Sphaeralcea coccinea	0.2	0.2	0.8	4.0	0.4	0.6	33
Vicia americana	0.2	0.2	0.8	4.0	0.4	0.6	32
Sub-Total	**5.8**	**7.1**	**7.6**				
Introduced Perennial Forbs							
Cardaria draba	0.1	0.1	0.4	4.0	0.4	0.5	34
Cirsium arvense	0.4	0.5	1.0	16.0	1.7	2.2	23
Convolvulus arvensis	1.1	1.3	2.3	24.0	2.6	3.9	16
Medicago sativa	0.1	0.1	0.4	4.0	0.4	0.5	34
Taraxacum officinale	2.3	2.8	3.5	44.0	4.8	7.6	7
Trifolium repens	0.1	0.1	0.4	4.0	0.4	0.5	34
Sub-Total	**4.1**	**5.0**	**5.1**				
Unknown Forb Species							
Astragalus spp.	0.8	1.0	2.5	12.0	1.3	2.3	22
Sonchus spp.	1.8	2.2	5.1	12.0	1.3	3.5	17
Sub-Total	**2.6**	**3.2**	**6.4**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RW	**Sample Size:**	1
Community Type:	Riparian Woodland	**Number of Samples:**	25
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Full Shrubs							
Artemisia cana	2.3	2.8	4.7	28.0	3.1	5.9	11
Artemisia tridentata	0.2	0.2	0.8	4.0	0.4	0.6	33
Atriplex canescens	0.2	0.2	1.2	4.0	0.4	0.6	33
Rosa woodsii	0.2	0.2	0.6	8.0	0.9	1.1	31
Symphoricarpos albus	11.5	14.0	14.4	76.0	8.3	22.3	1
Sub-Total	**14.4**	**17.6**	**15.7**				
Native Trees							
Fraxinus pennsylvanica	1.3	1.6	6.0	8.0	0.9	2.4	21
Populus deltoides	6.6	8.0	16.8	24.0	2.6	10.6	3
Salix amygdaloides	0.2	0.2	0.8	4.0	0.4	0.6	33
Sorbus scopulina	4.6	5.6	15.8	8.0	0.9	6.5	9
Sub-Total	**12.7**	**15.5**	**22.2**				
Introduced Trees							
Elaeagnus angustifolia	0.6	0.7	2.8	8.0	0.9	1.6	28
Sub-Total	**0.6**	**0.7**	**2.8**				
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	35
Lichen	0.0	0.0	0.0	0.0	0.0	0.0	35
Algae	0.0	0.0	0.0	0.0	0.0	0.0	35
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	35
Sub-Total	**0.0**	**0.0**	**0.0**				

Totals		Std. Dev.
Total Vegetation	82.0	14.8
Total Vegetation w/Cryptograms	82.0	14.8
Total Vegetation excluding SLCV	76.3	14.3
Litter	15.0	14.3
Rock	0.9	4.4
Total Ground Cover	97.9	3.5
Total Ground Cover excluding SLCV	92.2	7.3
Bare Soil	2.1	3.5

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RBMS	**Sample Size:**	1
Community Type:	Rough Breaks Mixed Shrubland	**Number of Samples:**	30
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Grasses							
Bromus japonicus	2.4	5.7	3.3	56.7	6.7	12.4	4
Bromus tectorum	0.3	0.7	0.9	13.3	1.6	2.3	21
Sub-Total	**2.7**	**6.5**	**3.5**				
Native Cool Season Perennial Grasses							
Achnatherum hymenoides	0.1	0.2	0.5	6.7	0.8	1.0	27
Elymus lanceolatus	0.5	1.2	1.4	16.7	2.0	3.2	16
Elymus smithii	4.1	9.8	5.7	56.7	6.7	16.5	3
Elymus spicatus	7.0	16.7	6.9	73.3	8.7	25.4	2
Hesperostipa comata	0.7	1.7	2.1	13.3	1.6	3.3	15
Koeleria macrantha	0.1	0.2	0.4	3.3	0.4	0.6	29
Nassella viridula	1.4	3.3	2.2	43.3	5.2	8.5	5
Poa secunda	0.9	2.2	2.1	23.3	2.8	5.0	11
Sub-Total	**14.8**	**35.4**	**8.4**				
Native Warm Season Perennial Grasses							
Aristida purpurea	0.1	0.2	0.4	3.3	0.4	0.6	29
Bouteloua gracilis	0.1	0.2	0.4	3.3	0.4	0.6	29
Schizachyrium scoparium	0.1	0.2	0.4	3.3	0.4	0.6	29
Sub-Total	**0.3**	**0.7**	**0.6**				
Introduced Perennial Grasses							
Agropyron cristatum	0.1	0.2	0.4	3.3	0.4	0.6	29
Bromus inermis	0.1	0.2	0.4	3.3	0.4	0.6	29
Poa bulbosa	0.1	0.2	0.4	3.3	0.4	0.6	29
Sub-Total	**0.3**	**0.7**	**0.8**				
Native Grasslike Species							
Carex filifolia	0.1	0.2	0.4	3.3	0.4	0.6	29
Sub-Total	**0.1**	**0.2**	**0.4**				
Native Annual Forbs							
Atriplex suckleyi	0.7	1.7	2.9	10.0	1.2	2.9	18
Chenopodium berlandieri	0.1	0.2	0.4	3.3	0.4	0.6	29
Plantago patagonica	0.3	0.7	0.9	10.0	1.2	1.9	23
Sub-Total	**1.1**	**2.6**	**3.0**				
Introduced Annual Forbs							
Alyssum desertorum	0.4	1.0	1.5	10.0	1.2	2.2	22
Thlaspi arvense	0.1	0.2	0.4	3.3	0.4	0.6	29
Sub-Total	**0.5**	**1.2**	**1.5**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RBMS	**Sample Size:**	1
Community Type:	Rough Breaks Mixed Shrubland	**Number of Samples:**	30
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Biennial Forbs							
Tragopogon dubius	0.3	0.7	0.8	16.7	2.0	2.7	19
Sub-Total	**0.3**	**0.7**	**0.8**				
Native Perennial Forbs							
Achillea millefolium	0.4	1.0	1.0	16.7	2.0	3.0	17
Comandra umbellata	0.3	0.7	0.9	10.0	1.2	1.9	23
Dalea candida	0.2	0.5	0.8	6.7	0.8	1.3	27
Dalea purpurea	0.1	0.2	0.5	6.7	0.8	1.0	28
Eriogonum pauciflorum	0.1	0.2	0.7	3.3	0.4	0.6	29
Evolvulus nuttallianus	0.2	0.5	1.1	3.3	0.4	0.9	28
Gaura coccinea	0.2	0.5	0.6	10.0	1.2	1.7	24
Grindelia squarrosa	0.1	0.2	0.5	6.7	0.8	1.0	27
Heterotheca villosa	0.1	0.2	0.4	3.3	0.4	0.6	31
Machaeranthera tanacetifolia	0.1	0.2	0.4	3.3	0.4	0.6	29
Musineon divaricatum	0.1	0.2	0.5	6.7	0.8	1.0	27
Pediomelum argophyllum	0.1	0.2	0.5	6.7	0.8	1.0	27
Pediomelum esculentum	0.2	0.5	1.1	3.3	0.4	0.9	28
Phlox hoodii	1.3	3.1	2.1	36.7	4.4	7.5	6
Psoralidium tenuiflorum	1.1	2.6	2.4	26.7	3.2	5.8	10
Ratibida columnifera	0.1	0.2	0.5	6.7	0.8	1.0	27
Sphaeralcea coccinea	0.5	1.2	0.9	23.3	2.8	4.0	13
Thermopsis rhombifolia	0.2	0.5	0.6	10.0	1.2	1.7	24
Vicia americana	0.5	1.2	1.0	23.3	2.8	4.0	13
Sub-Total	**5.9**	**14.1**	**4.5**				
Introduced Perennial Forbs							
Cirsium arvense	0.1	0.2	0.7	3.3	0.4	0.6	29
Convolvulus arvensis	0.5	1.2	1.9	10.0	1.2	2.4	20
Sub-Total	**0.6**	**1.4**	**2.0**				
Unknown Forb Species							
Cirsium spp.	0.1	0.2	0.4	3.3	0.4	0.6	29
Sub-Total	**0.1**	**0.2**	**0.4**				
Native Full Shrubs							
Artemisia cana	0.3	0.7	1.1	10.0	1.2	1.9	23
Artemisia tridentata	9.5	22.7	9.4	76.7	9.1	31.8	1
Atriplex canescens	0.1	0.2	0.4	3.3	0.4	0.6	29
Ericameria nauseosa	0.6	1.4	1.5	16.7	2.0	3.4	14
Rhus aromatica	0.3	0.7	1.5	6.7	0.8	1.5	25
Ribes cereum	0.1	0.2	0.4	3.3	0.4	0.6	29
Rosa woodsii	0.7	1.7	1.7	20.0	2.4	4.1	12

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	RBMS	**Sample Size:**	1
Community Type:	Rough Breaks Mixed Shrubland	**Number of Samples:**	30
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Sarcobatus vermiculatus	0.9	2.2	2.4	13.3	1.6	3.8	14
Sub-Total	**12.5**	**29.9**	**10.0**				
Native Half &Sub-Shrubs							
Artemisia frigida	1.1	2.6	2.5	30.0	3.6	6.2	9
Artemisia ludoviciana	0.1	0.2	0.7	3.3	0.4	0.6	29
Artemisia pedatifida	0.1	0.2	0.4	3.3	0.4	0.6	29
Atriplex gardneri	0.1	0.2	0.4	3.3	0.4	0.6	29
Gutierrezia sarothrae	1.1	2.6	1.9	33.3	4.0	6.6	8
Sub-Total	**2.5**	**6.0**	**4.0**				
Native Trees							
Juniperus scopulorum	0.1	0.2	0.4	3.3	0.4	0.6	29
Sub-Total	**0.1**	**0.2**	**0.4**				
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	30
Lichen	1.4	3.3	2.6	33.3	4.0	7.3	7
Algae	0.0	0.0	0.0	0.0	0.0	0.0	30
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	30
Sub-Total	**1.4**	**3.8**	**2.6**				

Totals		Std. Dev.
Total Vegetation	41.8	12.0
Total Vegetation w/Cryptograms	43.2	12.3
Total Vegetation excluding SLCV	38.1	10.9
Litter	15.7	8.9
Rock	10.8	8.4
Total Ground Cover	69.7	17.4
Total Ground Cover excluding SLCV	66.0	17.3
Bare Soil	30.3	17.4

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	SG	**Sample Size:**	1
Community Type:	Scoria Grassland	**Number of Samples:**	28
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Annual Grasses							
Echinochloa muricata	0.1	0.2	0.8	3.6	0.4	0.6	27
Vulpia octoflora	0.1	0.2	0.4	3.6	0.4	0.6	27
Sub-Total	**0.2**	**0.3**	**0.8**				
Introduced Annual Grasses							
Bromus japonicus	2.9	5.0	4.5	42.9	5.3	10.3	6
Bromus tectorum	18.8	32.4	13.8	89.3	11.0	43.4	1
Sub-Total	**21.7**	**37.3**	**13.9**				
Native Cool Season Perennial Grasses							
Elymus lanceolatus	0.1	0.2	0.8	3.6	0.4	0.6	27
Elymus smithii	2.8	4.8	4.6	50.0	6.1	10.9	5
Elymus spicatus	6.4	11.0	6.3	71.4	8.8	19.8	2
Hesperostipa comata	4.4	7.6	5.7	60.7	7.5	15.1	3
Koeleria macrantha	0.1	0.2	0.4	3.6	0.4	0.6	27
Nassella viridula	0.9	1.5	2.9	17.9	2.2	3.7	15
Poa secunda	1.5	2.6	2.3	35.7	4.4	7.0	8
Sub-Total	**16.2**	**27.9**	**11.1**				
Native Warm Season Perennial Grasses							
Aristida purpurea	0.4	0.7	1.0	17.9	2.2	2.9	17
Bouteloua gracilis	0.7	1.2	1.6	21.4	2.6	3.8	14
Sub-Total	**1.1**	**1.9**	**2.0**				
Introduced Perennial Grasses							
Bromus inermis	0.1	0.2	0.4	3.6	0.4	0.6	27
Festuca ovina	0.4	0.7	1.9	7.1	0.9	1.6	22
Sub-Total	**0.5**	**0.9**	**1.9**				
Native Grasslike Species							
Carex filifolia	0.1	0.2	0.5	7.1	0.9	1.1	25
Sub-Total	**0.1**	**0.2**	**0.5**				
Native Annual Forbs							
Helianthus annuus	0.1	0.2	0.4	3.6	0.4	0.6	27
Lappula redowskii	0.1	0.2	0.4	3.6	0.4	0.6	27
Sub-Total	**0.2**	**0.3**	**0.5**				
Introduced Annual Forbs							
Alyssum desertorum	0.7	1.2	1.2	28.6	3.5	4.7	11
Camelina microcarpa	0.9	1.5	1.8	21.4	2.6	4.1	12
Descurainia sophia	0.1	0.2	0.5	7.1	0.9	1.1	25

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	SG	**Sample Size:**	1
Community Type:	Scoria Grassland	**Number of Samples:**	28
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Lepidium perfoliatum	0.1	0.2	0.4	3.6	0.4	0.6	27
Medicago lupulina	0.1	0.2	0.5	7.1	0.9	1.1	25
Sisymbrium altissimum	0.3	0.5	1.2	7.1	0.9	1.4	23
Sub-Total	**2.2**	**3.8**	**3.2**				
Introduced Biennial Forbs							
Melilotus officinalis	0.1	0.2	0.4	3.6	0.4	0.6	27
Tragopogon dubius	0.3	0.5	0.9	10.7	1.3	1.8	20
Sub-Total	**0.4**	**0.7**	**1.0**				
Native Perennial Forbs							
Achillea millefolium	0.1	0.2	0.4	3.6	0.4	0.6	27
Ambrosia tomentosa	0.1	0.2	0.4	3.6	0.4	0.6	27
Comandra umbellata	0.1	0.2	0.4	3.6	0.4	0.6	27
Dalea purpurea	1.0	1.7	2.5	17.9	2.2	3.9	13
Evolvulus nuttallianus	0.3	0.5	0.9	10.7	1.3	1.8	20
Galium boreale	0.1	0.2	0.4	3.6	0.4	0.6	27
Gaura coccinea	0.1	0.2	0.4	3.6	0.4	0.6	27
Glycyrrhiza lepidota	0.1	0.2	0.4	3.6	0.4	0.6	27
Heterotheca villosa	0.2	0.3	0.8	7.1	0.9	1.2	24
Lactuca oblongifolia	0.4	0.7	1.1	10.7	1.3	2.0	19
Pediomelum argophyllum	0.3	0.5	1.2	7.1	0.9	1.4	23
Pediomelum esculentum	0.2	0.3	0.8	7.1	0.9	1.2	24
Phlox hoodii	0.1	0.2	0.5	7.1	0.9	1.1	25
Psoralidium tenuiflorum	1.1	1.9	1.6	35.7	4.4	6.3	9
Ratibida columnifera	0.1	0.2	0.4	3.6	0.4	0.6	27
Sphaeralcea coccinea	1.1	1.9	2.2	28.6	3.5	5.4	10
Thermopsis rhombifolia	0.1	0.2	0.4	3.6	0.4	0.6	27
Vicia americana	0.6	1.0	1.4	17.9	2.2	3.2	16
Sub-Total	**6.1**	**10.5**	**5.9**				
Introduced Perennial Forbs							
Convolvulus arvensis	1.2	2.1	6.4	3.6	0.4	2.5	18
Sub-Total	**1.2**	**2.1**	**6.4**				
Unknown Forb Species							
Astragalus spp.	0.1	0.2	0.4	3.6	0.4	0.6	27
Sub-Total	**0.1**	**0.2**	**0.4**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	SG	**Sample Size:**	1
Community Type:	Scoria Grassland	**Number of Samples:**	28
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Full Shrubs							
Artemisia cana	0.3	0.5	1.5	3.6	0.4	0.9	26
Artemisia tridentata	4.1	7.1	6.9	50.0	6.1	13.2	4
Rhus aromatica	3.0	5.2	5.8	39.3	4.8	10.0	7
Sub-Total	**7.4**	**12.7**	**7.9**				
Native Half &Sub-Shrubs							
Artemisia frigida	0.2	0.3	0.6	10.7	1.3	1.6	22
Gutierrezia sarothrae	0.2	0.3	0.8	7.1	0.9	1.2	24
Linanthus pungens	0.1	0.2	0.4	3.6	0.4	0.6	27
Yucca glauca	0.2	0.3	0.8	7.1	0.9	1.2	24
Sub-Total	**0.7**	**1.2**	**1.7**				
Cryptograms							
Moss	0.1	0.1	0.4	3.6	0.4	0.5	28
Lichen	0.3	0.5	0.9	10.7	1.3	1.8	20
Algae	0.0	0.0	0.0	0.0	0.0	0.0	29
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	29
Sub-Total	**0.4**	**0.6**	**1.0**				

Totals		Std. Dev.
Total Vegetation	58.1	9.3
Total Vegetation w/Cryptograms	58.5	8.9
Total Vegetation excluding SLCV	34.8	12.2
Litter	19.7	9.6
Rock	11.0	9.2
Total Ground Cover	89.2	7.1
Total Ground Cover excluding SLCV	65.9	15.9
Bare Soil	10.8	7.1

* I.V. Stands for Importance Value

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	UG	**Sample Size:**	1
Community Type:	Upland Grassland	**Number of Samples:**	28
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Annual Grasses							
Cenchrus longispinus	0.1	0.2	0.8	3.6	0.4	0.6	40
Echinochloa muricata	0.6	1.0	1.3	17.9	2.0	3.0	16
Vulpia octoflora	0.1	0.2	0.4	3.6	0.4	0.6	42
Sub-Total	**0.8**	**1.4**	**1.7**				
Introduced Annual Grasses							
Bromus japonicus	4.8	8.3	6.5	67.9	7.5	15.8	3
Bromus tectorum	13.1	22.6	16.6	60.7	6.7	29.3	1
Sub-Total	**17.9**	**30.9**	**17.6**				
Native Cool Season Perennial Grasses							
Elymus lanceolatus	0.6	1.0	1.6	17.9	2.0	3.0	16
Elymus smithii	10.4	17.9	12.0	82.1	9.1	27.0	2
Elymus spicatus	3.9	6.7	5.8	50.0	5.5	12.2	5
Elymus trachycaulus	0.1	0.2	0.4	3.6	0.4	0.6	42
Hesperostipa comata	5.4	9.3	6.0	53.6	5.9	15.2	4
Nassella viridula	1.1	1.9	2.1	28.6	3.2	5.1	10
Poa secunda	2.9	5.0	5.5	32.1	3.6	8.6	6
Sub-Total	**24.4**	**42.1**	**11.1**				
Native Warm Season Perennial Grasses							
Aristida purpurea	0.1	0.2	0.5	7.1	0.8	1.0	33
Bouteloua gracilis	0.5	0.9	1.2	17.9	2.0	2.9	18
Distichlis stricta	0.4	0.7	1.7	7.1	0.8	1.5	29
Sub-Total	**1.0**	**1.7**	**2.0**				
Introduced Perennial Grasses							
Agropyron cristatum	0.3	0.5	0.9	10.7	1.2	1.7	25
Poa bulbosa	0.1	0.2	0.4	3.6	0.4	0.6	42
Sub-Total	**0.4**	**0.7**	**1.1**				
Native Grasslike Species							
Carex filifolia	0.1	0.2	0.4	3.6	0.4	0.6	42
Sub-Total	**0.1**	**0.2**	**0.4**				
Native Annual Forbs							
Erigeron strigosus	0.1	0.2	0.4	3.6	0.4	0.6	42
Lappula redowskii	0.1	0.2	0.5	7.1	0.8	1.0	33
Plantago patagonica	0.6	1.0	1.7	14.3	1.6	2.6	20
Sub-Total	**0.8**	**1.4**	**2.1**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	UG	**Sample Size:**	1
Community Type:	Upland Grassland	**Number of Samples:**	28
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Introduced Annual Forbs							
Alyssum desertorum	1.3	2.2	2.1	39.3	4.3	6.5	1
Camelina microcarpa	0.1	0.2	0.5	7.1	0.8	1.0	17
Sisymbrium altissimum	0.4	0.7	1.2	10.7	1.2	1.9	12
Thlaspi arvense	0.1	0.2	0.5	7.1	0.8	1.0	17
Sub-Total	**1.9**	**3.3**	**2.5**				
Introduced Biennial Forbs							
Melilotus officinalis	0.2	0.3	0.6	10.7	1.2	1.5	13
Tragopogon dubius	0.4	0.7	1.0	14.3	1.6	2.3	11
Sub-Total	**0.6**	**1.0**	**1.1**				
Native Perennial Forbs							
Achillea millefolium	0.6	1.0	1.4	21.4	2.4	3.4	7
Evolvulus nuttallianus	0.1	0.2	0.4	3.6	0.4	0.6	18
Gaura coccinea	0.1	0.2	0.4	3.6	0.4	0.6	18
Grindelia squarrosa	0.1	0.2	0.5	7.1	0.8	1.0	17
Lactuca oblongifolia	0.1	0.2	0.4	3.6	0.4	0.6	18
Lygodesmia juncea	0.1	0.2	0.4	3.6	0.4	0.6	18
Musineon divaricatum	0.1	0.2	0.8	3.6	0.4	0.6	18
Pediomelum argophyllum	0.2	0.3	0.6	10.7	1.2	1.5	13
Phlox hoodii	0.9	1.6	1.6	32.1	3.6	5.2	3
Psoralidium tenuiflorum	0.5	0.9	1.3	17.9	2.0	2.9	10
Sphaeralcea coccinea	0.8	1.4	1.8	21.4	2.4	3.8	5
Symphyotrichum falcatum	0.1	0.2	0.5	7.1	0.8	1.0	17
Vicia americana	0.5	0.9	1.0	21.4	2.4	3.3	8
Zigadenus venenosus	0.1	0.2	0.4	3.6	0.4	0.6	18
Sub-Total	**4.3**	**7.4**	**3.1**				
Introduced Perennial Forbs							
Convolvulus arvensis	1.7	2.9	3.8	28.6	3.2	6.1	2
Taraxacum officinale	0.6	1.0	1.5	14.3	1.6	2.6	10
Sub-Total	**2.3**	**4.0**	**4.9**				
Unknown Forb Species							
Astragalus spp.	0.2	0.3	0.8	7.1	0.8	1.1	16
Cirsium spp.	0.1	0.2	0.4	3.6	0.4	0.6	18
Lappula spp.	0.1	0.2	0.4	3.6	0.4	0.6	18
Polygonum spp.	0.1	0.2	0.4	3.6	0.4	0.6	18
Sub-Total	**0.5**	**0.9**	**1.1**				

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RAMACO
Report: Cover Summary

Project Name:	2013 RAMACO	**Sampling Method:**	Point Line Intercept
Polygon Name:	UG	**Sample Size:**	1
Community Type:	Upland Grassland	**Number of Samples:**	28
Date:	7/1/2013	**Report Date:**	12/31/2013

Species	Cover			Frequency			
	Mean Absolute	Relative (%)	Std. Dev. (n-1)	Absolute	Relative (%)	I.V*	Rank
Native Full Shrubs							
Artemisia cana	0.3	0.5	1.0	7.1	0.8	1.3	14
Artemisia tridentata	0.9	1.6	2.3	17.9	2.0	3.6	6
Rhus aromatica	0.2	0.3	0.6	10.7	1.2	1.5	13
Ribes cereum	0.1	0.2	0.4	3.6	0.4	0.6	18
Sarcobatus vermiculatus	0.1	0.2	0.4	3.6	0.4	0.6	18
Symphoricarpos spp.	0.1	0.2	0.5	7.1	0.8	1.0	17
Sub-Total	**1.7**	**2.9**	**2.9**				
Native Half &Sub-Shrubs							
Artemisia frigida	0.8	1.4	1.4	32.1	3.6	5.0	4
Gutierrezia sarothrae	0.4	0.7	1.2	10.7	1.2	1.9	12
Sub-Total	**1.2**	**2.1**	**1.7**				
Native Succulents							
Opuntia polyacantha	0.1	0.2	0.4	3.6	0.4	0.6	18
Sub-Total	**0.1**	**0.2**	**0.4**				
Cryptograms							
Moss	0.0	0.0	0.0	0.0	0.0	0.0	19
Lichen	0.2	0.4	0.8	7.1	0.8	1.2	15
Algae	0.0	0.0	0.0	0.0	0.0	0.0	19
Fungi	0.0	0.0	0.0	0.0	0.0	0.0	19
Sub-Total	**0.2**	**0.4**	**0.8**				

Totals		Std. Dev.
Total Vegetation	58.0	12.7
Total Vegetation w/Cryptograms	58.2	12.5
Total Vegetation excluding SLCV	38.1	13.0
Litter	28.2	9.6
Rock	4.3	4.8
Total Ground Cover	90.7	9.2
Total Ground Cover excluding SLCV	70.8	15.5
Bare Soil	9.3	9.2

* I.V. Stands for Importance Value

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ATTACHMENT D8-1-D

Production Summaries

TFN 6 2/025
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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: BSS
Community Type: Big Sagebrush Shrubland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Vulpia octoflora	0.3	5.8	0.8	1.8
Total Native Annual Grasses	**0.3**	**5.8**	**0.8**	**1.8**
Bromus japonicus	3.7	65.8	9.9	8.9
Bromus tectorum	2.6	45.9	6.9	6.8
Total Introduced Annual Grasses	**6.3**	**111.7**	**16.8**	**11.2**
Achnatherum hymenoides	0.1	1.8	0.3	0.7
Elymus smithii	4.4	77.7	11.7	10.0
Elymus spicatus	8.9	158.0	23.7	10.9
Festuca idahoensis	0.2	4.4	0.5	1.8
Hesperostipa comata	5.6	100.1	14.9	9.0
Nassella viridula	1.5	26.3	4.0	4.0
Poa secunda	0.9	15.9	2.4	1.9
Total Native Cool Season Perennial Grasses	**21.6**	**384.2**	**57.6**	**14.8**
Aristida purpurea	0.2	3.1	0.5	1.2
Bouteloua gracilis	0.2	3.2	0.5	0.8
Total Native Warm Season Perennial Grasses	**0.4**	**6.3**	**1.1**	**1.4**
Agropyron cristatum	0.4	7.5	1.1	1.9
Bromus inermis	0.4	7.4	1.1	3.0
Festuca ovina	0.2	2.7	0.5	1.1
Poa bulbosa	<0.1	0.2	<0.1	0.1
Total Introduced Perennial Grasses	**1.0**	**17.8**	**2.7**	**3.6**
Carex filifolia	0.2	3.8	0.5	0.9
Total Native Grasslike Species	**0.2**	**3.8**	**0.5**	**0.9**
Lappula redowskii	0.1	0.9	0.3	0.4
Logfia arvensis	<0.1	0.5	0.1	0.2
Plantago patagonica	0.3	6.0	0.8	1.2
Total Native Annual Forbs	**0.4**	**7.4**	**1.1**	**1.3**
Alyssum desertorum	1.7	29.6	4.5	2.7
Camelina microcarpa	<0.1	0.2	<0.1	0.1
Descurainia sophia	0.3	4.7	0.8	1.8
Total Introduced Annual Forbs	**2.0**	**34.5**	**5.3**	**3.2**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: BSS
Community Type: Big Sagebrush Shrubland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Melilotus officinalis	<0.1	0.6	0.1	0.2
Tragopogon dubius	0.3	5.0	0.8	0.6
Total Introduced Biennial Forbs	**0.3**	**5.6**	**0.8**	**0.7**
Achillea millefolium	0.2	2.8	0.5	0.5
Brickellia eupatorioides	0.1	1.5	0.3	0.6
Calochortus nuttallii	0.1	2.0	0.3	0.6
Comandra umbellata	0.1	1.7	0.3	0.7
Dalea purpurea	0.6	10.1	1.6	2.0
Evolvulus nuttallianus	0.1	1.2	0.3	0.5
Gaura coccinea	0.1	1.2	0.3	0.4
Heterotheca villosa	0.1	1.7	0.3	0.7
Lygodesmia juncea	<0.1	0.8	0.1	0.3
Mertensia ciliata	<0.1	0.2	<0.1	0.1
Pediomelum argophyllum	0.1	2.5	0.3	0.6
Pediomelum esculentum	0.3	4.9	0.8	0.9
Phlox hoodii	0.1	2.0	0.3	0.4
Psoralidium tenuiflorum	1.0	17.5	2.7	4.3
Sphaeralcea coccinea	0.5	8.8	1.3	2.2
Thermopsis rhombifolia	0.1	1.0	0.3	0.4
Vicia americana	1.3	24.0	3.5	4.8
Total Native Perennial Forbs	**4.9**	**83.9**	**13.1**	**7.1**
Taraxacum officinale	0.1	2.0	0.3	0.8
Total Introduced Perennial Forbs	**0.1**	**2.0**	**0.3**	**0.8**
Total Production	**37.5**	**663.0**	**100.1**	**23.7**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: BSG
Community Type: Bottomland Sagebrush Grassland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 25
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Bromus japonicus	2.6	46.0	2.2	4.7
Bromus tectorum	2.5	45.3	2.1	8.0
Total Introduced Annual Grasses	**5.1**	**91.3**	**4.3**	**8.7**
Achnatherum hymenoides	0.2	3.3	0.2	0.9
Elymus lanceolatus	0.4	7.2	0.3	2.0
Elymus smithii	34.0	607.5	28.3	55.4
Elymus trachycaulus	0.8	14.2	0.7	2.8
Hordeum jubatum	2.8	49.6	2.3	11.4
Nassella viridula	2.0	36.3	1.7	6.1
Total Native Cool Season Perennial Grasses	**40.2**	**718.1**	**33.5**	**57.4**
Spartina pectinata	1.7	29.6	1.4	8.3
Total Native Warm Season Perennial Grasses	**1.7**	**29.6**	**1.4**	**8.3**
Agropyron cristatum	18.0	321.4	15.0	41.7
Bromus inermis	9.4	167.6	7.8	42.5
Phleum pratense	0.7	12.9	0.6	3.6
Poa bulbosa	0.5	9.4	0.4	2.6
Poa pratensis	0.2	3.6	0.2	1.0
Total Introduced Perennial Grasses	**28.8**	**514.9**	**24.0**	**56.9**
Carex nebrascensis	15.8	281.3	13.2	65.6
Total Native Grasslike Species	**15.8**	**281.3**	**13.2**	**65.6**
Carex spp.	1.0	18.4	0.8	5.2
Total Unknown Grasslike Species	**1.0**	**18.4**	**0.8**	**5.2**
Lappula redowskii	0.1	1.9	0.1	0.5
Total Native Annual Forbs	**0.1**	**1.9**	**0.1**	**0.5**
Alyssum desertorum	1.4	25.1	1.2	4.4
Camelina microcarpa	0.1	1.6	0.1	0.4
Lepidium perfoliatum	0.1	1.6	0.1	0.5
Thlaspi arvense	0.4	7.8	0.3	2.0
Total Introduced Annual Forbs	**2.0**	**36.1**	**1.7**	**4.8**
Lactuca serriola	6.4	113.9	5.3	31.5
Tragopogon dubius	0.5	8.6	0.4	2.0
Total Introduced Biennial Forbs	**6.9**	**122.5**	**5.8**	**31.5**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: BSG
Community Type: Bottomland Sagebrush Grassland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 25
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Achillea millefolium	2.4	42.3	2.0	10.9
Ambrosia psilostachya	4.2	74.1	3.5	16.3
Lygodesmia juncea	0.4	6.6	0.3	1.8
Sphaeralcea coccinea	0.5	8.2	0.4	1.4
Total Native Perennial Forbs	**7.5**	**131.2**	**6.3**	**19.1**
Cirsium arvense	1.0	17.0	0.8	2.3
Convolvulus arvensis	5.8	103.7	4.8	12.6
Rumex crispus	0.7	12.0	0.6	2.7
Taraxacum officinale	0.1	1.9	0.1	0.5
Total Introduced Perennial Forbs	**7.6**	**134.6**	**6.3**	**13.5**
Astragalus spp.	0.2	4.4	0.2	1.2
Chenopodium spp.	0.5	8.9	0.4	1.7
Polygonum spp.	0.8	14.2	0.7	4.0
Sonchus spp.	1.4	24.5	1.2	6.9
Trifolium spp.	0.4	7.8	0.3	2.2
Total Unknown Forb Species	**3.3**	**59.8**	**2.8**	**8.0**
Total Production	**120.0**	**2,139.7**	**100.2**	**85.2**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: RW
Community Type: Riparian Woodland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 48
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Bromus japonicus	5.7	102.2	4.0	15.5
Bromus tectorum	2.1	38.1	1.5	7.5
Total Introduced Annual Grasses	**7.8**	**140.3**	**5.4**	**19.4**
Elymus lanceolatus	0.4	7.8	0.3	2.1
Elymus smithii	13.1	233.7	9.1	30.0
Elymus trachycaulus	16.4	292.2	11.4	63.2
Hordeum jubatum	5.0	88.3	3.5	17.8
Nassella viridula	1.7	30.3	1.2	7.3
Poa secunda	1.0	17.8	0.7	4.2
Total Native Cool Season Perennial Grasses	**37.6**	**670.1**	**26.2**	**68.3**
Spartina pectinata	7.8	139.3	5.4	28.5
Total Native Warm Season Perennial Grasses	**7.8**	**139.3**	**5.4**	**28.5**
Agropyron cristatum	31.1	554.7	21.7	82.3
Agrostis capillaris	<0.1	0.6	<0.1	0.2
Bromus inermis	10.3	183.9	7.2	33.7
Poa pratensis	2.9	51.4	2.0	7.6
Total Introduced Perennial Grasses	**44.3**	**790.6**	**30.9**	**85.0**
Festuca spp.	2.2	39.5	1.5	10.9
Total Unknown Grass Species	**2.2**	**39.5**	**1.5**	**10.9**
Carex nebrascensis	12.2	217.9	8.5	36.9
Schoenoplectus pungens	0.1	1.0	0.1	0.3
Total Native Grasslike Species	**12.3**	**218.9**	**8.6**	**36.9**
Chenopodium berlandieri	0.2	3.9	0.1	1.5
Descurainia pinnata	0.3	5.4	0.2	1.4
Galium aparine	0.1	1.4	0.1	0.5
Helianthus annuus	0.4	7.6	0.3	2.9
Total Native Annual Forbs	**1.0**	**18.3**	**0.7**	**4.1**
Alyssum desertorum	0.4	7.9	0.3	1.4
Atriplex heterosperma	0.7	11.9	0.5	4.6
Camelina microcarpa	0.8	13.8	0.6	2.2
Descurainia sophia	0.2	3.8	0.1	1.5
Lepidium perfoliatum	1.0	18.7	0.7	6.7
Medicago lupulina	0.8	14.2	0.6	4.2
Polygonum convolvulus	0.1	1.3	0.1	0.5

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: RW
Community Type: Riparian Woodland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 48
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Thlaspi arvense	0.9	16.5	0.6	4.5
Total Introduced Annual Forbs	**4.9**	**88.1**	**3.4**	**13.7**
Cynoglossum officinale	0.2	3.1	0.1	1.2
Lactuca serriola	1.2	20.8	0.8	5.7
Melilotus officinalis	<0.1	0.3	<0.1	0.1
Tragopogon dubius	0.2	3.2	0.1	0.9
Total Introduced Biennial Forbs	**1.6**	**27.4**	**1.1**	**5.8**
Achillea millefolium	2.6	46.0	1.8	7.4
Agoseris aurantiaca	<0.1	0.7	<0.1	0.3
Apocynum cannabinum	0.1	2.5	0.1	1.0
Asclepias speciosa	0.3	4.8	0.2	1.9
Brickellia eupatorioides	0.7	12.3	0.5	4.8
Comandra umbellata	0.1	2.1	0.1	0.8
Equisetum laevigatum	0.7	12.9	0.5	3.3
Evolvulus nuttallianus	0.8	14.4	0.6	5.6
Galium boreale	0.1	2.3	0.1	0.9
Glycyrrhiza lepidota	0.1	1.8	0.1	0.7
Grindelia squarrosa	1.9	33.9	1.3	10.9
Lactuca oblongifolia	0.2	3.3	0.1	1.3
Lepidium fremontii	<0.1	0.4	<0.1	0.2
Linum lewisii	<0.1	0.4	<0.1	0.2
Symphyotrichum falcatum	0.5	8.6	0.3	1.9
Typha latifolia	<0.1	0.7	<0.1	0.3
Vicia americana	<0.1	0.4	<0.1	0.1
Wyethia amplexicaulis	<0.1	0.5	<0.1	0.2
Total Native Perennial Forbs	**8.3**	**148.0**	**5.8**	**15.4**
Cardaria draba	7.0	125.0	4.9	34.0
Cirsium arvense	1.5	26.6	1.0	6.7
Convolvulus arvensis	1.8	31.9	1.3	6.7
Medicago sativa	0.1	2.1	0.1	0.8
Rumex crispus	0.1	1.4	0.1	0.5
Taraxacum officinale	2.7	48.7	1.9	5.7
Trifolium repens	0.1	1.1	0.1	0.4
Total Introduced Perennial Forbs	**13.3**	**236.8**	**9.3**	**34.6**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: RW
Community Type: Riparian Woodland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 48
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Astragalus spp.	0.9	16.7	0.6	6.2
Asteraceae spp.	0.5	9.6	0.3	2.6
Chenopodium spp.	0.1	0.9	0.1	0.4
Sonchus spp.	0.7	12.4	0.5	4.4
Total Unknown Forb Species	**2.2**	**39.6**	**1.5**	**7.8**
Total Production	**143.3**	**2,556.9**	**99.8**	**78.1**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: RBMS
Community Type: Rough Breaks Mixed Shrubland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Bromus japonicus	3.6	63.4	9.5	13.1
Bromus tectorum	1.1	19.5	2.9	4.3
Total Introduced Annual Grasses	**4.7**	**82.9**	**12.5**	**16.3**
Elymus lanceolatus	1.2	22.0	3.2	3.5
Elymus smithii	2.6	45.7	6.9	4.2
Elymus spicatus	13.2	236.0	35.0	16.9
Hesperostipa comata	2.3	40.7	6.1	6.4
Koeleria macrantha	0.1	2.0	0.3	0.6
Nassella viridula	0.6	10.7	1.6	2.0
Poa secunda	0.1	1.9	0.3	0.5
Total Native Cool Season Perennial Grasses	**20.1**	**359.0**	**53.3**	**16.8**
Bouteloua gracilis	0.1	2.2	0.3	0.6
Schizachyrium scoparium	0.1	1.2	0.3	0.5
Total Native Warm Season Perennial Grasses	**0.2**	**3.4**	**0.5**	**0.7**
Carex filifolia	0.1	1.4	0.3	0.4
Total Native Grasslike Species	**0.1**	**1.4**	**0.3**	**0.4**
Atriplex suckleyi	<0.1	0.6	0.1	0.2
Descurainia pinnata	<0.1	0.3	0.1	0.1
Gnaphalium palustre	<0.1	0.3	0.1	0.1
Plantago patagonica	<0.1	0.6	0.1	0.2
Total Native Annual Forbs	**0.1**	**1.8**	**0.3**	**0.3**
Alyssum desertorum	0.3	5.9	0.8	0.9
Chenopodium album	<0.1	0.1	<0.1	<0.1
Medicago lupulina	0.2	2.7	0.5	0.7
Total Introduced Annual Forbs	**0.5**	**8.7**	**1.3**	**1.1**
Lactuca serriola	<0.1	0.4	0.1	0.2
Melilotus officinalis	0.1	1.7	0.3	0.6
Tragopogon dubius	0.3	5.9	0.8	1.2
Total Introduced Biennial Forbs	**0.4**	**8.0**	**1.1**	**1.3**
Achillea millefolium	0.2	4.2	0.5	0.7
Agoseris glauca	0.1	1.6	0.3	0.6
Allium textile	<0.1	1.8	0.1	0.3
Antennaria microphylla	0.2	2.9	0.5	1.1
Calochortus nuttallii	<0.1	0.2	<0.1	0.1
Comandra umbellata	0.7	12.9	1.9	2.1

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: RBMS
Community Type: Rough Breaks Mixed Shrubland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Dalea candida	0.3	4.9	0.8	1.2
Dalea purpurea	0.5	8.2	1.3	2.0
Evolvulus nuttallianus	<0.1	0.6	0.1	0.2
Gaura coccinea	1.1	20.0	2.9	2.9
Glycyrrhiza lepidota	0.2	4.2	0.5	1.7
Grindelia squarrosa	0.3	4.8	0.8	1.1
Machaeranthera grindelioides	<0.1	0.7	0.1	0.3
Musineon divaricatum	0.2	3.9	0.5	0.7
Oxytropis lambertii	<0.1	0.7	0.1	0.3
Oxytropis sericea	0.1	1.3	0.3	0.5
Packera cana	0.1	2.1	0.3	0.6
Pediomelum argophyllum	0.2	5.4	0.5	1.6
Pediomelum esculentum	<0.1	0.7	0.1	0.2
Phlox hoodii	1.3	23.0	3.4	2.9
Psoralidium lanceolatum	0.4	7.2	1.1	1.4
Psoralidium tenuiflorum	2.1	36.9	5.6	4.4
Ratibida columnifera	<0.1	0.6	0.1	0.2
Sphaeralcea coccinea	0.4	7.1	1.1	1.2
Stenotus armerioides	0.1	1.2	0.3	0.3
Symphyotrichum falcatum	0.2	3.2	0.5	1.0
Vicia americana	0.3	5.1	0.8	1.1
Total Native Perennial Forbs	**9.2**	**165.4**	**24.4**	**8.5**
Astragalus cicer	<0.1	0.6	0.1	0.3
Convolvulus arvensis	2.1	37.3	5.6	6.8
Taraxacum officinale	0.1	1.6	0.3	0.4
Total Introduced Perennial Forbs	**2.2**	**39.5**	**5.8**	**6.8**
Eriogonum spp.	0.1	1.8	0.3	0.5
Penstemon spp.	0.1	1.6	0.3	0.6
Total Unknown Forb Species	**0.2**	**3.4**	**0.5**	**0.8**
Total Production	**37.7**	**673.5**	**100.0**	**24.0**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: SG
Community Type: Scoria Grassland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Echinochloa muricata	<0.1	0.3	<0.1	0.1
Total Native Annual Grasses	**<0.1**	**0.3**	**<0.1**	**0.1**
Bromus japonicus	1.6	28.5	2.6	2.8
Bromus tectorum	19.7	351.8	32.4	28.2
Total Introduced Annual Grasses	**21.3**	**380.3**	**35.0**	**28.9**
Elymus smithii	1.6	27.7	2.6	4.0
Elymus spicatus	15.9	284.3	26.2	21.9
Festuca idahoensis	0.1	1.0	0.2	0.4
Hesperostipa comata	5.5	97.7	9.0	13.0
Nassella viridula	1.0	18.7	1.6	4.1
Poa secunda	0.3	4.7	0.5	1.0
Total Native Cool Season Perennial Grasses	**24.4**	**434.1**	**40.1**	**22.3**
Aristida purpurea	0.1	1.6	0.2	0.4
Bouteloua gracilis	0.1	0.9	0.2	0.4
Buchloe dactyloides	<0.1	0.7	0.1	0.3
Calamagrostis purpurascens	0.2	3.5	0.3	1.4
Total Native Warm Season Perennial Grasses	**0.4**	**6.7**	**0.7**	**1.5**
Festuca ovina	<0.1	0.5	<0.1	0.2
Total Introduced Perennial Grasses	**<0.1**	**0.5**	**<0.1**	**0.2**
Descurainia pinnata	<0.1	0.7	0.1	0.3
Helianthus annuus	1.4	25.6	2.3	9.4
Logfia arvensis	<0.1	0.2	<0.1	0.1
Total Native Annual Forbs	**1.5**	**26.5**	**2.5**	**9.4**
Alyssum desertorum	1.2	20.7	2.0	3.0
Camelina microcarpa	1.4	24.5	2.3	7.2
Descurainia sophia	<0.1	0.8	0.1	0.3
Sisymbrium altissimum	0.3	5.8	0.5	1.6
Total Introduced Annual Forbs	**2.9**	**51.8**	**4.8**	**7.9**
Melilotus officinalis	0.1	1.2	0.2	0.5
Tragopogon dubius	0.5	8.7	0.8	1.7
Total Introduced Biennial Forbs	**0.6**	**9.9**	**1.0**	**1.7**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: SG
Community Type: Scoria Grassland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Ambrosia psilostachya	0.1	1.4	0.2	0.5
Brickellia eupatorioides	0.2	4.0	0.3	1.6
Dalea purpurea	2.2	39.8	3.6	5.8
Eriogonum pauciflorum	0.2	3.3	0.3	1.0
Evolvulus nuttallianus	0.5	9.6	0.8	3.2
Galium boreale	<0.1	0.1	<0.1	0.1
Gaura coccinea	0.1	2.0	0.2	0.6
Lactuca tatarica	<0.1	0.5	<0.1	0.2
Lomatium foeniculaceum	0.2	3.4	0.3	1.3
Lygodesmia juncea	0.2	4.2	0.3	1.7
Musineon divaricatum	<0.1	0.3	<0.1	0.1
Oxytropis sericea	1.0	17.1	1.6	4.7
Pediomelum argophyllum	0.2	4.1	0.3	1.0
Pediomelum esculentum	0.1	1.7	0.2	0.5
Phlox hoodii	0.4	7.6	0.7	2.3
Psoralidium tenuiflorum	1.9	34.7	3.1	11.3
Sphaeralcea coccinea	1.6	29.1	2.6	3.8
Symphyotrichum falcatum	0.2	3.6	0.3	1.4
Vicia americana	0.2	3.3	0.3	0.7
Total Native Perennial Forbs	**9.4**	**169.8**	**15.5**	**17.9**
Astragalus cicer	<0.1	0.5	<0.1	0.2
Medicago sativa	0.1	1.1	0.2	0.4
Taraxacum officinale	<0.1	0.3	<0.1	0.1
Total Introduced Perennial Forbs	**0.2**	**1.9**	**0.3**	**0.5**
Cryptantha spp.	<0.1	0.4	<0.1	0.1
Eriogonum spp.	0.1	1.5	0.2	0.6
Total Unknown Forb Species	**0.1**	**1.9**	**0.2**	**0.6**
Total Production	**60.8**	**1,083.7**	**100.1**	**33.8**

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: UG
Community Type: Upland Grassland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Bromus japonicus	4.8	85.6	7.5	7.7
Bromus tectorum	10.9	194.8	16.9	20.0
Total Introduced Annual Grasses	**15.7**	**280.4**	**24.4**	**23.8**
Elymus lanceolatus	1.4	24.9	2.2	4.6
Elymus smithii	20.3	362.3	31.5	24.5
Elymus spicatus	7.9	141.8	12.3	16.1
Hesperostipa comata	4.1	73.6	6.4	7.5
Nassella viridula	1.9	33.7	3.0	6.5
Poa secunda	1.4	24.7	2.2	3.2
Total Native Cool Season Perennial Grasses	**37.0**	**661.0**	**57.5**	**24.9**
Aristida purpurea	0.2	4.1	0.3	1.6
Bouteloua gracilis	0.6	10.3	0.9	1.7
Distichlis stricta	<0.1	0.8	0.1	0.3
Sporobolus cryptandrus	0.2	4.0	0.3	1.2
Total Native Warm Season Perennial Grasses	**1.0**	**19.2**	**1.6**	**2.9**
Agropyron cristatum	0.4	7.8	0.6	2.8
Festuca ovina	0.1	1.4	0.2	0.6
Poa bulbosa	0.2	3.0	0.3	0.7
Total Introduced Perennial Grasses	**0.7**	**12.2**	**1.1**	**2.9**
Carex filifolia	0.5	9.0	0.8	3.6
Total Native Grasslike Species	**0.5**	**9.0**	**0.8**	**3.6**
Lappula redowskii	1.1	19.4	1.7	7.7
Logfia arvensis	0.1	1.0	0.2	0.3
Plantago patagonica	0.3	5.6	0.5	1.0
Total Native Annual Forbs	**1.5**	**26.0**	**2.3**	**7.7**
Alyssum desertorum	0.4	7.6	0.6	1.1
Total Introduced Annual Forbs	**0.4**	**7.6**	**0.6**	**1.1**
Melilotus officinalis	0.1	1.1	0.2	0.3
Tragopogon dubius	0.5	9.8	0.8	1.2
Total Introduced Biennial Forbs	**0.6**	**10.9**	**0.9**	**1.2**
Achillea millefolium	0.7	11.6	1.1	2.0

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RAMACO
BASELINE ASSESSMENT
Report: Production Summary

Project Name: 2013 RAMACO
Polygon Name: UG
Community Type: Upland Grassland
Date: 7/1/2013

Plot Size: 1 Square Meter
Sample Size: 1
Number of Samples: 50
Report Date: 12/31/2013

Species	Mean g/m²	Mean lbs/acre	Relative (%)	Std. Dev n - 1 (gm/sq.m.)
Agoseris glauca	<0.1	0.1	<0.1	<0.1
Ambrosia psilostachya	0.2	2.9	0.3	0.7
Antennaria microphylla	<0.1	0.1	<0.1	<0.1
Cirsium flodmanii	0.2	2.8	0.3	1.1
Dalea purpurea	0.5	9.5	0.8	2.6
Evolvulus nuttallianus	0.5	8.9	0.8	3.4
Gaura coccinea	0.1	1.5	0.2	0.6
Grindelia squarrosa	0.1	1.4	0.2	0.6
Musineon divaricatum	<0.1	0.2	<0.1	0.1
Pediomelum argophyllum	0.1	2.3	0.2	0.7
Pediomelum esculentum	0.1	2.5	0.2	0.8
Phlox hoodii	0.3	5.3	0.5	1.3
Psoralidium tenuiflorum	1.3	23.1	2.0	3.8
Sphaeralcea coccinea	1.0	18.4	1.6	2.3
Thermopsis rhombifolia	0.2	4.5	0.3	1.3
Vicia americana	1.1	18.8	1.7	4.1
Total Native Perennial Forbs	**6.4**	**113.9**	**9.9**	**8.2**
Convolvulus arvensis	0.1	0.9	0.2	0.4
Taraxacum officinale	0.5	8.7	0.8	1.3
Total Introduced Perennial Forbs	**0.6**	**9.6**	**0.9**	**1.4**
Eriogonum spp.	<0.1	0.3	<0.1	0.1
Penstemon spp.	<0.1	0.4	<0.1	0.1
Total Unknown Forb Species	**<0.1**	**0.7**	**0.1**	**0.2**
Total Production	**64.4**	**1,150.5**	**100.1**	**27.9**

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ATTACHMENT D8-1-E

Shrub Density Summaries

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	BSS	**Sample Size**	1
Community Type	Big Sagebrush Shrubland	**Number of Samples**	50
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	3.3	2.7	10.7	<0.1	133.6
Artemisia tridentata	90.7	74.5	45.5	0.9	3,669.8
Chrysothamnus viscidiflorus	1.1	0.9	6.0	<0.1	46.1
Ericameria nauseosa	1.1	0.9	5.2	<0.1	44.5
Rhus aromatica	0.3	0.2	1.1	<0.1	11.3
Ribes cereum	<0.1	<0.1	<0.1	<0.1	<0.1
Symphoricarpos albus	0.1	0.1	0.6	<0.1	3.2
Total Native Full Shrubs	**96.6**	**79.4**	**52.3**	**1.0**	**3,908.6**
Artemisia frigida	15.2	12.5	18.4	0.2	613.5
Gutierrezia sarothrae	9.9	8.1	17.2	0.1	402.3
Yucca glauca	<0.1	<0.1	0.3	<0.1	1.6
Total Native Half &Sub-Shrubs	**25.1**	**20.6**	**26.4**	**0.3**	**1,017.4**
Total	**121.7**	**100.0**	**64.5**	**1.2**	**4,926.0**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	BSG	**Sample Size**	1
Community Type	Bottomland Sagebrush Grassland	**Number of Samples**	25
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	12.0	21.9	38.4	0.1	484.0
Rhus aromatica	0.2	0.4	0.7	<0.1	8.1
Rosa woodsii	0.1	0.2	0.4	<0.1	3.2
Symphoricarpos albus	1.1	2.0	5.0	<0.1	43.7
Symphoricarpos occidentalis	7.7	14.1	18.4	0.1	312.4
Symphoricarpos spp.	0.4	0.7	2.0	<0.1	16.2
Total Native Full Shrubs	**21.5**	**39.2**	**41.7**	**0.2**	**867.7**
Artemisia frigida	1.9	3.5	4.1	<0.1	76.1
Artemisia ludoviciana	31.4	57.3	54.2	0.3	1,272.4
Total Native Half &Sub-Shrubs	**33.3**	**60.8**	**53.5**	**0.3**	**1,348.5**
Total	**54.8**	**100.0**	**68.3**	**0.5**	**2,216.1**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	PJW	**Sample Size**	1
Community Type	Pine and Juniper Woodland	**Number of Samples**	15
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia tridentata	8.1	14.1	11.6	0.1	326.5
Chrysothamnus viscidiflorus	1.1	1.9	3.9	<0.1	45.9
Ericameria nauseosa	3.3	5.7	7.8	<0.1	132.2
Rhus aromatica	3.3	5.7	5.9	<0.1	132.2
Ribes cereum	1.9	3.3	4.1	<0.1	75.5
Rosa woodsii	2.7	4.7	10.0	<0.1	110.6
Total Native Full Shrubs	**20.4**	**35.5**	**22.9**	**0.2**	**822.9**
Artemisia frigida	13.9	24.2	19.3	0.1	563.9
Artemisia ludoviciana	9.0	15.7	34.9	0.1	364.2
Gutierrezia sarothrae	14.1	24.6	19.9	0.1	569.3
Total Native Half &Sub-Shrubs	**37.0**	**64.5**	**46.5**	**0.4**	**1,497.4**
Total	**57.4**	**100.0**	**62.2**	**0.6**	**2,320.3**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	PDMG	**Sample Size**	1
Community Type	Prairie Dog Modified Grassland	**Number of Samples**	40
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	<0.1	0.1	0.2	<0.1	1.0
Artemisia tridentata	3.3	8.5	9.2	<0.1	132.5
Chrysothamnus viscidiflorus	2.0	5.2	7.8	<0.1	79.9
Ericameria nauseosa	1.5	3.9	8.9	<0.1	58.7
Rhus aromatica	<0.1	0.1	0.2	<0.1	1.0
Symphoricarpos albus	0.2	0.5	1.3	<0.1	8.1
Total Native Full Shrubs	**7.1**	**18.3**	**14.4**	**0.1**	**281.3**
Artemisia frigida	26.1	67.3	67.7	0.3	1,057.3
Artemisia ludoviciana	3.1	8.0	18.2	<0.1	123.4
Gutierrezia sarothrae	2.5	6.4	11.4	<0.1	99.2
Total Native Half &Sub-Shrubs	**31.7**	**81.7**	**69.3**	**0.3**	**1,279.9**
Total	**38.8**	**100.0**	**73.0**	**0.4**	**1,561.1**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	RG	**Sample Size**	1
Community Type	Reclaimed Grassland	**Number of Samples**	10
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	0.4	8.3	1.3	<0.1	16.2
Artemisia tridentata	0.1	2.1	0.3	<0.1	4.0
Atriplex canescens	3.8	79.2	11.0	<0.1	153.8
Ericameria nauseosa	0.4	8.3	1.3	<0.1	16.2
Total Native Full Shrubs	**4.7**	**97.9**	**10.3**	**<0.1**	**190.2**
Artemisia frigida	0.1	2.1	0.3	<0.1	4.0
Total Native Half &Sub-Shrubs	**0.1**	**2.1**	**0.3**	**<0.1**	**4.0**
Total	**4.8**	**100.0**	**10.8**	**<0.1**	**194.3**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	RW	**Sample Size**	1
Community Type	Riparian Woodland	**Number of Samples**	46
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	20.9	11.6	36.3	0.2	846.4
Artemisia tridentata	0.9	0.5	2.9	<0.1	35.2
Ericameria nauseosa	0.2	0.1	0.6	<0.1	6.2
Rhus aromatica	<0.1	<0.1	0.1	<0.1	0.9
Ribes cereum	0.1	0.1	0.5	<0.1	5.3
Rosa woodsii	8.1	4.5	31.2	0.1	329.0
Shepherdia canadensis	0.3	0.2	2.4	<0.1	14.1
Symphoricarpos albus	126.1	70.0	175.6	1.3	5,104.5
Symphoricarpos occidentalis	14.2	7.9	51.6	0.1	576.3
Total Native Full Shrubs	**170.8**	**94.8**	**177.2**	**1.7**	**6,917.7**
Artemisia frigida	2.0	1.1	7.2	<0.1	80.9
Artemisia ludoviciana	7.4	4.1	17.1	0.1	298.2
Gutierrezia sarothrae	<0.1	<0.1	0.3	<0.1	1.8
Total Native Half &Sub-Shrubs	**9.4**	**5.2**	**18.3**	**0.1**	**380.9**
Total	**180.2**	**100.0**	**179.3**	**1.8**	**7,298.7**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	RBMS	**Sample Size**	1
Community Type	Rough Breaks Mixed Shrubland	**Number of Samples**	49
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	1.5	0.9	5.4	<0.1	60.3
Artemisia tridentata	62.5	39.3	53.6	0.6	2,529.0
Atriplex canescens	<0.1	<0.1	0.3	<0.1	1.7
Chrysothamnus viscidiflorus	0.4	0.3	2.0	<0.1	18.2
Ericameria nauseosa	17.8	11.2	28.8	0.2	718.5
Rhus aromatica	0.9	0.6	2.1	<0.1	34.7
Rosa woodsii	24.3	15.3	42.9	0.2	983.7
Sarcobatus vermiculatus	2.6	1.6	10.1	<0.1	104.1
Symphoricarpos albus	0.1	0.1	0.4	<0.1	2.5
Symphoricarpos occidentalis	0.2	0.1	1.6	<0.1	9.1
Total Native Full Shrubs	**110.3**	**69.4**	**81.6**	**1.1**	**4,461.6**
Artemisia frigida	20.3	12.8	23.2	0.2	821.8
Artemisia ludoviciana	0.6	0.4	2.9	<0.1	23.1
Artemisia pedatifida	0.2	0.1	1.6	<0.1	9.1
Atriplex gardneri	0.3	0.2	1.8	<0.1	13.2
Gutierrezia sarothrae	26.8	16.9	34.4	0.3	1,084.4
Juniperus horizontalis	<0.1	<0.1	0.1	<0.1	0.8
Linanthus pungens	0.2	0.1	1.1	<0.1	6.6
Yucca glauca	0.3	0.2	1.8	<0.1	14.0
Total Native Half &Sub-Shrubs	**48.7**	**30.6**	**49.0**	**0.5**	**1,973.1**
Total	**159.0**	**100.0**	**83.1**	**1.6**	**6,434.7**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	SG	**Sample Size**	1
Community Type	Scoria Grassland	**Number of Samples**	50
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	2.7	5.9	8.5	<0.1	109.3
Artemisia tridentata	18.3	40.2	23.9	0.2	742.2
Chrysothamnus viscidiflorus	0.1	0.2	0.5	<0.1	4.9
Ericameria nauseosa	0.9	2.0	5.3	<0.1	38.0
Rhus aromatica	6.1	13.4	6.7	0.1	248.5
Ribes cereum	<0.1	0.1	0.3	<0.1	1.6
Rosa woodsii	1.5	3.3	4.8	<0.1	62.3
Symphoricarpos albus	0.1	0.2	0.4	<0.1	3.2
Symphoricarpos occidentalis	<0.1	<0.1	0.1	<0.1	0.8
Total Native Full Shrubs	**29.8**	**65.5**	**26.2**	**0.3**	**1,210.9**
Artemisia frigida	10.2	22.4	17.7	0.1	414.4
Artemisia ludoviciana	1.3	2.9	8.9	<0.1	51.0
Gutierrezia sarothrae	3.7	8.1	6.7	<0.1	151.4
Krascheninnikovia lanata	<0.1	0.1	0.3	<0.1	1.6
Yucca glauca	0.5	1.1	3.4	<0.1	20.2
Total Native Half &Sub-Shrubs	**15.7**	**34.5**	**25.7**	**0.2**	**638.6**
Total	**45.5**	**100.0**	**42.0**	**0.5**	**1,849.5**

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RAMACO
BASELINE ASSESSMENT
Report: Density Summary

Project Name	2013 RAMACO	**Plot Size**	100 Square Meters
Polygon Name	UG	**Sample Size**	1
Community Type	Upland Grassland	**Number of Samples**	52
Date	7/1/2013	**Report Date**	12/31/2013

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Artemisia cana	1.3	3.7	6.0	<0.1	53.7
Artemisia tridentata	4.1	11.7	9.3	<0.1	166.5
Chrysothamnus viscidiflorus	1.6	4.6	4.9	<0.1	64.6
Ericameria nauseosa	0.6	1.7	2.9	<0.1	25.7
Rhus aromatica	0.4	1.1	1.2	<0.1	15.6
Ribes cereum	0.1	0.3	0.7	<0.1	5.4
Rosa woodsii	0.4	1.1	2.2	<0.1	15.6
Sarcobatus vermiculatus	0.3	0.9	1.8	<0.1	10.1
Symphoricarpos albus	1.2	3.4	8.3	<0.1	47.5
Total Native Full Shrubs	**10.0**	**28.7**	**17.2**	**0.1**	**404.7**
Artemisia frigida	21.9	62.8	30.5	0.2	888.0
Artemisia pedatifida	<0.1	0.1	0.1	<0.1	0.8
Gutierrezia sarothrae	1.7	4.9	5.2	<0.1	67.7
Krascheninnikovia lanata	0.9	2.6	6.2	<0.1	35.8
Yucca glauca	0.4	1.1	1.3	<0.1	15.6
Total Native Half &Sub-Shrubs	**24.9**	**71.3**	**32.1**	**0.2**	**1,007.9**
Total	**34.9**	**100.0**	**36.7**	**0.3**	**1,412.6**

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ATTACHMENT D8-1-F

Photographs

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Agricultural Land 1

Agricultural Land 2

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Agricultural Land 3

Agricultural Land 4

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PHOTO FOR AGRICULTURAL LAND 5 NOT AVAILABLE

Agricultural Land 6

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Agricultural Land 7

Agricultural Land 8

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Agricultural Land 9

Agricultural Land 10

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Agricultural Land 11

Agricultural Land 12

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Agricultural Land 13

Agricultural Land 14

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Agricultural Land 15

Agricultural Land 16

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Agricultural Land 17

PHOTO FOR AGRICULTURAL LAND 18 NOT AVAILABLE

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Agricultural Land 19

Agricultural Land 20

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Agricultural Land 21

Agricultural Land 22

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PHOTO FOR AGRICULTURAL LAND 23 NOT AVAILABLE

Agricultural Land 24

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Agricultural Land 25

Bottomland Sagebrush Grassland 1

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Bottomland Sagebrush Grassland 2

Bottomland Sagebrush Grassland 3

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Bottomland Sagebrush Grassland 4

Bottomland Sagebrush Grassland 5

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Bottomland Sagebrush Grassland 6

Bottomland Sagebrush Grassland 7

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Bottomland Sagebrush Grassland 8

Bottomland Sagebrush Grassland 9

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Bottomland Sagebrush Grassland 10

Bottomland Sagebrush Grassland 11

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Bottomland Sagebrush Grassland 12

Bottomland Sagebrush Grassland 13

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Bottomland Sagebrush Grassland 14

Bottomland Sagebrush Grassland 15

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Bottomland Sagebrush Grassland 16

Bottomland Sagebrush Grassland 17

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Bottomland Sagebrush Grassland 18

Bottomland Sagebrush Grassland 19

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Bottomland Sagebrush Grassland 20

Bottomland Sagebrush Grassland 21

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Bottomland Sagebrush Grassland 22

Bottomland Sagebrush Grassland 23

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Bottomland Sagebrush Grassland 24

Bottomland Sagebrush Grassland 25

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Big Sagebrush Shrubland 1

Big Sagebrush Shrubland 2

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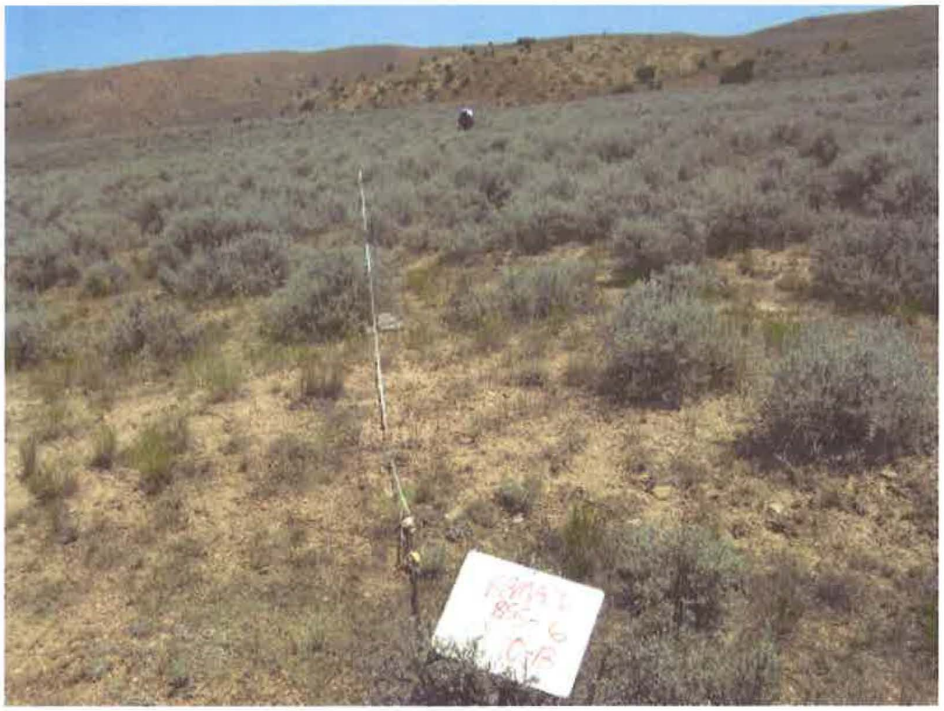
Big Sagebrush Shrubland 3

Big Sagebrush Shrubland 4

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 5



Big Sagebrush Shrubland 6

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 7

Big Sagebrush Shrubland 8

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 9

Big Sagebrush Shrubland 10

TFN 6 2/025
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Big Sagebrush Shrubland 11

Big Sagebrush Shrubland 12

TFN 6 2/025
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Big Sagebrush Shrubland 13

Big Sagebrush Shrubland 14

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Big Sagebrush Shrubland 15

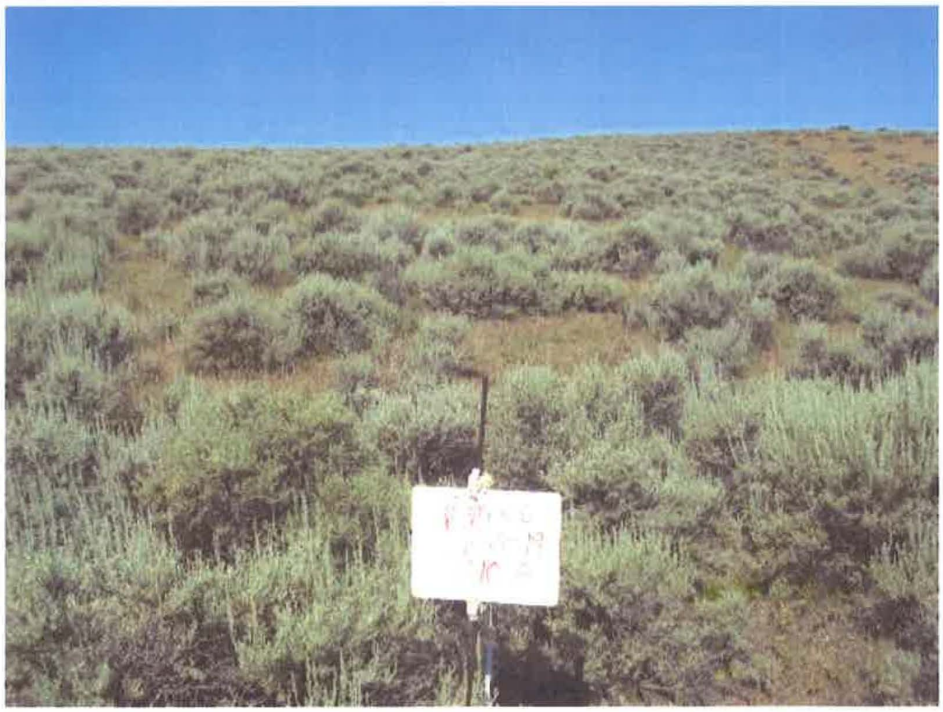
Big Sagebrush Shrubland 16

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 17

Big Sagebrush Shrubland 18

TFN 6 2/025
RECD NOV 14, 2014



Big Sagebrush Shrubland 19

Big Sagebrush Shrubland 20

TFN 6 2/025
RECD NOV 14, 2014

PHOTO FOR BIG SAGEBRUSH SHRUBLAND 21 NOT AVAILABLE

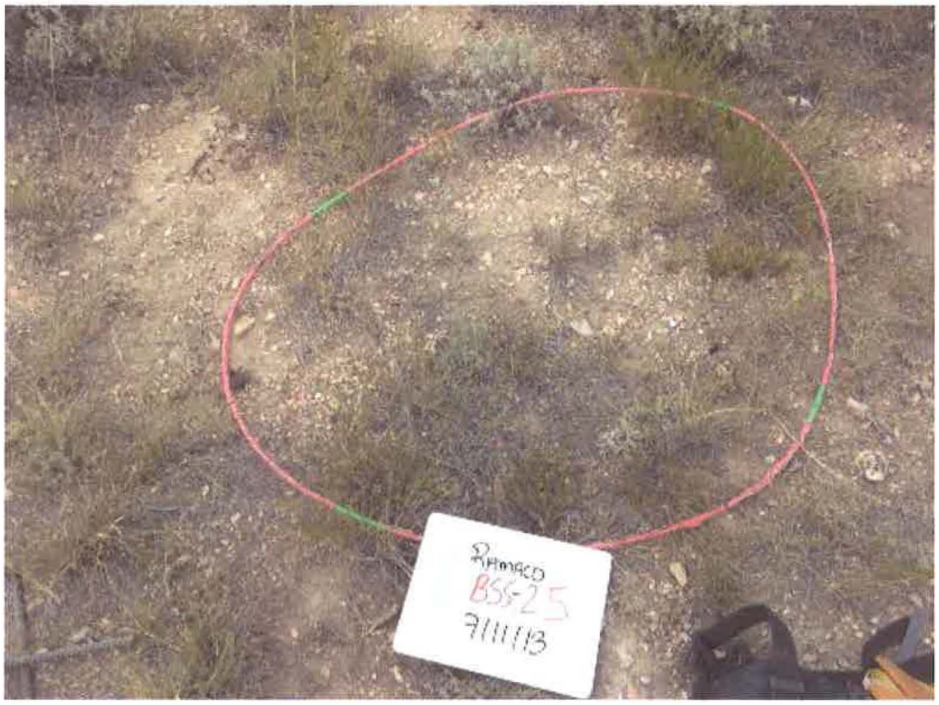
Big Sagebrush Shrubland 22

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 23

Big Sagebrush Shrubland 24

TFN 6 2/025
RECD NOV 14, 2014



Big Sagebrush Shrubland 25

Big Sagebrush Shrubland 26

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 27

Big Sagebrush Shrubland 28

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 29

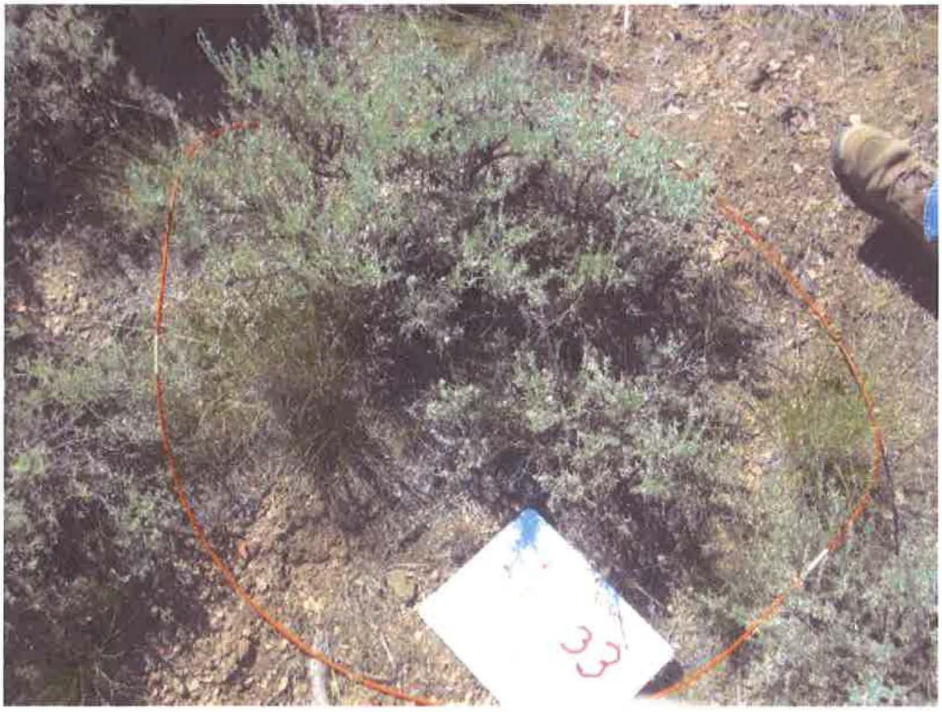
Big Sagebrush Shrubland 30

TFN 6 2/025
RECD NOV 14,2014

Big Sagebrush Shrubland 31

PHOTO FOR BIG SAGEBRUSH SHRUBLAND 32 NOT AVAILABLE

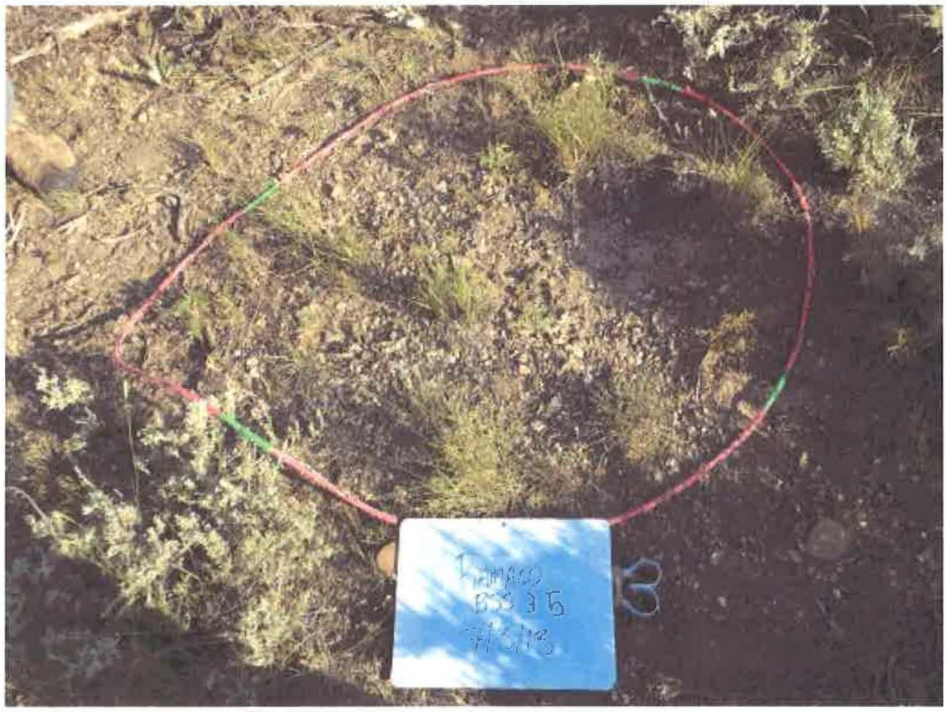
TFN 6 2/025
RECD NOV 14, 2014



Big Sagebrush Shrubland 33

Big Sagebrush Shrubland 34

TFN 6 2/025
RECD NOV 14, 2014



Big Sagebrush Shrubland 35

Big Sagebrush Shrubland 36

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 37

Big Sagebrush Shrubland 38

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 39

PHOTO FOR BIG SAGEBRUSH SHRUBLAND 40 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 41

Big Sagebrush Shrubland 42

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 43

Big Sagebrush Shrubland 44

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 45

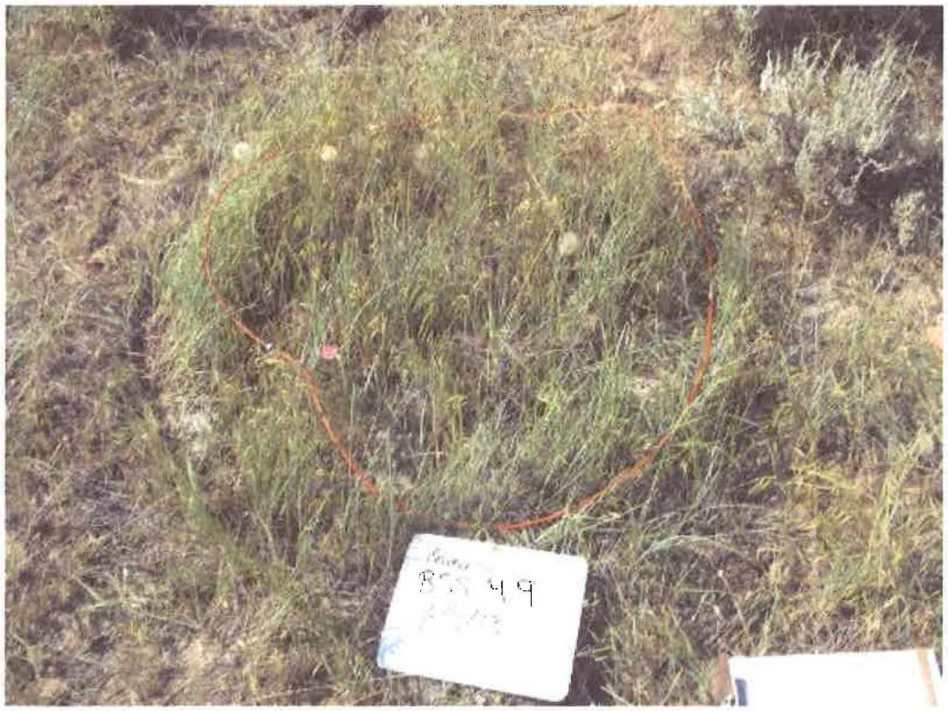
PHOTO FOR BIG SAGEBRUSH SHRUBLAND 46 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

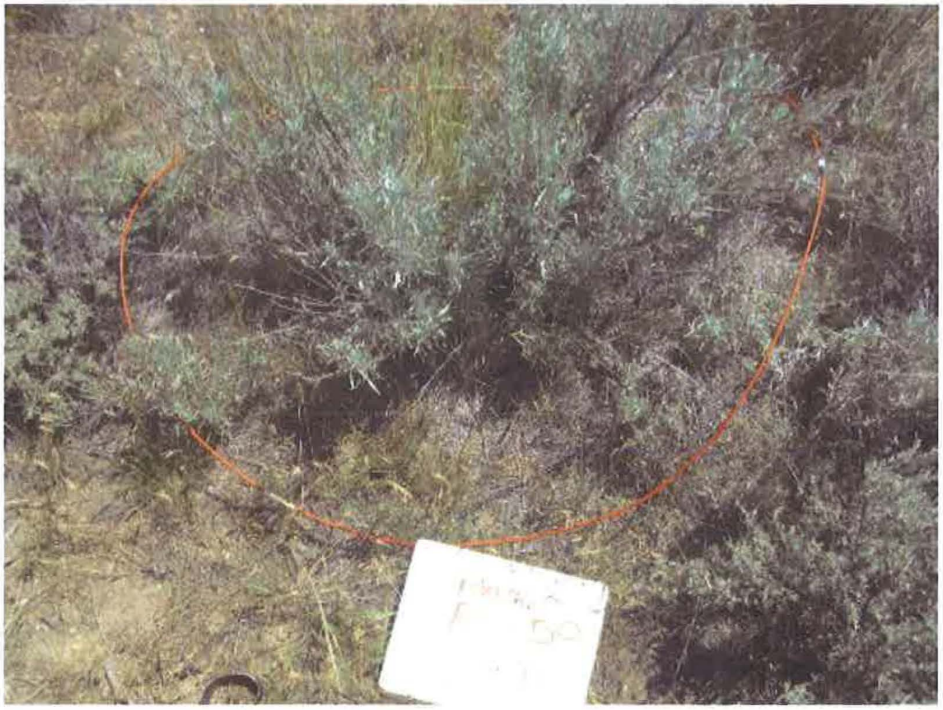
Big Sagebrush Shrubland 47

Big Sagebrush Shrubland 48

TFN 6 2/025
RECD NOV 14, 2014



Big Sagebrush Shrubland 49



Big Sagebrush Shrubland 50

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 51

PHOTOS FOR BIG SAGEBRUSH SHRUBLAND 52-53 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 54

Big Sagebrush Shrubland 55

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 56

Big Sagebrush Shrubland 57

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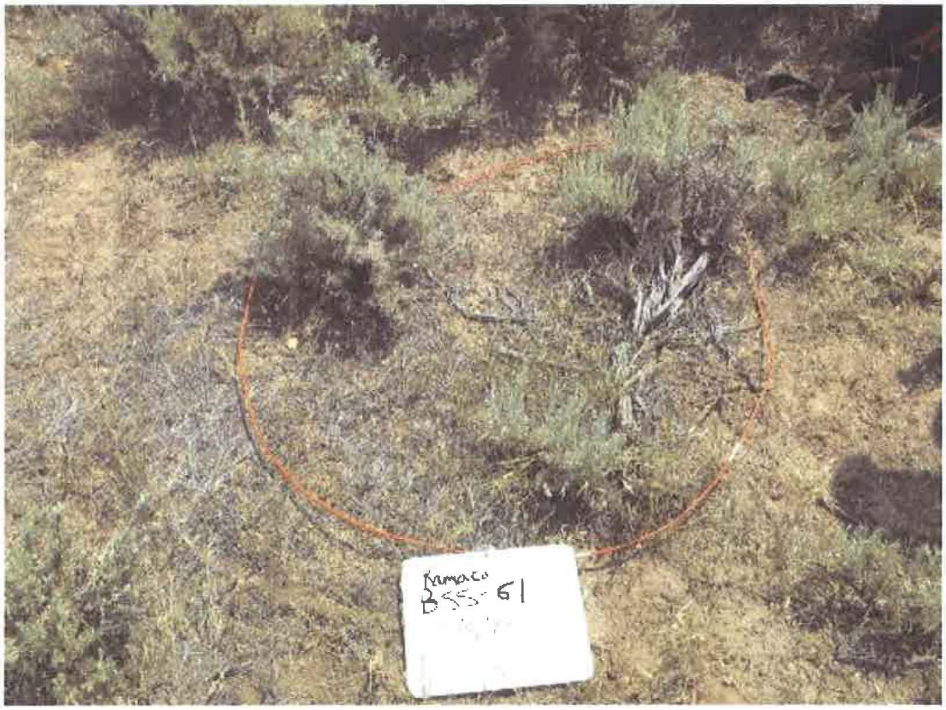
RECD NOV 14, 2014

Big Sagebrush Shrubland 58

Big Sagebrush Shrubland 59

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 60



Big Sagebrush Shrubland 61

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 62

Big Sagebrush Shrubland 63

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 64

Big Sagebrush Shrubland 65

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 66

Big Sagebrush Shrubland 67

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 68

Big Sagebrush Shrubland 69

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 70

Big Sagebrush Shrubland 71

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 72

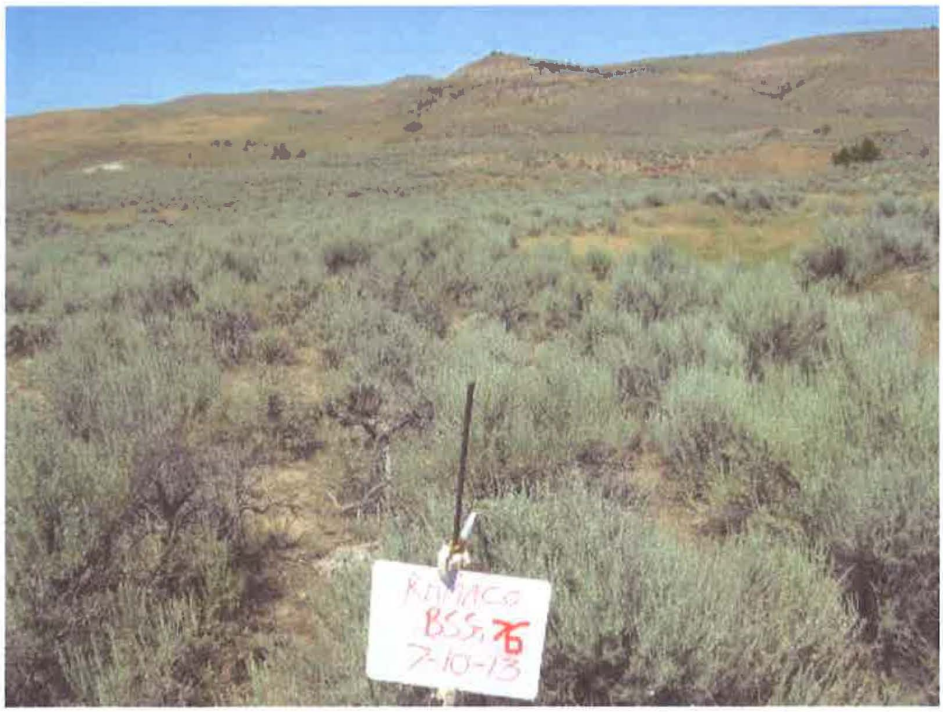
Big Sagebrush Shrubland 73

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 74

Big Sagebrush Shrubland 75

TFN 6 2/025
RECD NOV 14, 2014



Big Sagebrush Shrubland 76

Big Sagebrush Shrubland 77

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 78

Big Sagebrush Shrubland 79

TFN 6 2/025
RECD NOV 14, 2014

Big Sagebrush Shrubland 80

Big Sagebrush Shrubland 81

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RECD NOV 14, 2014

Big Sagebrush Shrubland 82

Big Sagebrush Shrubland 83

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RECD NOV 14, 2014

Big Sagebrush Shrubland 84

Big Sagebrush Shrubland 85

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RECD NOV 14, 2014

Big Sagebrush Shrubland 86

Big Sagebrush Shrubland 87

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RECD NOV 14, 2014

PHOTO FOR BIG SAGEBRUSH SHRUBLAND 88 NOT AVAILABLE

Big Sagebrush Shrubland 89

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Big Sagebrush Shrubland 90

Prairie Dog Modified Grassland 1

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 2

Prairie Dog Modified Grassland 3

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 4

Prairie Dog Modified Grassland 5

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 6

Prairie Dog Modified Grassland 7

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 8

Prairie Dog Modified Grassland 9

TFN 6 2/025
RECD NOV 14, 2014

PHOTO FOR PRAIRIE DOG MODIFIED GRASSLAND 10 NOT AVAILABLE

Prairie Dog Modified Grassland 11

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 12

Prairie Dog Modified Grassland 13

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 14

PHOTO FOR PRAIRIE DOG MODIFIED GRASSLAND 15 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 16

Prairie Dog Modified Grassland 17

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 18

Prairie Dog Modified Grassland 19

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 20

Prairie Dog Modified Grassland 21

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 22

Prairie Dog Modified Grassland 23

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 24

Prairie Dog Modified Grassland 25

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 26

Prairie Dog Modified Grassland 27

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 28

Prairie Dog Modified Grassland 29

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 30

Prairie Dog Modified Grassland 31

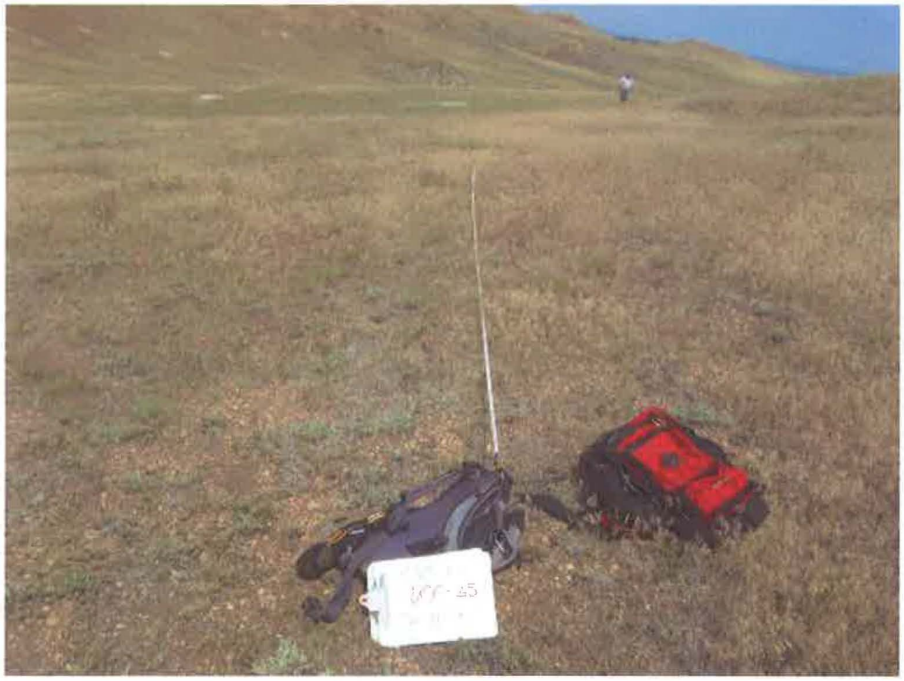
TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 32

Prairie Dog Modified Grassland 33

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 34



Prairie Dog Modified Grassland 35

TFN 6 2/025
RECD NOV 14, 2014

Prairie Dog Modified Grassland 36

Prairie Dog Modified Grassland 37

TFN 6 2/025
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Prairie Dog Modified Grassland 38

Prairie Dog Modified Grassland 39

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Prairie Dog Modified Grassland 40

Pine and Juniper Woodland 1

TFN 6 2/025
RECD NOV 14, 2014

Pine and Juniper Woodland 2

Pine and Juniper Woodland 3

TFN 6 2/025
RECD NOV 14, 2014

Pine and Juniper Woodland 4

Pine and Juniper Woodland 5

TFN 6 2/025
RECD NOV 14, 2014

Pine and Juniper Woodland 6

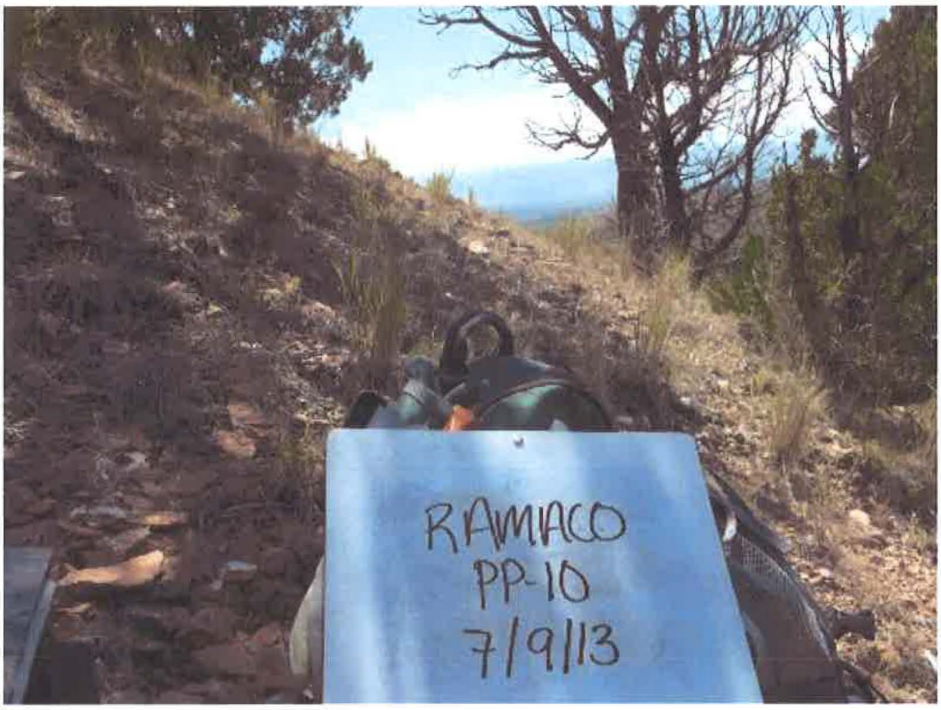
Pine and Juniper Woodland 7

TFN 6 2/025
RECD NOV 14, 2014

Pine and Juniper Woodland 8

Pine and Juniper Woodland 9

TFN 6 2/025
RECD NOV 14, 2014



Pine and Juniper Woodland 10

Pine and Juniper Woodland 11

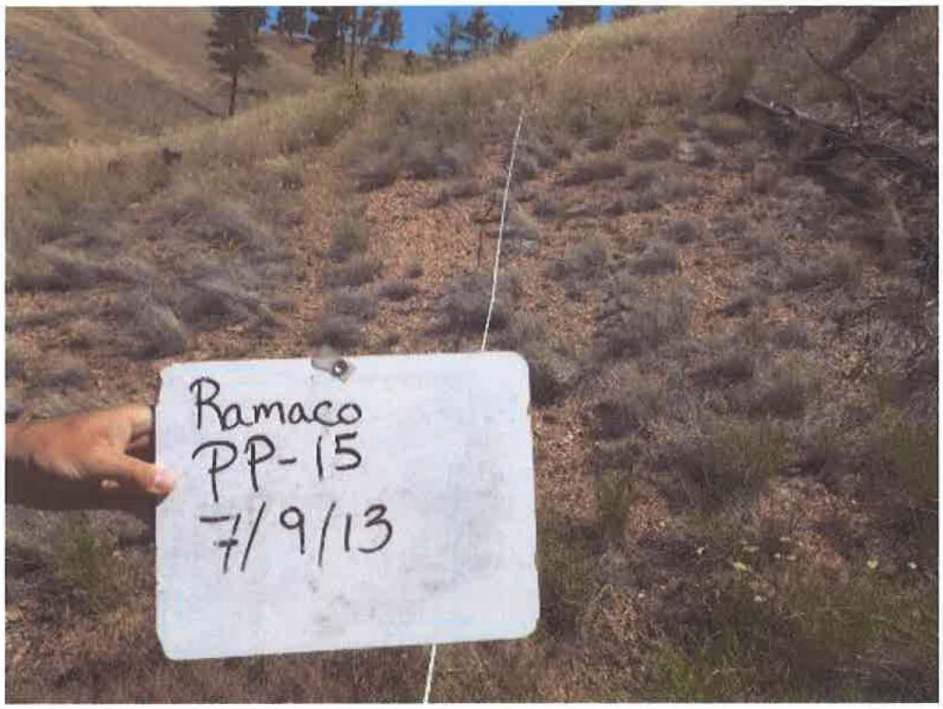
TFN 6 2/025
RECD NOV 14, 2014

Pine and Juniper Woodland 12

Pine and Juniper Woodland 13

TFN 6 2/025
RECD NOV 14, 2014

Pine and Juniper Woodland 14



Pine and Juniper Woodland 15

TFN 8 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 1

Rough Breaks Mixed Shrubland 2

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 3

Rough Breaks Mixed Shrubland 4

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 5

Rough Breaks Mixed Shrubland 6

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 7

Rough Breaks Mixed Shrubland 8

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 9

Rough Breaks Mixed Shrubland 10

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 11

Rough Breaks Mixed Shrubland 12

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 13

Rough Breaks Mixed Shrubland 14

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 15

Rough Breaks Mixed Shrubland 16

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 17

Rough Breaks Mixed Shrubland 18

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 20

Rough Breaks Mixed Shrubland 21

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 22

Rough Breaks Mixed Shrubland 23

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 24

Rough Breaks Mixed Shrubland 25

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 26

Rough Breaks Mixed Shrubland 27

TFN 6 2/025
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Rough Breaks Mixed Shrubland 28

Rough Breaks Mixed Shrubland 29

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Rough Breaks Mixed Shrubland 30

Rough Breaks Mixed Shrubland 31

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RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 32

Rough Breaks Mixed Shrubland 33

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 34

Rough Breaks Mixed Shrubland 35

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Rough Breaks Mixed Shrubland 36

Rough Breaks Mixed Shrubland 37

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 38

Rough Breaks Mixed Shrubland 39

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 40

Rough Breaks Mixed Shrubland 41

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 42

Rough Breaks Mixed Shrubland 43

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 44

Rough Breaks Mixed Shrubland 45

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 46

PHOTO FOR ROUGH BREAKS MIXED SHRUBLAND 47 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 48

Rough Breaks Mixed Shrubland 49

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 50

Rough Breaks Mixed Shrubland 51

TFN 6 2/025
RECD NOV 14, 2014

PHOTO FOR ROUGH BREAKS MIXED SHRUBLAND 52 NOT AVAILABLE

Rough Breaks Mixed Shrubland 53

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 54

Rough Breaks Mixed Shrubland 55

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RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 56

Rough Breaks Mixed Shrubland 57

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RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 58

Rough Breaks Mixed Shrubland 59

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 60

Rough Breaks Mixed Shrubland 61

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 62

Rough Breaks Mixed Shrubland 63

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 64

Rough Breaks Mixed Shrubland 65

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 66

Rough Breaks Mixed Shrubland 67

TFN 6 2/025
RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 68

Rough Breaks Mixed Shrubland 69

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RECD NOV 14, 2014

Rough Breaks Mixed Shrubland 70

Riparian Woodland 1

TFN 6 2/025
RECD NOV 14, 201

Riparian Woodland 2

Riparian Woodland 3

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 4

Riparian Woodland 5

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 6

Riparian Woodland 7

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 8

Riparian Woodland 9

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 10

Riparian Woodland 11

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 12

Riparian Woodland 13

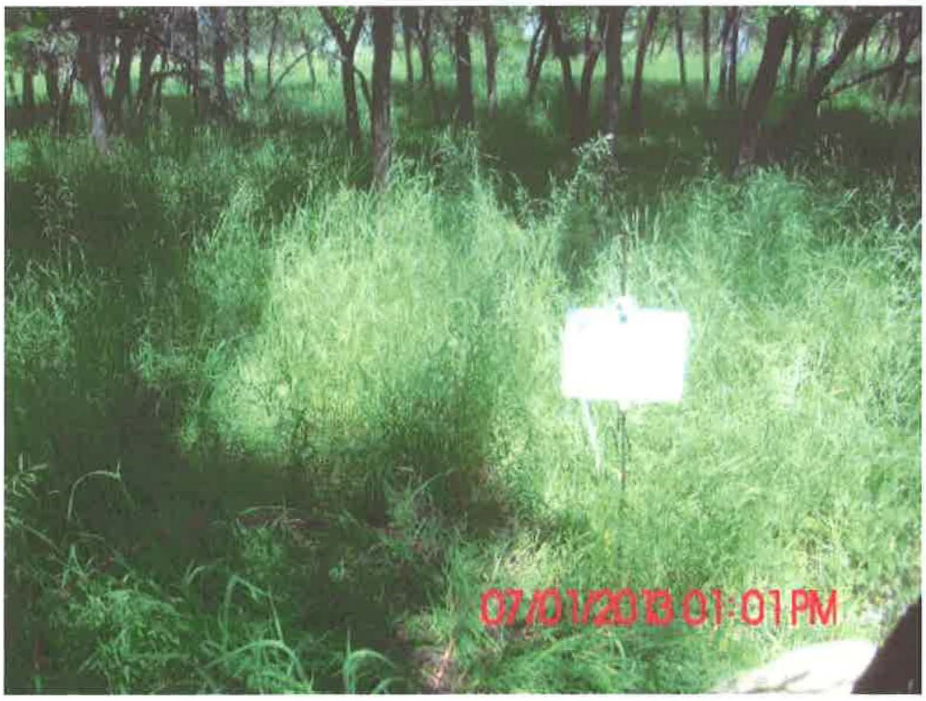
TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 14

Riparian Woodland 15

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 16



Riparian Woodland 17

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 18

Riparian Woodland 19

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 20

Riparian Woodland 21

TFN 6 2/025
RECD NOV 14,2014

Riparian Woodland 22

Riparian Woodland 23

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 24

Riparian Woodland 25

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 26

Riparian Woodland 27

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 28

Riparian Woodland 29

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 30

Riparian Woodland 31

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 32

Riparian Woodland 33

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 34

Riparian Woodland 35

TFN 8 2/025
RECD NOV 14, 2014

Riparian Woodland 36

Riparian Woodland 37

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 38

Riparian Woodland 39

TFN 6 2/025
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Riparian Woodland 40

Riparian Woodland 41

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RECD NOV 14,2014

Riparian Woodland 42

Riparian Woodland 43

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 44

Riparian Woodland 45

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 46

Riparian Woodland 47

TFN 6 2/025
RECD NOV 14, 2014

Riparian Woodland 48

Riparian Woodland 49

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 1

Scoria Grassland 2

TFN 6 2/025
RECD NOV 14,2014

Scoria Grassland 3

Scoria Grassland 4

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 5

Scoria Grassland 6

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 7

Scoria Grassland 8

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 9

Scoria Grassland 10

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 11

Scoria Grassland 12

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 13

Scoria Grassland 14

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 15

Scoria Grassland 16

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 17

Scoria Grassland 18

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 19

Scoria Grassland 20

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 21

Scoria Grassland 22

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 23

Scoria Grassland 24

TFN 6 2/025
RECD NOV 14, 2014

PHOTO FOR SCORIA GRASSLAND 25 NOT AVAILABLE

Scoria Grassland 26

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 27

Scoria Grassland 28

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 29

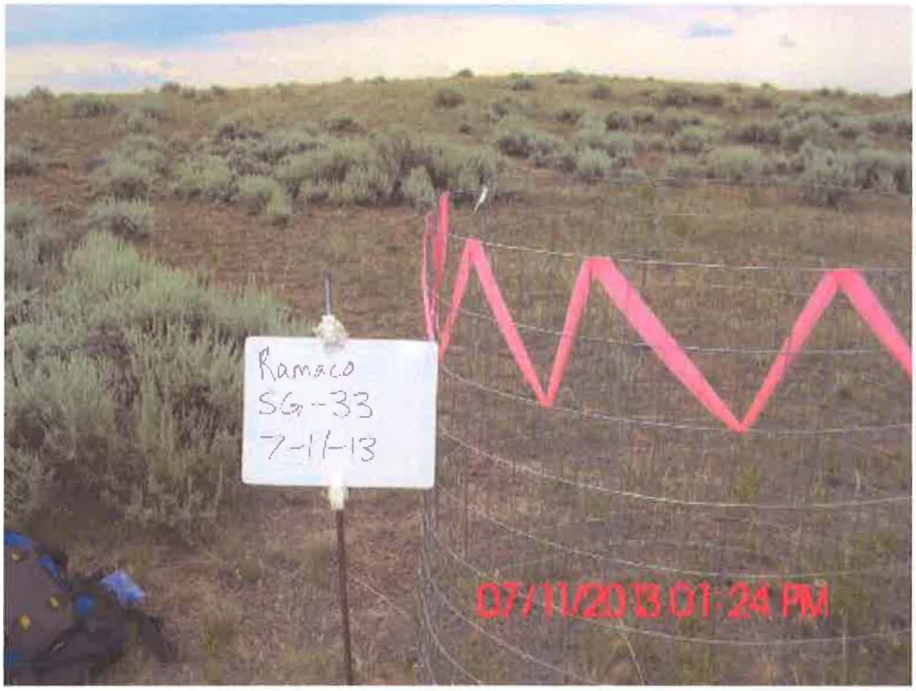
Scoria Grassland 30

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 31

PHOTO FOR SCORIA GRASSLAND 32 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014



Scoria Grassland 33

Scoria Grassland 34

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 35

PHOTO FOR SCORIA GRASSLAND 38 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 37

PHOTO FOR SCORIA GRASSLAND 38 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 39

Scoria Grassland 40

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 41

Scoria Grassland 42

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 43

PHOTOS FOR SCORIA GRASSLAND 44-45 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 46

Scoria Grassland 47

TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 48

Scoria Grassland 49

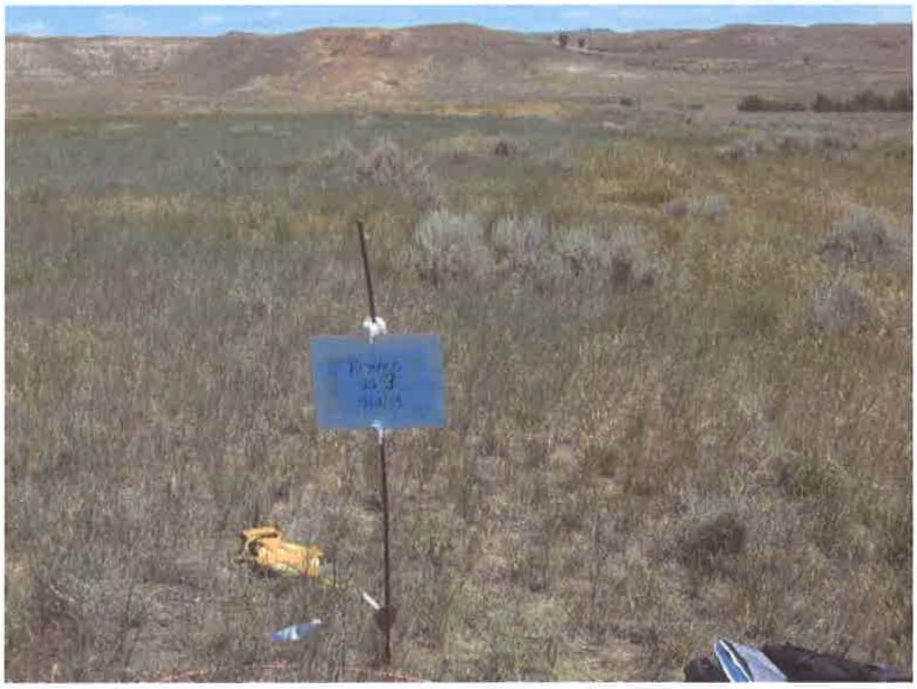
TFN 6 2/025
RECD NOV 14, 2014

Scoria Grassland 50

Upland Grassland 1

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 2



Upland Grassland 3

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 4

Upland Grassland 5

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 6

Upland Grassland 7

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 8

Upland Grassland 9

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 10

Upland Grassland 11

TFN 6 2/025
RCD NOV 14, 2014

Upland Grassland 12

Upland Grassland 13

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 14

PHOTO FOR UPLAND GRASSLAND 15 NOT AVAILABLE

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 16

Upland Grassland 17

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 18

Upland Grassland 19

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 20

Upland Grassland 21

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 22

Upland Grassland 23

TFN 6 2/025
RECD NOV 14, 2014

PHOTO FOR UPLAND GRASSLAND 24 NOT AVAILABLE

Upland Grassland 25

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 26

Upland Grassland 27

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RECD NOV 14, 2014

Upland Grassland 28

Upland Grassland 29

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Upland Grassland 30

Upland Grassland 31

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Upland Grassland 32

Upland Grassland 33

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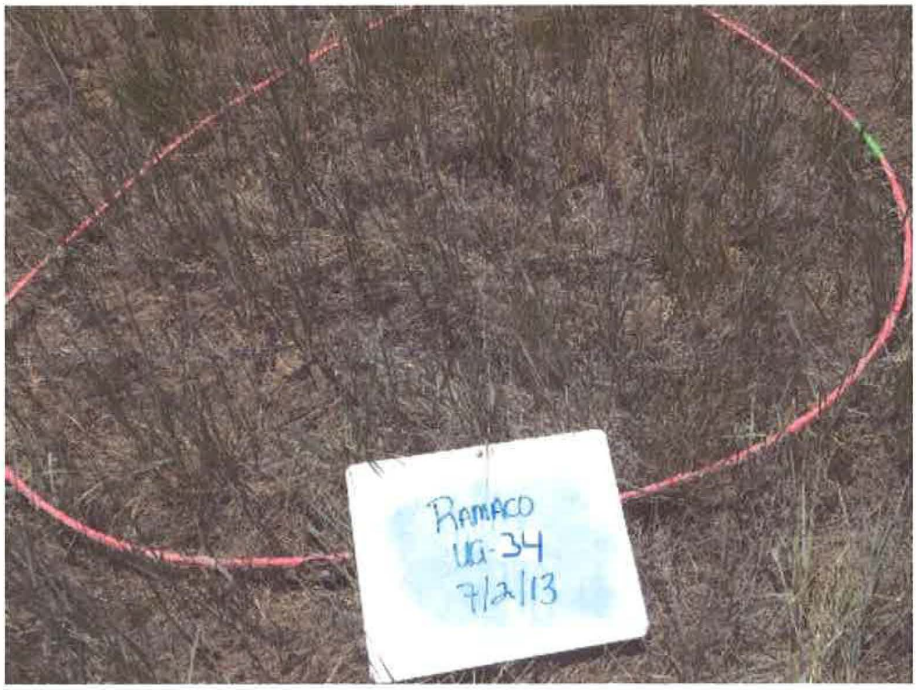


Upland Grassland 34

Upland Grassland 35

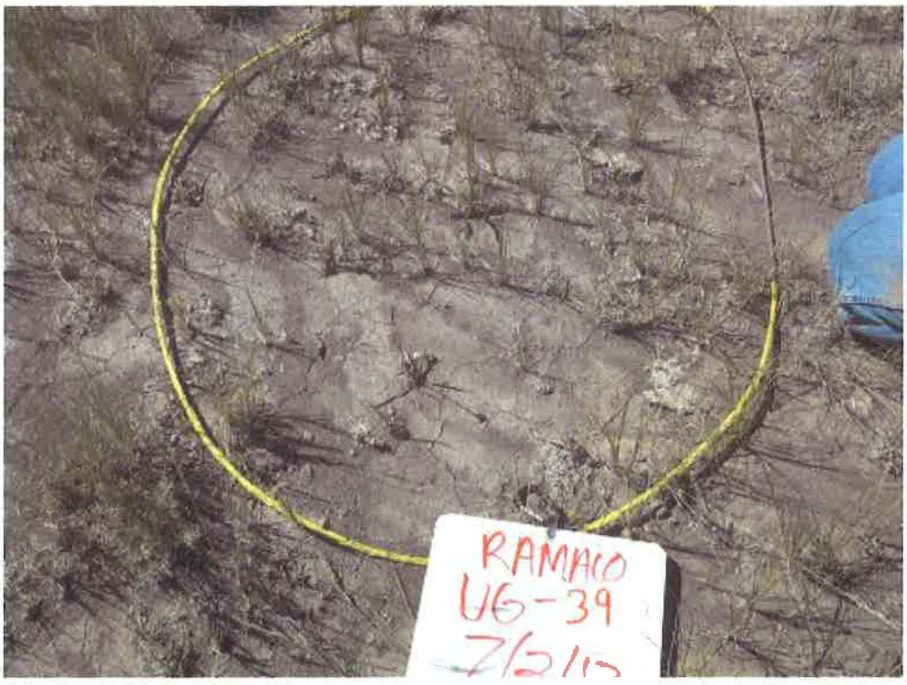
TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 36

Upland Grassland 37

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 38



Upland Grassland 39

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Upland Grassland 40

Upland Grassland 41

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Upland Grassland 42

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Upland Grassland 46

Upland Grassland 47

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Upland Grassland 48

Upland Grassland 49

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Upland Grassland 50

Upland Grassland 51

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Upland Grassland 52

Upland Grassland 53

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Upland Grassland 54

Upland Grassland 55

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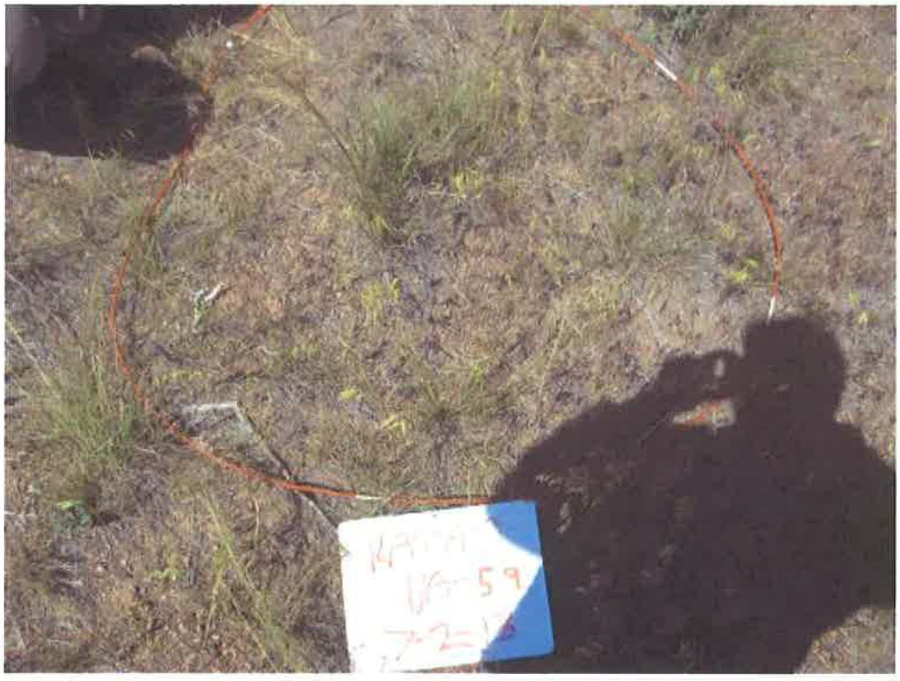
PHOTO FOR UPLAND GRASSLAND 56 NOT AVAILABLE

Upland Grassland 57

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 58



Upland Grassland 59

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Upland Grassland 60

Upland Grassland 61

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 62

Upland Grassland 63

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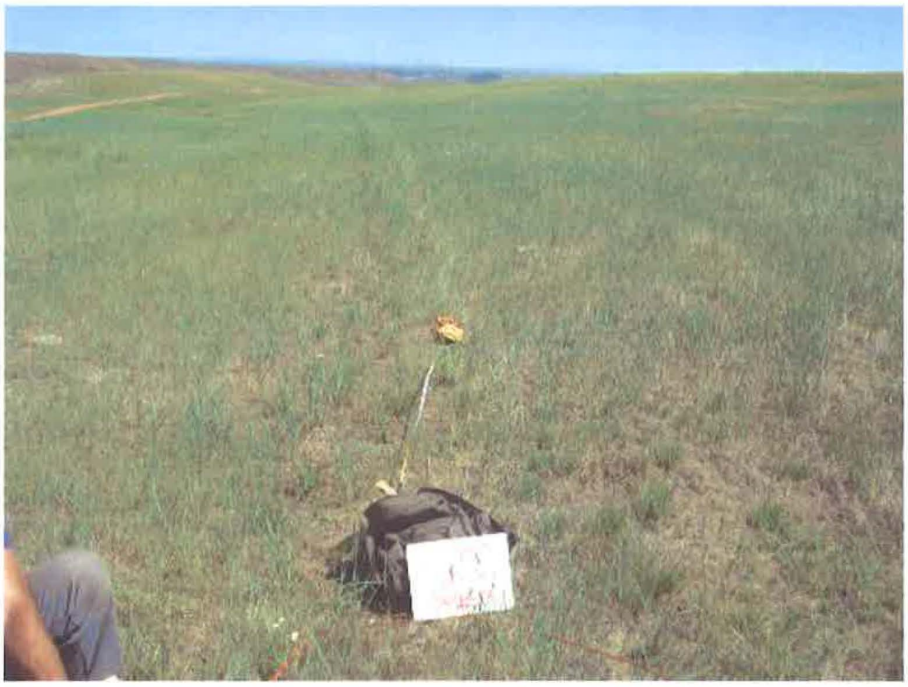

Upland Grassland 64

Upland Grassland 65

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RECD NOV 14, 2014

Upland Grassland 66

Upland Grassland 67

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RECD NOV 14, 2014

Upland Grassland 68

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RECD NOV 14, 2014

Upland Grassland 70

Upland Grassland 71

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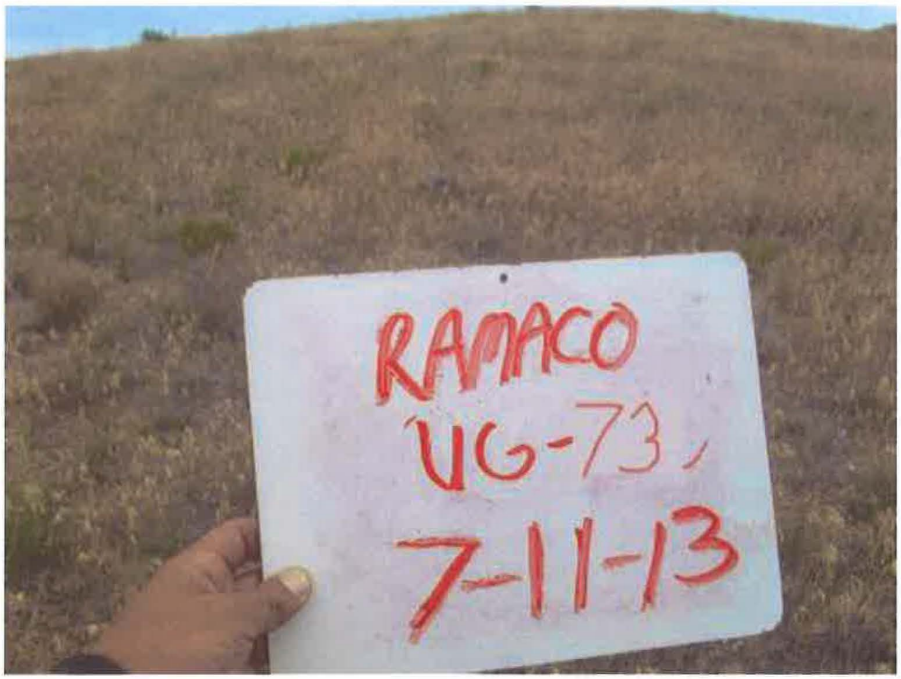
RECD NOV 14, 2014

Upland Grassland 72



Upland Grassland 73

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RECD NOV 14, 2014

Upland Grassland 74

Upland Grassland 75

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 76

Upland Grassland 77

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 78

Upland Grassland 79

TFN 6 2/025
REGD NOV 14, 2014

Upland Grassland 80

Upland Grassland 81

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 82

Upland Grassland 83

TFN 6 2/025
RECD NOV 14, 2014

Upland Grassland 84

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ATTACHMENT D8-1-G

Maps

TFN 6 2/025
RECD NOV 14, 2014

Coordinate System: NAD 1983 UTM Zone 13N, 2011 NAIP True Color Imagery Scale: 1 in = 700 ft

0 1,050 2,100 4,200 Feet

0 0.175 0.35 0.7 Kilometers

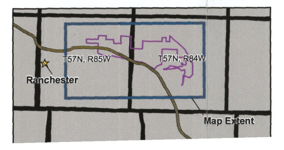
Legend

- Cover, Density Sample Location
- Cover, Density, Production Sample Location
- Density Sample Location
- Production Sample Location
- Density, Production Sample Location
- Sheridan County Declared Weed Location
- Wyoming Designated Weed Location
- Interstate
- Highway
- Vegetation Communities
- Disturbed Land
- Proposed Permit Boundary
- Study Area Boundary
- Half-Mile Buffer
- Section Boundary
- Township/Range Boundary

Vegetation Communities

Map Symbol	Name
AG	Agricultural Land
BSG	Bottomland Sagebrush Grassland
BSS	Big Sagebrush Shrubland
D	Disturbed
PDMG	Prairie Dog Modified Grassland
PJW	Pine and Juniper Woodland
RBMS	Rough Breaks Mixed Shrubland
RG	Reclaimed Grassland
RS	Rabbitbrush Shrubland

General Location Map



N

RAMACO

BROOK MINE
SHERIDAN COUNTY, WY
1101 SUGARVIEW DR. STE. 201
SHERIDAN, WY 82801

REVISIONS

Date	Description
7/30/13	BKS/JB
1/22/14	BKS/JB
7/31/14	BKS/TS
10/23/14	BKS/TS
12/2015	Round 3 Comments

ADDENDUM: D8
MAP: 1

TFN 6 2/025
RECD DEC 18, 2015

2013 BASELINE
VEGETATION ASSESSMENT

ATTACHMENT D8-1-H

Raw Cover Data

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Agricultural Lands (AG)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																									Study Area n=25	
	1	2	3	4	5	6	7	8	9	10	11	12	13*	14*	15	16	17*	18	19	20	21	22	23	24	25*	Mean Absolute	Standard Deviation
Bromus japonicus	0	0	0	0	10	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	6	6	0	1.0	2.6
Bromus tectorum	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.2	0.9
Triticum aestivum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.4
Total Introduced Annual Grasses	**0**	**0**	**0**	**0**	**10**	**0**	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**6**	**6**	**0**	**1.3**	**2.6**
Elymus lanceolatus	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.7	3.2
Elymus smithii	8	0	0	0	16	8	0	0	14	2	0	8	0	0	0	0	0	0	0	6	14	10	12	0	6	4.2	5.5
Elymus spicatus	2	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.7
Elymus trachycaulus	0	0	0	32	0	22	18	42	28	0	16	0	12	10	2	16	68	18	0	0	46	20	0	28	12	15.6	17.6
Glyceria grandis	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1.2
Hesperostipa comata	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0.2	0.6
Hordeum jubatum	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2.8
Nassella viridula	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Phalaris arundinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0.4
Poa secunda	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	18	2	0	0	2	1.4	4.2
Total Native Cool Season Perennial Grasses	**12**	**0**	**0**	**32**	**18**	**30**	**38**	**42**	**42**	**18**	**16**	**12**	**24**	**10**	**2**	**16**	**68**	**18**	**2**	**6**	**78**	**32**	**14**	**28**	**22**	**23.3**	**19.5**
Bouteloua gracilis	0	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.9
Spartina pectinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.4
Total Native Warm Season Perennial Grasses	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.3**	**0.9**
Agropyron cristatum	42	8	22	0	4	0	0	0	0	36	0	42	0	0	16	0	0	0	8	12	0	0	12	0	0	8.1	13.5
Bromus inermis	2	0	0	12	10	0	0	22	18	2	0	0	2	40	0	48	0	0	0	50	0	6	2	0	20	9.4	15.4
Dactylis glomerata	0	0	0	0	0	0	0	2	8	0	0	0	14	4	0	4	0	0	0	0	6	0	0	0	12	2.0	4.0
Phleum pratense	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	2	0	0	0	0	0	0	0	0	2	0.6	2.0
Poa pratensis	0	0	0	0	0	0	0	2	0	0	0	0	0	22	0	8	0	2	0	0	0	0	0	2	0	1.4	4.6
Total Introduced Perennial Grasses	**44**	**8**	**22**	**12**	**14**	**0**	**0**	**26**	**26**	**38**	**0**	**42**	**16**	**76**	**16**	**62**	**0**	**2**	**8**	**62**	**6**	**6**	**14**	**2**	**34**	**21.5**	**21.8**
Festuca spp.	0	0	0	22	0	0	30	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2.3	7.2
Total Unknown Grass Species	**0**	**0**	**0**	**22**	**0**	**0**	**30**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**2.3**	**7.2**
Carex nebrascensis	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2.4
Total Native Grasslike Species	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.5**	**2.4**
Chenopodium berlandieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0.4
Descurainia pinnata	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Plantago patagonica	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Native Annual Forbs	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0.3**	**0.7**
Alyssum desertorum	2	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0.3	0.7
Bassia sieversiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0.9	4.4
Polygonum convolvulus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0.2	1.2
Total Introduced Annual Forbs	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**28**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1.4**	**5.6**
Melilotus officinalis	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.6
Tragopogon dubius	0	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.4	1.0
Total Introduced Biennial Forbs	**0**	**6**	**2**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0.6**	**1.4**
Achillea millefolium	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Phlox hoodii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0.2	0.8
Psoralidium tenuiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0.4
Symphyotrichum falcatum	0	0	0	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.9

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Agricultural Lands (AG)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																								Study Area n=25	
	1	2	3	4	5	6	7	8	9	10	11	12	13*	14*	15	16	17*	18	19	20	21	22	23	24	25*	Mean Absolute	Standard Deviation
Vicia americana	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Native Perennial Forbs	**2**	**0**	**0**	**2**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0.7**	**1.5**
Convolvulus arvensis	0	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	2	14	0	0	0	0	0	1.0	3.0
Medicago sativa	0	82	74	10	4	64	2	20	28	14	0	16	56	12	80	22	0	0	88	0	10	62	0	0	40	27.4	30.8
Rumex crispus	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Taraxacum officinale	0	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	4	0	0	0	0	0	4	0	0.6	1.2
Trifolium pratense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	2	0	0.6	2.8
Total Introduced Perennial Forbs	**0**	**86**	**74**	**10**	**4**	**68**	**2**	**20**	**28**	**20**	**0**	**16**	**56**	**14**	**80**	**22**	**0**	**20**	**90**	**14**	**10**	**62**	**0**	**6**	**40**	**29.7**	**30.2**
Artemisia tridentata	0	0	0	0	14	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	10	0	0	1.0	3.4
Chrysothamnus viscidiflorus	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.2	0.6
Total Native Full Shrubs	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**1.2**	**3.9**
Artemisia frigida	2	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	10	0	0	0.7	2.2
Total Native Half &Sub-Shrubs	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**0**	**0.7**	**2.2**
Lichen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**	**0.0**
Bare Ground	16	0	0	0	14	2	0	0	0	2	0	4	0	0	2	0	0	2	0	0	0	0	14	10	0	2.5	5.0
Litter	14	0	2	18	14	0	14	10	0	18	84	6	4	0	0	0	0	58	0	14	4	0	18	48	0	13.0	20.8
Rock	6	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	4	0	0	0.7	2.1
Total Vegetation Cover	64	100	98	82	72	98	86	90	100	80	16	82	96	100	98	100	100	40	100	86	96	100	64	42	100	83.8	22.6
Total Vegetation Cover w/out SLCV	64	96	98	82	62	96	86	90	100	72	16	78	96	100	98	100	78	38	98	70	96	100	58	36	100	80.3	23.4
Total Vegetation w/Cryptograms	64	100	98	82	72	98	86	90	100	80	16	82	96	100	98	100	100	40	100	86	96	100	64	42	100	83.8	22.6
Total Vegetation w/Cryptograms w/out SLCV	64	96	98	82	62	96	86	90	100	72	16	78	96	100	98	100	78	38	98	70	96	100	58	36	100	80.3	23.4
Total Ground Cover	84	100	100	100	86	98	100	100	100	98	100	96	100	100	98	100	100	98	100	100	100	100	86	90	100	97.5	5.0
Total Ground Cover w/out SLCV	84	96	100	100	76	96	100	100	100	90	100	92	100	100	98	100	78	96	98	84	100	100	80	84	100	94.0	8.1
No. of Species Sampled excluding SLCV	9	4	3	7	10	4	7	6	7	6	1	9	5	7	3	6	4	4	3	4	6	5	10	4	10	5.8	2.5
No.of Species Observed excluding SLCV	4	0	2	7	12	5	2	1	3	1	2	6	3	3	3	0	1	1	0	1	4	3	7	1	1	2.9	2.8
Total No. of Species excluding SLCV	13	4	5	14	22	9	9	7	10	7	3	15	8	10	6	6	5	5	3	5	10	8	17	5	11	8.7	4.7
Total No. of SLCV	1	1	1	1	1	3	1	0	1	2	1	1	1	0	0	0	1	1	1	2	2	1	2	3	3	1.2	0.9

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																						Study Area n=23		Permit Area n=19	
	1	2	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16	17*	18*	19*	20	21*	22*	23*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Echinochloa muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.9	0.4	0.1	0.5
Total Native Annual Grasses	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0.9**	**0.4**	**0.1**	**0.5**
Bromus japonicus	8	6	0	6	0	0	4	2	0	0	0	0	4	6	0	16	4	0	0	8	0	0	10	3.2	4.3	1.9	2.9
Bromus tectorum	4	0	0	14	0	0	0	0	0	2	2	6	4	0	0	0	0	0	6	0	0	2	0	1.7	3.3	1.9	3.6
Total Introduced Annual Grasses	**12**	**6**	**0**	**20**	**0**	**0**	**4**	**2**	**0**	**2**	**2**	**6**	**8**	**6**	**0**	**16**	**4**	**0**	**6**	**8**	**0**	**2**	**10**	**4.9**	**5.5**	**3.8**	**5.0**
Elymus smithii	20	4	0	0	0	4	0	6	10	0	0	6	0	10	2	0	0	0	2	18	0	2	2	3.7	5.7	2.3	3.4
Elymus spicatus	0	0	4	8	6	2	8	0	8	2	0	0	4	0	6	0	2	10	0	0	12	2	6	3.5	3.8	4.2	3.8
Hesperostipa comata	2	0	4	0	10	0	0	0	0	6	8	8	0	0	6	8	10	2	6	2	4	0	8	3.7	3.7	3.8	3.8
Nassella viridula	0	12	0	0	0	0	2	10	0	0	0	2	0	0	0	0	0	0	0	8	0	0	0	1.5	3.5	0.7	2.3
Poa secunda	0	0	0	2	4	0	2	0	0	0	0	0	0	4	2	2	0	6	0	0	0	8	0	1.3	2.2	1.5	2.4
Total Native Cool Season Perennial Grasses	**22**	**16**	**8**	**10**	**20**	**6**	**12**	**16**	**18**	**8**	**8**	**16**	**4**	**14**	**16**	**10**	**12**	**18**	**8**	**28**	**16**	**12**	**16**	**13.7**	**5.6**	**12.5**	**4.6**
Aristida purpurea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0.2	0.8	0.2	0.9
Bouteloua gracilis	6	0	0	0	0	0	0	2	0	2	2	2	2	0	0	6	0	0	0	0	0	0	0	1.0	1.8	0.5	0.9
Total Native Warm Season Perennial Grasses	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**2**	**2**	**2**	**0**	**0**	**6**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**1.2**	**1.9**	**0.7**	**1.2**
Agropyron cristatum	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0.3	1.0	0.3	1.0
Festuca ovina	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0.5	1.8	0.6	2.0
Total Introduced Perennial Grasses	**0**	**0**	**0**	**8**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**4**	**0**	**0**	**0.8**	**2.0**	**0.9**	**2.1**
Carex filifolia	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	0.3	1.2	0.2	0.9
Total Native Grasslike Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0.3**	**1.2**	**0.2**	**0.9**
Plantago patagonica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0.4	0.0	0.0
Total Native Annual Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0.1**	**0.4**	**0.0**	**0.0**
Alyssum desertorum	2	4	0	0	4	2	0	2	6	4	6	4	2	0	0	10	2	2	6	4	2	2	2	2.9	2.5	2.4	2.1
Medicago lupulina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Total Introduced Annual Forbs	**2**	**4**	**0**	**0**	**4**	**2**	**0**	**2**	**6**	**4**	**6**	**4**	**2**	**0**	**0**	**12**	**2**	**2**	**6**	**4**	**2**	**2**	**2**	**3.0**	**2.8**	**2.4**	**2.1**
Tragopogon dubius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0.4	0.0	0.0
Total Introduced Biennial Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0.1**	**0.4**	**0.0**	**0.0**
Achillea millefolium	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.2	0.6	0.0	0.0
Allium textile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Comandra umbellata	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	8	0	0	0	0.7	2.0	0.0	0.0
Dalea purpurea	0	0	0	2	0	0	0	0	0	2	4	0	0	0	0	0	0	0	2	0	0	0	0	0.4	1.0	0.5	1.1
Eriogonum ovalifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0.4	0.1	0.5
Eriogonum pauciflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	0.4	0.1	0.5
Evolvulus nuttallianus	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Gaura coccinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.1	0.4	0.1	0.5
Phlox hoodii	0	0	8	0	0	2	0	2	0	2	0	0	0	0	6	2	0	0	0	2	2	4	2	1.4	2.1	1.5	2.3
Pediomelum argophyllum	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	0	0	0	0	2	0	0.6	1.5	0.4	1.4
Psoralidium tenuiflorum	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	2	0	4	2	0	0	0	0	0.5	1.1	0.5	1.1
Symphyotrichum falcatum	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Vicia americana	2	0	0	0	0	2	4	0	0	0	0	2	0	16	0	0	0	0	0	0	0	0	0	1.1	3.4	1.3	3.7
Total Native Perennial Forbs	**8**	**2**	**10**	**2**	**0**	**4**	**4**	**2**	**0**	**6**	**4**	**2**	**0**	**20**	**8**	**12**	**6**	**8**	**2**	**12**	**2**	**8**	**4**	**5.5**	**4.8**	**4.8**	**4.7**
Artemisia tridentata	14	16	26	4	32	36	20	34	36	22	30	28	32	2	36	18	24	16	38	16	26	36	20	24.4	10.2	26.2	10.4
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	4	0.3	0.9	0.3	1.0
Ericameria nauseosa	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.2	0.6	0.0	0.0
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	2	0	0	0	0	0.6	2.5	0.7	2.8

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RECD NOV 14, 2014

RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																							Study Area n=23		Permit Area n=19	
	1	2	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16	17*	18*	19*	20	21*	22*	23*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Total Native Full Shrubs	**14**	**18**	**26**	**4**	**32**	**36**	**20**	**34**	**36**	**22**	**30**	**28**	**44**	**2**	**36**	**18**	**26**	**16**	**40**	**18**	**26**	**36**	**24**	**25.5**	**10.8**	**27.2**	**11.1**
Artemisia frigida	6	0	0	2	0	0	0	0	0	0	0	0	0	2	0	4	4	2	0	2	2	0	2	1.1	1.7	0.7	1.2
Gutierrezia sarothrae	0	0	0	0	0	2	0	6	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.4	1.3	0.5	1.5
Yucca glauca	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Total Native Half &Sub-Shrubs	**6**	**0**	**0**	**4**	**0**	**2**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**4**	**4**	**2**	**0**	**2**	**2**	**0**	**2**	**1.6**	**2.0**	**1.3**	**1.8**
Opuntia polyacantha	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2	0.6	0.2	0.6
Total Native Succulents	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0.2**	**0.6**	**0.2**	**0.6**
Lichen	0	8	0	8	0	0	?	4	?	0	2	2	0	0	0	0	0	0	0	0	2	0	2	1.4	2.4	1.3	2.0
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Total Cryptograms	**0**	**8**	**0**	**8**	**0**	**0**	**2**	**4**	**2**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**1.4**	**2.4**	**1.3**	**2.0**
Bare Ground	10	26	20	2	4	20	8	24	14	10	10	22	12	6	12	4	8	24	14	10	4	4	8	11.7	7.3	12.0	7.1
Litter	20	20	32	28	26	30	32	8	18	30	26	14	26	38	20	18	20	8	20	6	20	28	22	21.9	8.2	23.6	8.0
Rock	0	0	4	14	14	0	14	0	6	14	10	0	2	10	6	0	12	22	4	2	22	8	8	7.2	6.9	9.0	6.7
Total Vegetation Cover	70	46	44	48	56	50	44	64	60	46	52	62	60	46	62	78	60	46	62	82	52	60	60	57.8	10.5	54.1	7.2
Total Vegetation Cover w/out SLCV	58	40	44	28	56	50	40	62	60	44	50	56	52	40	62	62	56	46	56	74	52	58	50	52.0	9.9	50.3	8.7
Total Vegetation w/Cryptograms	70	54	44	56	56	50	46	68	62	46	54	64	60	46	62	78	60	46	62	82	54	60	62	59.2	10.0	55.4	7.4
Total Vegetation w/Cryptograms w/out SLCV	58	48	44	36	56	50	42	66	62	44	52	58	52	40	62	62	56	46	56	74	54	58	52	53.4	9.0	51.6	8.1
Total Ground Cover	90	74	80	98	96	80	92	76	86	90	90	78	88	94	88	96	92	76	86	90	96	96	92	88.3	7.3	88.0	7.1
Total Ground Cover w/out SLCV	78	68	80	78	96	80	88	74	86	88	88	72	80	88	88	80	88	76	80	82	96	94	82	82.5	7.4	84.2	7.1
No. of Species Sampled excluding SLCV	9	6	5	7	5	7	6	7	4	9	5	8	5	8	8	11	9	9	6	14	7	8	10	7.5	2.3	7.0	1.7
No.of Species Observed excluding SLCV	10	4	6	8	7	5	8	0	5	7	12	9	6	11	10	4	4	8	13	4	5	9	4	6.9	3.1	7.2	3.1
Total No. of Species excluding SLCV	19	10	11	15	12	12	14	7	9	16	17	17	11	19	18	15	13	17	19	18	12	17	14	14.4	3.5	14.2	3.4
Total No. of SLCV	2	1	1	2	1	1	1	1	1	2	2	2	2	2	1	2	1	1	2	1	2	2	1	1.5	0.5	1.5	0.5

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Bottomland Sagebrush Grassland (BSG)
Cover Sample Data
Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																									Study Area n=25		Permit Area n=17	
	1*	2*	3*	4*	*5	6*	7*	8*	9	10*	11*	12	13*	14	15*	16	17*	18*	19*	20*	21*	22*	23*	24	25	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Bromus japonicus	4	0	4	0	8	0	6	0	0	4	2	0	0	6	0	0	6	2	0	2	4	8	6	0	0	2.5	2.8	3.3	2.8
Bromus tectorum	2	8	0	0	6	0	0	0	0	12	8	0	20	0	0	0	16	6	0	2	6	0	2	0	0	3.5	5.5	5.2	6.1
Total Introduced Annual Grasses	**6**	**8**	**4**	**0**	**14**	**0**	**6**	**0**	**0**	**16**	**10**	**0**	**20**	**6**	**0**	**0**	**22**	**8**	**0**	**4**	**10**	**8**	**8**	**0**	**0**	**6.0**	**6.6**	**8.5**	**6.5**
Elymus elymoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0.2	0.8	0.0	0.0
Elymus lanceolatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	2	0.7	3.2	0.0	0.0
Elymus smithii	20	0	10	0	14	30	0	0	2	22	12	0	20	22	12	22	22	10	0	24	20	32	8	26	4	13.3	10.5	15.1	9.9
Elymus spicatus	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.2	1.0
Elymus trachycaulus	0	0	0	0	0	0	0	0	12	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2.5	0.0	0.0
Hesperostipa comata	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	10	0	0	0.6	2.1	0.8	2.6
Hordeum jubatum	14	0	30	0	0	18	0	0	26	0	0	2	0	0	0	8	2	0	0	0	6	4	0	0	0	4.4	8.5	4.4	8.5
Nassella viridula	0	0	2	0	2	0	0	0	0	0	0	0	10	0	0	0	0	2	8	6	4	4	2	16	2	2.3	3.9	2.4	3.1
Phalaris arundinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0.2	1.2	0.0	0.0
Poa secunda	0	6	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	2	0	2	0.6	1.5	0.8	1.7
Total Native Cool Season Perennial Grasses	**34**	**6**	**42**	**0**	**16**	**48**	**0**	**0**	**40**	**22**	**16**	**6**	**38**	**28**	**14**	**30**	**24**	**12**	**8**	**30**	**30**	**40**	**22**	**62**	**10**	**23.1**	**16.4**	**23.7**	**13.8**
Bouteloua gracilis	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1.2	0.4	1.5
Buchloe dactyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.2	1.2	0.0	0.0
Spartina pectinata	0	0	0	0	0	0	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1.8	0.0	0.0
Total Native Warm Season Perennial Grasses	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**8**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.9**	**2.3**	**0.4**	**1.5**
Agropyron cristatum	14	14	0	0	4	0	24	0	0	0	28	0	0	0	36	0	0	14	32	10	0	2	2	0	0	7.2	11.4	10.6	12.5
Bromus inermis	0	0	0	0	0	0	6	0	4	0	0	0	0	10	2	0	0	2	0	0	0	0	0	0	26	2.0	5.5	0.6	1.5
Elymus junceus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	0	0	0	0	0	0	0	0.2	0.9	0.4	1.1
Phleum pratense	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.6	0.0	0.0
Poa pratensis	0	0	0	2	0	8	0	0	4	0	0	4	0	4	0	6	0	0	0	0	0	0	0	0	2	1.2	2.2	0.5	1.9
Total Introduced Perennial Grasses	**14**	**14**	**0**	**2**	**4**	**8**	**30**	**0**	**8**	**0**	**28**	**12**	**0**	**14**	**40**	**6**	**0**	**20**	**32**	**10**	**0**	**2**	**2**	**0**	**28**	**10.9**	**12.1**	**12.1**	**13.3**
Carex nebrascensis	0	0	0	60	0	0	0	32	24	0	0	22	0	24	0	0	0	0	0	0	0	0	0	8	0	6.8	14.7	0.0	0.0
Carex praegracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	1.2	6.0	0.0	0.0
Juncus balticus	0	0	4	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0.5	1.3	0.2	1.0
Schoenoplectus pungens	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	12.0	0.0	0.0
Total Native Grasslike Species	**0**	**0**	**4**	**60**	**0**	**0**	**0**	**92**	**24**	**0**	**0**	**22**	**0**	**28**	**0**	**34**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**10.9**	**22.5**	**0.2**	**1.0**
Chenopodium berlandieri	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Lappula redowskii	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Plantago patagonica	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1.2	0.4	1.5
Total Native Annual Forbs	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.4**	**1.3**	**0.5**	**1.5**
Alyssum desertorum	0	6	0	0	0	0	0	0	0	0	10	0	8	0	0	0	0	2	0	0	4	2	2	6	0	1.6	2.9	2.0	3.2
Bassia sieversiana	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Camelina microcarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0.2	0.6	0.2	0.7
Descurainia sophia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0.2	0.6	0.2	0.7
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.2	0.6	0.2	0.7
Thlaspi arvense	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0.3	0.9	0.5	1.1
Total Introduced Annual Forbs	**0**	**6**	**0**	**0**	**2**	**0**	**2**	**0**	**4**	**2**	**10**	**0**	**8**	**0**	**0**	**0**	**2**	**6**	**0**	**8**	**4**	**2**	**2**	**6**	**0**	**2.7**	**3.1**	**3.2**	**3.2**
Lactuca serriola	0	0	2	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.9	0.1	0.5
Melilotus officinalis	0	0	8	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0.6	1.8	0.9	2.1
Tragopogon dubius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0.2	0.6	0.2	0.7
Total Introduced Biennial Forbs	**0**	**0**	**10**	**0**	**0**	**4**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**1.0**	**2.4**	**1.2**	**2.7**
Achillea millefolium	0	0	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	0	6	0	4	0	2	0	0.8	1.6	1.1	1.9
Ambrosia psilostachya	0	0	4	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0.9	0.5	1.1
Ambrosia tomentosa	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	12	0	0	0	0	0	0	0.7	2.5	1.1	3.0

TFN 6 2/025
RECD NOV 14,2014

RAMACO
Polygon: Bottomland Sagebrush Grassland (BSG)
Cover Sample Data
Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																								Study Area n=25		Permit Area n=17	
	1*	2*	3*	4*	*5	6*	7*	8*	9	10*	11*	12	13*	14	15*	16	17*	18*	19*	20*	21*	22*	23*	24	25	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Asclepias speciosa	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Echinacea angustifolia	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Equisetum laevigatum	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0.4	1.6	0.6	2.0
Glycyrrhiza lepidota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0.6	2.8	0.0	0.0
Psoralidium tenuiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0.4	0.1	0.5
Sphaeralcea coccinea	0	4	0	0	2	0	0	0	0	8	0	0	4	0	2	0	0	0	0	2	0	2	6	0	0	1.2	2.2	1.8	2.4
Vicia americana	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Total Native Perennial Forbs	**2**	**4**	**8**	**4**	**4**	**8**	**0**	**0**	**0**	**10**	**0**	**0**	**4**	**0**	**2**	**14**	**0**	**6**	**20**	**8**	**0**	**6**	**8**	**2**	**0**	**4.5**	**5.1**	**5.4**	**5.0**
Cirsium arvense	2	0	0	16	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1.0	3.4	0.5	1.5
Convolvulus arvensis	22	0	2	0	6	2	0	0	0	0	0	0	2	0	4	0	16	8	4	14	10	0	0	0	4	3.8	5.9	5.3	6.6
Medicago sativa	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Rumex crispus	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0.3	0.7	0.5	0.9
Taraxacum officinale	0	0	0	0	0	2	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	28	1.4	5.6	0.1	0.5
Total Introduced Perennial Forbs	**24**	**0**	**2**	**20**	**6**	**4**	**8**	**0**	**2**	**0**	**0**	**0**	**2**	**4**	**4**	**0**	**16**	**10**	**6**	**16**	**10**	**0**	**0**	**0**	**34**	**6.7**	**8.9**	**6.4**	**7.0**
Astragalus spp.	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Polygonum spp.	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	4.8	0.0	0.0
Rumex spp.	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Sonchus spp.	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2.0	0.0	0.0
Total Unknown Forb Species	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**24**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.6**	**5.3**	**0.1**	**0.5**
Artemisia cana	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	8	4	0	0	0	12	0	0	1.1	2.9	1.6	3.4
Rhus aromatica	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.2	1.0
Symphoricarpos albus	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.2	0.6	0.0	0.0
Symphoricarpos occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.3	1.6	0.0	0.0
Symphoricarpos spp.	0	0	2	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	8	0	0	2	0	0	0	1.0	3.2	1.5	3.8
Total Native Full Shrubs	**0**	**0**	**2**	**0**	**6**	**0**	**14**	**0**	**2**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**8**	**12**	**0**	**0**	**2**	**12**	**0**	**8**	**2.8**	**4.4**	**3.4**	**5.0**
Artemisia frigida	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0.2	0.7	0.4	0.8
Artemisia ludoviciana	0	0	2	0	6	0	2	0	0	2	2	0	0	0	0	0	2	2	2	0	4	2	2	0	0	1.1	1.5	1.6	1.6
Total Native Half &Sub-Shrubs	**0**	**0**	**2**	**0**	**6**	**0**	**4**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**4**	**2**	**0**	**4**	**2**	**4**	**0**	**0**	**1.3**	**1.8**	**2.0**	**1.9**
Lichen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**
Bare Ground	0	12	6	0	8	0	4	0	0	2	4	2	0	2	4	10	10	4	20	2	4	4	0	4	12	4.5	5.0	4.7	5.2
Litter	20	36	18	14	32	28	32	0	0	38	30	34	24	14	36	0	24	16	0	22	38	30	42	18	8	22.1	13.2	27.4	10.4
Rock	0	2	0	0	2	0	0	0	0	6	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0.6	1.4	0.8	1.6
Total Vegetation Cover	80	50	76	86	58	72	64	100	100	54	66	64	74	84	60	90	66	78	80	76	58	66	58	78	80	72.8	13.4	67.1	9.5
Total Vegetation Cover w/out SLCV	50	42	70	66	38	70	50	100	96	38	56	64	52	78	56	76	28	60	74	56	38	58	50	78	74	60.7	17.9	52.1	12.6
Total Vegetation w/Cryptograms	80	50	76	86	58	72	64	100	100	54	66	64	74	84	60	90	66	78	80	76	58	66	58	78	80	72.8	13.4	67.1	9.5
Total Vegetation w/Cryptograms w/out SLCV	50	42	70	66	38	70	50	100	96	38	56	64	52	78	56	76	28	60	74	56	38	58	50	78	74	60.7	17.9	52.1	12.6
Total Ground Cover	100	88	94	100	92	100	96	100	100	98	96	98	100	98	96	90	90	96	80	98	96	96	100	96	88	95.5	5.0	95.3	5.2
Total Ground Cover w/out SLCV	70	80	88	80	72	98	82	100	96	82	86	98	78	92	92	76	52	78	74	78	76	88	92	96	82	83.4	11.0	80.3	10.6
No. of Species Sampled excluding SLCV	4	6	12	3	9	8	6	3	12	6	5	6	7	9	6	6	4	15	7	8	5	11	11	7	8	7.4	3.0	7.6	3.1
No.of Species Observed excluding SLCV	10	7	6	7	4	8	5	2	1	11	4	2	5	8	6	7	9	1	3	3	8	2	4	1	5	5.2	2.9	5.6	2.8
Total No. of Species excluding SLCV	14	13	18	10	13	16	11	5	13	17	9	8	12	17	12	13	13	16	10	11	13	13	15	8	13	12.5	3.1	13.3	2.5
Total No. of SLCV	4	1	3	3	3	1	4	0	1	2	3	0	2	2	4	5	4	4	2	5	4	1	2	4	5	2.8	1.5	2.9	1.3

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RAMACO
Polygon: Pine and Juniper Woodland (PJW)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values) 1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	Study Area and Permit Area n=15 Mean Absolute	Standard Deviation
Bromus japonicus	0	2	0	0	0	0	0	2	2	0	10	0	2	0	0	1.2	2.6
Bromus tectorum	0	0	0	0	0	0	12	6	8	0	10	4	10	0	36	5.7	9.5
Total Introduced Annual Grasses	**0**	**2**	**0**	**0**	**0**	**0**	**12**	**8**	**10**	**0**	**20**	**4**	**12**	**0**	**36**	**6.9**	**10.2**
Elymus smithii	0	0	0	4	2	0	6	18	2	0	0	0	0	2	16	3.3	5.8
Elymus spicatus	14	6	4	4	18	12	14	12	14	8	28	22	30	20	8	14.3	8.1
Hesperostipa comata	0	0	0	0	4	0	0	0	2	0	0	0	0	0	2	0.5	1.2
Nassella viridula	0	0	0	0	0	2	2	4	0	0	0	0	0	0	0	0.5	1.2
Poa secunda	0	8	0	0	0	2	0	0	0	8	0	0	4	2	0	1.6	2.8
Total Native Cool Season Perennial Grasses	**14**	**14**	**4**	**8**	**24**	**16**	**22**	**34**	**18**	**16**	**28**	**22**	**34**	**24**	**26**	**20.2**	**8.6**
Bouteloua gracilis	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0.3	0.7
Total Native Warm Season Perennial Grasses	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0.3**	**0.7**
Carex filifolia	0	0	0	0	0	0	0	0	6	0	2	0	0	0	4	0.8	1.8
Total Native Grasslike Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**2**	**0**	**0**	**0**	**4**	**0.8**	**1.8**
Plantago patagonica	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Total Native Annual Forbs	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.5**
Alyssum desertorum	0	2	0	0	0	0	0	0	0	0	2	2	0	0	0	0.4	0.8
Camelina microcarpa	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0.3	0.7
Thlaspi arvense	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0.4	1.1
Total Introduced Annual Forbs	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**2**	**2**	**0**	**2**	**1.1**	**2.1**
Tragopogon dubius	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.5
Total Introduced Biennial Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.5**
Achillea millefolium	0	0	0	0	0	0	2	0	0	0	0	2	4	0	2	0.7	1.2
Dalea purpurea	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0.3	1.0
Phlox hoodii	0	2	2	4	2	0	0	0	4	0	0	0	0	10	0	1.6	2.7
Psoralidium tenuiflorum	0	2	0	0	2	0	2	0	2	0	0	0	0	0	0	0.5	0.9
Sphaeralcea coccinea	0	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0.4	1.1
Vicia americana	0	0	0	2	0	0	0	2	0	0	0	4	0	0	0	0.5	1.2
Total Native Perennial Forbs	**0**	**4**	**2**	**6**	**4**	**0**	**4**	**6**	**10**	**0**	**0**	**8**	**4**	**10**	**2**	**4.0**	**3.5**
Cerastium arvense	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	0.5
Total Introduced Perennial Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.5**
Artemisia tridentata	0	6	0	0	0	0	0	0	0	0	0	0	0	4	0	0.7	1.8
Chrysothamnus viscidiflorus	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Ericameria nauseosa	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0.4	1.1
Rhus aromatica	0	0	0	0	0	0	0	2	0	0	2	2	0	0	0	0.4	0.8
Total Native Full Shrubs	**0**	**6**	**0**	**2**	**4**	**2**	**0**	**2**	**0**	**0**	**2**	**2**	**0**	**4**	**0**	**1.6**	**1.9**
Artemisia frigida	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0.3	0.7
Gutierrezia sarothrae	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.1	0.5
Total Native Half &Sub-Shrubs	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0.4**	**0.8**
Juniperus scopulorum	0	0	14	6	0	10	0	0	0	16	0	0	0	4	0	3.3	5.6
Pinus ponderosa	0	0	0	0	0	0	20	18	12	0	0	20	0	0	0	4.7	8.2
Total Native Trees	**0**	**0**	**14**	**6**	**0**	**10**	**20**	**18**	**12**	**16**	**0**	**20**	**0**	**4**	**0**	**8.0**	**8.1**
Lichen	0	4	2	2	4	4	0	0	0	4	0	0	0	0	0	1.3	1.8
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total Cryptograms	**0**	**4**	**2**	**2**	**4**	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**1.3**	**1.8**
Bare Ground	16	10	14	48	14	24	2	2	6	4	6	8	6	0	4	11.0	12.1
Litter	6	18	10	8	4	12	38	26	32	8	14	24	30	10	26	17.8	10.8
Rock	64	40	52	20	44	30	0	4	4	50	20	8	12	46	0	26.3	21.6
Total Vegetation Cover	14	28	22	22	34	30	60	68	58	34	60	60	52	44	70	43.6	18.5
Total Vegetation Cover w/out SLCV	14	26	22	22	34	30	48	60	48	34	40	56	40	44	34	37.7	13.0
Total Vegetation w/Cryptograms	14	32	24	24	38	34	60	68	58	38	60	60	52	44	70	44.9	17.5
Total Vegetation w/Cryptograms w/out SLCV	14	30	24	24	38	34	48	60	48	38	40	56	40	44	34	39.0	12.3
Total Ground Cover	84	90	86	52	86	76	98	98	94	96	94	92	94	100	96	89.0	12.1
Total Ground Cover w/out SLCV	84	88	86	52	86	76	86	90	84	96	74	88	82	100	60	83.1	12.5
No. of Species Sampled excluding SLCV	1	6	4	6	7	6	7	7	9	4	6	8	4	7	6	5.9	2.0
No.of Species Observed excluding SLCV	13	16	11	15	5	8	5	3	4	11	7	3	9	6	9	8.3	4.2
Total No. of Species excluding SLCV	14	22	15	21	12	14	12	10	13	15	13	11	13	13	15	14.2	3.3
Total No. of SLCV	0	1	0	2	0	0	1	2	2	1	2	2	2	1	1	1.1	0.8

TFN 6 2/025
DEQD NOV 14, 2014

RAMACO
Polygon: Prairie Dog Modified Grassland (PDMG)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																																								
	1*	2	3*	4*	5*	6*	7*	8*	9	10*	11*	12	13*	14	15	16*	17*	18*	19*	20*	21*	22	23*	24*	25*	26*	27*	28*	29*	30*	31*	32*	33*	34*	35*	36*	37*	38*	39*	40*
Vulpia octoflora	0	0	0	0	0	0	0	0	2	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Annual Grasses	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Bromus japonicus	0	2	0	0	0	0	0	0	0	0	0	4	16	8	0	0	0	0	0	0	8	6	12	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0
Bromus tectorum	0	12	0	2	0	22	12	12	26	24	0	6	0	0	40	40	16	0	0	0	0	16	4	0	4	0	28	0	44	0	8	28	40	0	22	8	14	18	0	54
Total Introduced Annual Grasses	**0**	**14**	**0**	**2**	**0**	**22**	**12**	**12**	**26**	**24**	**0**	**10**	**16**	**8**	**40**	**40**	**16**	**0**	**0**	**0**	**8**	**22**	**16**	**0**	**4**	**0**	**28**	**0**	**44**	**0**	**8**	**28**	**40**	**0**	**24**	**8**	**14**	**20**	**0**	**54**
Elymus smithii	0	4	0	0	2	30	6	10	12	8	0	10	26	16	8	0	20	2	8	22	8	10	16	2	20	8	2	0	20	0	14	8	6	12	2	10	18	22	16	10
Elymus spicatus	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	0	0
Hesperostipa comata	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Nassella viridula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa secunda	0	0	0	0	0	0	2	2	0	0	0	4	4	6	0	0	0	0	0	0	4	4	2	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
Total Native Cool Season Perennial Grasses	**2**	**4**	**0**	**0**	**2**	**30**	**8**	**16**	**12**	**12**	**0**	**14**	**30**	**22**	**8**	**4**	**20**	**2**	**8**	**22**	**18**	**16**	**24**	**2**	**20**	**8**	**2**	**0**	**20**	**0**	**14**	**8**	**8**	**12**	**10**	**10**	**18**	**24**	**16**	**10**
Aristida purpurea	0	0	0	4	0	2	0	4	0	0	0	8	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	2	6	0	0	0	4
Bouteloua gracilis	0	0	0	0	0	0	2	0	0	0	0	8	0	2	0	4	2	0	0	4	0	0	2	0	0	10	0	0	2	0	0	2	0	0	0	0	0	0	0	0
Sporobolus cryptandrus	0	2	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Warm Season Perennial Grasses	**0**	**2**	**0**	**4**	**6**	**2**	**2**	**4**	**0**	**0**	**0**	**16**	**0**	**2**	**0**	**6**	**2**	**4**	**0**	**4**	**0**	**2**	**2**	**0**	**0**	**10**	**0**	**2**	**2**	**0**	**0**	**2**	**0**	**0**	**2**	**6**	**0**	**0**	**0**	**4**
Agropyron cristatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	22	14	10	0	0	0	0	20	0	0	0	0	0	10	2	16	0
Bromus inermis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Introduced Perennial Grasses	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**22**	**14**	**12**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**10**	**2**	**16**	**0**
Chamaesyce glyptosperma	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lappula redowskii	0	0	0	0	0	0	0	0	8	0	8	0	0	0	0	0	4	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	2	0	0	0
Logfia arvensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Plantago patagonica	0	0	12	0	2	0	10	0	0	0	10	2	0	0	0	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0
Solanum triflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0
Total Native Annual Forbs	**0**	**0**	**12**	**4**	**2**	**0**	**10**	**0**	**8**	**0**	**18**	**2**	**0**	**0**	**4**	**0**	**8**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**4**	**2**	**0**	**0**	**2**	**0**	**0**	**2**	**0**	**4**	**0**
Alyssum desertorum	12	4	2	0	0	0	2	0	8	6	0	0	4	2	4	0	8	2	2	0	0	2	4	0	0	2	2	2	6	0	4	0	0	8	0	0	4	0	6	0
Amaranthus albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0
Bassia sieversiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brassica juncea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Medicago lupulina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
Polygonum argyrocoleon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum aviculare	0	0	2	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	2	0	0
Polygonum convolvulus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0
Total Introduced Annual Forbs	**12**	**4**	**4**	**0**	**0**	**2**	**2**	**0**	**10**	**6**	**0**	**0**	**4**	**2**	**4**	**0**	**8**	**2**	**14**	**0**	**0**	**2**	**4**	**0**	**2**	**2**	**2**	**2**	**8**	**40**	**4**	**0**	**0**	**8**	**0**	**8**	**6**	**4**	**6**	**0**
Melilotus officinalis	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Introduced Biennial Forbs	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Achillea millefolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ambrosia psilostachya	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Antennaria microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Dalea purpurea	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Evolvulus nuttallianus	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Gaura coccinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grindelia squarrosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heterotheca villosa	0	0	0	0	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Linum lewisii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lygodesmia juncea	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Prairie Dog Modified Grassland (PDMG)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																																								
	1*	2	3*	4*	5*	6*	7*	8*	9	10*	11*	12	13*	14	15	16*	17*	18*	19*	20*	21*	22	23*	24*	25*	26*	27*	28*	29*	30*	31*	32*	33*	34*	35*	36*	37*	38*	39*	40*
Pediomelum argophyllum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phlox hoodii	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0	6	0	6	4	0	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Psoralidium tenuiflorum	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sphaeralcea coccinea	0	0	0	0	0	0	0	0	0	8	0	2	2	0	2	0	0	0	0	0	0	2	0	2	0	0	2	0	0	0	6	14	0	0	2	6	0	2	2	4
Symphyotrichum falcatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	0	0	0	0	0	0
Vicia americana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Total Native Perennial Forbs	**0**	**0**	**0**	**8**	**0**	**2**	**2**	**0**	**2**	**10**	**0**	**8**	**6**	**2**	**2**	**2**	**0**	**0**	**2**	**2**	**12**	**4**	**8**	**10**	**0**	**2**	**2**	**0**	**0**	**4**	**10**	**16**	**6**	**4**	**10**	**6**	**0**	**2**	**2**	**6**
Convolvulus arvensis	6	28	34	18	0	0	0	0	0	0	16	0	0	0	8	0	0	0	2	0	0	0	0	0	0	0	14	16	0	14	0	0	20	0	0	12	10	4	0	0
Total Introduced Perennial Forbs	**6**	**28**	**34**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**16**	**0**	**14**	**0**	**0**	**20**	**0**	**0**	**12**	**10**	**4**	**0**	**0**
Astragalus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cirsium spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Penstemon spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex spp.	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Unknown Forb Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Artemisia tridentata	0	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Total Native Full Shrubs	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**
Artemisia frigida	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	4	2	0	0	6	4	4	0	0	0	2	0	0	0	0	4	0	0	0	0	0
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**4**	**2**	**0**	**0**	**6**	**4**	**4**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**
Opuntia polyacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Total Native Succulents	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Lichen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Bare Ground	12	34	48	38	88	10	48	42	18	14	62	34	20	36	30	16	12	82	50	22	14	28	12	14	28	28	22	54	16	4	10	22	10	50	12	34	14	2	14	14
Litter	32	8	2	4	2	32	14	20	20	26	4	10	14	24	4	24	28	4	18	34	38	26	26	46	28	28	28	24	10	16	32	16	16	16	16	14	24	32	42	8
Rock	36	0	0	22	0	0	2	6	0	8	0	0	2	2	0	8	0	0	4	4	4	0	4	0	0	4	2	0	0	10	0	6	0	6	22	2	2	8	0	4
Total Vegetation Cover	20	58	50	36	10	58	36	32	62	52	34	56	64	38	66	52	60	14	28	40	44	46	58	40	44	40	48	22	74	70	58	56	74	26	50	50	60	58	44	74
Total Vegetation Cover w/out SLCV	14	16	16	16	10	36	24	20	36	28	18	46	48	30	18	12	44	14	24	40	36	24	42	40	40	40	6	6	30	56	50	28	14	26	26	30	36	34	44	20
Total Vegetation w/Cryptograms	20	58	50	36	10	58	36	32	62	52	34	56	64	38	66	52	60	14	28	40	44	46	58	40	44	40	48	22	74	70	58	56	74	28	50	50	60	58	44	74
Total Vegetation w/Cryptograms w/out SLCV	14	16	16	16	10	36	24	20	36	28	18	46	48	30	18	12	44	14	24	40	36	24	42	40	40	40	6	6	30	56	50	28	14	28	26	30	36	34	44	20
Total Ground Cover	88	66	52	62	12	90	52	58	82	86	38	66	80	64	70	84	88	18	50	78	86	72	88	86	72	72	78	46	84	96	90	78	90	50	88	66	86	98	86	86
Total Ground Cover w/out SLCV	82	24	18	42	12	68	40	46	56	62	22	56	64	56	22	44	72	18	46	78	78	50	72	86	68	72	36	30	40	82	82	50	30	50	64	46	62	74	86	32
No. of Species Sampled excluding SLCV	2	5	3	4	3	4	6	4	7	5	2	9	8	6	4	4	7	4	5	5	10	7	11	7	4	8	3	3	4	9	6	5	4	4	9	5	5	7	5	4
No.of Species Observed excluding SLCV	0	3	1	1	3	6	5	7	3	4	1	7	1	4	4	10	1	2	0	3	2	7	5	5	4	5	10	5	3	10	7	2	8	8	10	5	6	9	3	4
Total No. of Species excluding SLCV	2	8	4	5	6	10	11	11	10	9	3	16	9	10	8	14	8	6	5	8	12	14	16	12	8	13	13	8	7	19	13	7	12	12	19	10	11	16	8	8
Total No. of SLCV	1	3	2	2	0	2	2	1	3	1	2	2	1	1	2	1	1	0	2	0	1	2	2	0	1	1	2	1	1	1	2	2	2	1	2	2	3	3	1	1

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RECD NOV 14, 2014

RAMACO
Polygon: Prairie Dog Modified Grassland (PDMG)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Study Area n=40		Permit Area n=34	
	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Vulpia octoflora	0.2	1.0	0.0	0.0
Total Native Annual Grasses	**0.2**	**1.0**	**0.0**	**0.0**
Bromus japonicus	1.5	3.6	1.2	3.6
Bromus tectorum	12.5	15.1	11.8	15.3
Total Introduced Annual Grasses	**14.0**	**14.7**	**13.0**	**15.0**
Elymus smithii	9.7	8.1	9.6	8.6
Elymus spicatus	0.4	1.0	0.4	1.1
Hesperostipa comata	0.4	1.0	0.4	1.0
Nassella viridula	0.2	1.0	0.2	1.1
Poa secunda	0.8	1.6	0.5	1.1
Total Native Cool Season Perennial Grasses	**11.5**	**8.6**	**11.1**	**9.0**
Aristida purpurea	0.9	1.9	0.8	1.6
Bouteloua gracilis	1.0	2.2	0.8	2.0
Sporobolus cryptandrus	0.3	1.2	0.3	1.2
Total Native Warm Season Perennial Grasses	**2.2**	**3.2**	**1.9**	**2.5**
Agropyron cristatum	2.6	5.9	3.0	6.3
Bromus inermis	0.1	0.3	0.1	0.3
Total Introduced Perennial Grasses	**2.7**	**5.9**	**3.1**	**6.3**
Chamaesyce glyptosperma	0.1	0.6	0.1	0.7
Lappula redowskii	0.7	1.9	0.5	1.6
Logfia arvensis	0.2	0.7	0.1	0.3
Plantago patagonica	1.3	3.0	1.5	3.2
Solanum triflorum	0.1	0.4	0.1	0.5
Total Native Annual Forbs	**2.4**	**4.0**	**2.3**	**4.1**
Alyssum desertorum	2.4	3.0	2.2	3.0
Amaranthus albus	0.3	1.9	0.4	2.1
Bassia sieversiana	0.1	0.3	0.1	0.3
Brassica juncea	0.1	0.6	0.1	0.7
Medicago lupulina	0.5	3.2	0.6	3.4
Polygonum argyrocoleon	0.1	0.3	0.1	0.3
Polygonum aviculare	0.6	1.8	0.6	1.9
Polygonum convolvulus	0.2	1.3	0.2	1.4
Sisymbrium altissimum	0.1	0.4	0.1	0.5
Total Introduced Annual Forbs	**4.4**	**6.8**	**4.4**	**7.3**
Melilotus officinalis	0.2	0.5	0.1	0.5
Total Introduced Biennial Forbs	**0.2**	**0.5**	**0.1**	**0.5**
Achillea millefolium	0.2	0.5	0.2	0.6
Ambrosia psilostachya	0.1	0.6	0.1	0.7
Antennaria microphylla	0.2	0.7	0.2	0.8
Dalea purpurea	0.1	0.3	0.0	0.0
Evolvulus nuttallianus	0.2	0.7	0.2	0.8
Gaura coccinea	0.1	0.3	0.1	0.3
Grindelia squarrosa	0.1	0.3	0.0	0.0
Heterotheca villosa	0.3	0.9	0.2	0.8
Linum lewisii	0.1	0.3	0.1	0.3
Lygodesmia juncea	0.3	0.9	0.3	0.9
Pediomelum argophyllum	0.1	0.3	0.1	0.3

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RECD NOV 14, 2014

RAMACO
Polygon: Prairie Dog Modified Grassland (PDMG)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Study Area n=40		Permit Area n=34	
	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Phlox hoodii	0.7	1.7	0.8	1.8
Psoralidium tenuiflorum	0.1	0.4	0.1	0.5
Sphaeralcea coccinea	1.4	2.8	1.5	3.0
Symphyotrichum falcatum	0.2	0.7	0.2	0.8
Vicia americana	0.1	0.6	0.1	0.7
Total Native Perennial Forbs	**4.3**	**4.1**	**4.2**	**4.3**
Convolvulus arvensis	5.1	8.6	4.9	8.3
Total Introduced Perennial Forbs	**5.1**	**8.6**	**4.9**	**8.3**
Astragalus spp.	0.2	0.5	0.2	0.6
Cirsium spp.	0.1	0.3	0.1	0.3
Penstemon spp.	0.1	0.3	0.1	0.3
Rumex spp.	0.1	0.3	0.0	0.0
Total Unknown Forb Species	**0.5**	**0.9**	**0.4**	**0.9**
Artemisia tridentata	0.2	0.7	0.0	0.0
Chrysothamnus viscidiflorus	0.2	0.8	0.2	0.8
Total Native Full Shrubs	**0.4**	**1.0**	**0.2**	**0.8**
Artemisia frigida	0.8	1.6	0.9	1.7
Artemisia ludoviciana	0.1	0.6	0.1	0.7
Total Native Half &Sub-Shrubs	**0.9**	**1.8**	**1.0**	**1.9**
Opuntia polyacantha	0.1	0.3	0.1	0.3
Total Native Succulents	**0.1**	**0.3**	**0.1**	**0.3**
Lichen	0.1	0.3	0.1	0.3
Fungi	0.0	0.0	0.0	0.0
Algae	0.0	0.0	0.0	0.0
Moss	0.0	0.0	0.0	0.0
Total Cryptograms	**0.1**	**0.3**	**0.1**	**0.3**
Bare Ground	27.5	20.0	27.4	21.6
Litter	19.8	11.4	20.9	11.6
Rock	3.7	7.3	4.9	7.7
Total Vegetation Cover	48.9	16.2	46.7	16.9
Total Vegetation Cover w/out SLCV	29.8	12.9	28.5	13.3
Total Vegetation w/Cryptograms	49.0	16.2	46.8	16.8
Total Vegetation w/Cryptograms w/out SLCV	29.9	12.9	28.6	13.3
Total Ground Cover	72.5	20.0	72.6	21.6
Total Ground Cover w/out SLCV	53.4	21.3	54.4	21.9
No. of Species Sampled excluding SLCV	5.4	2.2	5.3	2.2
No.of Species Observed excluding SLCV	4.6	2.9	4.6	3.1
Total No. of Species excluding SLCV	10.0	4.0	9.9	4.2
Total No. of SLCV	1.5	0.8	1.4	0.8

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RECD NOV 14, 2014

RAMACO
Polygon: Reclaimed Grassland (RG)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values) 1*	2*	3*	4*	5*	6	7*	8	9*	10*	Study Area n=10 Mean Absolute	Study Area n=10 Standard Deviation	Permit Area n=8 Mean Absolute	Permit Area n=8 Standard Deviation
Bromus japonicus	2	12	2	0	0	4	0	16	0	2	3.8	5.6	2.3	4.1
Bromus tectorum	2	10	0	2	0	0	0	0	0	0	1.4	3.1	1.8	3.5
Total Introduced Annual Grasses	**4**	**22**	**2**	**2**	**0**	**4**	**0**	**16**	**0**	**2**	**5.2**	**7.6**	**4.1**	**7.4**
Elymus lanceolatus	18	0	0	0	0	0	0	0	0	0	1.8	5.7	2.3	6.4
Elymus smithii	14	0	38	24	12	26	0	18	62	56	25.0	21.3	25.8	24.0
Elymus trachycaulus	14	0	0	0	0	0	0	0	0	0	1.4	4.4	1.8	4.9
Nassella viridula	0	0	0	4	0	0	0	0	0	0	0.4	1.3	0.5	1.4
Poa secunda	0	0	0	0	0	2	0	0	0	0	0.2	0.6	0.0	0.0
Total Native Cool Season Perennial Grasses	**46**	**0**	**38**	**28**	**12**	**28**	**0**	**18**	**62**	**56**	**28.8**	**21.8**	**30.4**	**24.3**
Agropyron cristatum	0	0	8	4	0	2	0	0	0	4	1.8	2.7	2.0	3.0
Bromus inermis	4	22	14	10	52	0	56	0	0	0	15.8	21.4	19.8	22.4
Total Introduced Perennial Grasses	**4**	**22**	**22**	**14**	**52**	**2**	**56**	**0**	**0**	**4**	**17.6**	**20.9**	**21.8**	**21.6**
Carex filifolia	0	0	0	0	0	4	0	0	0	0	0.4	1.3	0.0	0.0
Total Native Grasslike Species	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0.4**	**1.3**	**0.0**	**0.0**
Plantago patagonica	0	0	0	0	0	0	0	2	0	0	0.2	0.6	0.0	0.0
Total Native Annual Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0.2**	**0.6**	**0.0**	**0.0**
Alyssum desertorum	2	0	2	2	2	0	0	6	0	0	1.4	1.9	1.0	1.1
Camelina microcarpa	0	0	0	0	0	0	2	0	4	0	0.6	1.3	0.8	1.5
Halogeton glomeratus	0	2	0	0	0	0	0	0	0	0	0.2	0.6	0.3	0.7
Medicago lupulina	0	2	0	0	0	0	0	0	0	0	0.2	0.6	0.3	0.7
Total Introduced Annual Forbs	**2**	**4**	**2**	**2**	**2**	**0**	**2**	**6**	**4**	**0**	**2.4**	**1.8**	**2.4**	**1.3**
Melilotus officinalis	0	2	0	0	0	8	0	18	0	0	2.8	5.9	0.3	0.7
Tragopogon dubius	0	2	2	0	0	0	0	0	2	0	0.6	1.0	0.8	1.0
Total Introduced Biennial Forbs	**0**	**4**	**2**	**0**	**0**	**8**	**0**	**18**	**2**	**0**	**3.4**	**5.7**	**1.1**	**1.5**
Comandra umbellata	0	0	0	0	0	0	0	2	0	0	0.2	0.6	0.0	0.0
Grindelia squarrosa	0	6	0	0	0	0	0	4	0	0	1.0	2.2	0.8	2.1
Vicia americana	0	0	0	2	0	2	0	0	0	0	0.4	0.8	0.3	0.7
Total Native Perennial Forbs	**0**	**6**	**0**	**2**	**0**	**2**	**0**	**6**	**0**	**0**	**1.6**	**2.5**	**1.1**	**2.1**
Convolvulus arvensis	0	0	0	4	6	0	0	0	0	0	1.0	2.2	1.3	2.4
Medicago sativa	0	0	0	0	0	0	0	2	0	0	0.2	0.6	0.0	0.0
Taraxacum officinale	0	18	0	0	0	2	0	4	0	0	2.4	5.6	2.3	6.4
Total Introduced Perennial Forbs	**0**	**18**	**0**	**4**	**6**	**2**	**0**	**6**	**0**	**0**	**3.6**	**5.6**	**3.6**	**6.3**
Artemisia cana	2	0	0	0	0	0	0	0	0	0	0.2	0.6	0.3	0.7
Ericameria nauseosa	0	0	0	0	0	0	0	2	0	0	0.2	0.6	0.0	0.0
Total Native Full Shrubs	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0.4**	**0.8**	**0.3**	**0.7**
Lichen	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fungi	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**
Bare Ground	4	12	8	10	0	36	4	18	2	2	9.6	10.8	5.0	4.3
Litter	34	10	24	32	28	14	38	8	30	36	25.4	11.0	28.7	8.9
Rock	4	2	2	6	0	0	0	0	0	0	1.4	2.1	1.5	2.3
Total Vegetation Cover	58	76	66	52	72	50	58	74	68	62	63.6	9.1	64.8	8.0
Total Vegetation Cover w/out SLCV	54	52	64	46	66	46	58	58	68	60	57.2	7.7	58.5	7.5
Total Vegetation w/Cryptograms	58	76	66	52	72	50	58	74	68	62	63.6	9.1	64.8	8.0
Total Vegetation w/Cryptograms w/out SLCV	54	52	64	46	66	46	58	58	68	60	57.2	7.7	58.5	7.5
Total Ground Cover	96	88	92	90	100	64	96	82	98	98	90.4	10.8	95.0	4.3
Total Ground Cover w/out SLCV	92	64	90	84	94	60	96	66	98	96	84.0	14.8	88.7	11.1
No. of Species Sampled excluding SLCV	6	6	5	6	3	7	2	9	3	2	4.9	2.3	4.1	1.8
No.of Species Observed excluding SLCV	7	1	0	2	3	4	0	2	1	3	2.3	2.1	2.1	2.3
Total No. of Species excluding SLCV	13	7	5	8	6	11	2	11	4	5	7.2	3.5	6.3	3.3
Total No. of SLCV	3	4	1	2	2	1	1	1	1	2	1.8	1.0	2.0	1.1

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																									Study Area n=25		Permit Area n=14	
	1	2	3	4*	5*	6*	7	8	9*	10	11*	12*	13	14	15*	16*	17	18*	19*	20*	21*	22	23*	24*	25	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Bromus japonicus	0	6	0	0	0	0	0	0	8	0	2	0	4	0	6	0	2	0	4	0	0	0	0	10	0	1.7	2.9	2.1	3.5
Bromus tectorum	0	0	0	0	0	0	0	0	14	0	0	0	4	0	0	0	0	0	6	0	0	0	0	2	0	1.0	3.1	1.6	3.9
Total Introduced Annual Grasses	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**2**	**0**	**8**	**0**	**6**	**0**	**2**	**0**	**10**	**0**	**0**	**0**	**0**	**12**	**0**	**2.7**	**5.4**	**3.7**	**6.6**
Elymus cinereus	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0.2	0.7	0.3	0.7
Elymus lanceolatus	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1.3	5.6	0.3	1.1
Elymus smithii	0	0	14	14	26	2	0	28	8	2	16	0	18	10	14	0	28	20	18	8	0	6	12	0	0	9.8	9.5	9.9	8.6
Elymus trachycaulus	6	0	0	0	0	2	6	0	0	0	0	0	0	0	0	2	0	0	0	0	18	0	0	0	12	1.8	4.4	1.6	4.8
Hordeum jubatum	14	0	0	0	4	18	0	2	0	0	0	14	0	0	0	0	22	0	0	40	0	0	0	0	0	4.6	9.8	5.4	11.5
Nassella viridula	0	0	0	0	0	0	0	0	14	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	1.0	3.4	1.0	3.7
Poa secunda	0	2	8	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2.0	0.0	0.0
Total Native Cool Season Perennial Grasses	**20**	**30**	**22**	**14**	**30**	**22**	**12**	**30**	**22**	**2**	**18**	**14**	**28**	**10**	**14**	**2**	**50**	**20**	**20**	**48**	**18**	**8**	**12**	**4**	**12**	**19.3**	**12.1**	**18.5**	**11.2**
Bouteloua gracilis	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Spartina pectinata	26	0	0	0	0	16	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	10	3.0	7.6	2.9	7.4
Total Native Warm Season Perennial Grasses	**26**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**24**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**3.2**	**7.5**	**2.9**	**7.4**
Agropyron cristatum	0	0	0	2	0	0	0	2	2	24	2	0	0	24	2	0	0	2	2	0	0	4	2	0	0	2.7	6.5	1.0	1.0
Bromus inermis	0	6	2	0	0	0	4	0	14	14	12	0	0	0	0	4	0	0	2	0	16	0	0	2	2	3.1	5.1	3.6	5.8
Dactylis glomerata	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.3	1.2	0.4	1.6
Phleum pratense	0	0	0	0	0	0	0	0	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0.4	1.3	0.6	1.7
Poa pratensis	0	6	0	0	0	2	0	0	0	0	0	0	12	0	0	6	6	0	0	0	8	0	0	4	0	1.8	3.3	1.4	2.7
Total Introduced Perennial Grasses	**0**	**12**	**2**	**2**	**0**	**2**	**6**	**2**	**22**	**38**	**14**	**0**	**14**	**24**	**2**	**16**	**6**	**2**	**4**	**0**	**24**	**4**	**2**	**8**	**2**	**8.3**	**9.9**	**7.0**	**8.4**
Festuca spp.	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.3	1.1
Total Unknown Grass Species	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.2**	**0.8**	**0.3**	**1.1**
Carex filifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0.4	2.0	0.7	2.7
Carex nebrascensis	22	0	2	0	0	16	0	0	0	0	0	32	0	0	2	10	0	0	0	0	0	0	0	0	4	3.5	8.1	4.3	9.3
Juncus balticus	8	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1.0	2.9	0.7	2.7
Schoenoplectus pungens	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Total Native Grasslike Species	**30**	**2**	**2**	**0**	**0**	**26**	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**0**	**2**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**12**	**5.0**	**9.8**	**5.7**	**10.5**
Chenopodium berlandieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Galium aparine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.1	0.4	0.1	0.5
Total Native Annual Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0.2**	**0.6**	**0.2**	**0.7**
Alyssum desertorum	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	2	0	0.4	1.0	0.7	1.3
Bassia sieversiana	0	0	0	0	0	2	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.2	0.6	1.7
Lepidium perfoliatum	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.2	0.6	0.1	0.5
Medicago lupulina	0	6	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.2	0.0	0.0
Thlaspi arvense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	0	0.2	0.7	0.4	0.9
Total Introduced Annual Forbs	**0**	**6**	**0**	**0**	**4**	**2**	**0**	**0**	**0**	**0**	**0**	**6**	**2**	**0**	**0**	**0**	**2**	**2**	**4**	**4**	**0**	**0**	**0**	**4**	**0**	**1.4**	**2.0**	**1.8**	**2.1**
Cynoglossum officinale	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Lactuca serriola	8	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	14	1.0	3.2	0.1	0.5
Melilotus officinalis	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2	0.7	0.0	0.0
Tragopogon dubius	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0.2	0.6	0.1	0.5
Total Introduced Biennial Forbs	**8**	**2**	**0**	**0**	**0**	**2**	**0**	**2**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**16**	**1.5**	**3.5**	**0.3**	**0.9**
Achillea millefolium	0	2	2	0	0	0	0	0	22	0	0	0	4	0	2	0	0	2	2	0	0	0	2	6	0	1.8	4.5	2.6	5.8
Asclepias speciosa	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2	0.6	0.1	0.5
Asteraceae spp.	0	0	0	0	8	0	0	6	0	0	0	0	0	0	0	0	8	0	0	4	0	0	0	0	0	1.0	2.5	0.9	2.3
Comandra umbellata	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0.3	0.9	0.3	0.7
Equisetum laevigatum	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Evolvulus nuttallianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Galium boreale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number / Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																									Study Area n=25		Permit Area n=14	
	1	2	3	4*	5*	6*	7	8	9*	10	11*	12*	13	14	15*	16*	17	18*	19*	20*	21*	22	23*	24*	25	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Glycyrrhiza lepidota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0.2	1.2	0.4	1.6
Grindelia squarrosa	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	8	0	0	16	0	0	0	0	0	1.5	4.4	2.1	5.5
Sphaeralcea coccinea	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Vicia americana	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Total Native Perennial Forbs	**4**	**14**	**2**	**0**	**22**	**2**	**0**	**6**	**22**	**0**	**0**	**0**	**4**	**0**	**2**	**0**	**16**	**12**	**2**	**22**	**0**	**0**	**2**	**8**	**2**	**5.8**	**7.6**	**6.6**	**9.0**
Cardaria draba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Cirsium arvense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	0	0	4	0	0	0	0.4	1.0	0.4	0.9
Convolvulus arvensis	0	8	0	0	6	0	6	4	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1.1	2.3	0.7	1.7
Medicago sativa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.1	0.4	0.1	0.5
Taraxacum officinale	0	12	0	2	2	0	0	6	4	0	4	0	4	0	0	0	6	0	0	12	0	2	0	4	0	2.3	3.5	2.0	3.3
Trifolium repens	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Total Introduced Perennial Forbs	**0**	**22**	**0**	**2**	**8**	**0**	**6**	**10**	**6**	**0**	**4**	**0**	**4**	**0**	**2**	**2**	**6**	**2**	**6**	**12**	**0**	**6**	**0**	**4**	**0**	**4.1**	**5.1**	**3.3**	**3.5**
Astragalus spp.	10	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.8	2.5	0.1	0.5
Sonchus spp.	0	0	0	0	0	16	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	14	1.8	5.1	2.3	5.8
Total Unknown Forb Species	**10**	**0**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**2.6**	**6.4**	**2.4**	**6.2**
Artemisia cana	0	0	2	0	0	0	0	0	2	0	0	0	4	12	10	0	0	0	16	0	0	0	12	0	0	2.3	4.7	2.9	5.5
Artemisia tridentata	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.0	0.0
Atriplex canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0.2	1.2	0.4	1.6
Rosa woodsii	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.2	0.6	0.1	0.5
Symphoricarpos albus	2	2	48	10	0	2	0	12	0	32	40	0	0	12	30	2	2	28	4	2	0	30	8	14	8	11.5	14.4	10.0	13.2
Total Native Full Shrubs	**2**	**2**	**52**	**10**	**0**	**2**	**0**	**12**	**2**	**32**	**40**	**0**	**8**	**24**	**40**	**2**	**2**	**36**	**20**	**2**	**0**	**30**	**20**	**14**	**8**	**14.4**	**15.7**	**13.4**	**15.4**
Fraxinus pennsylvanica	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	1.3	6.0	2.3	8.0
Populus deltoides	0	0	0	24	0	0	76	0	0	8	0	0	0	0	0	4	0	0	0	0	0	32	20	0	0	6.6	16.8	3.4	8.0
Salix amygdaloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.2	0.8	0.3	1.1
Sorbus scopulina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	0	0	0	0	58	0	0	0	0	4.6	15.8	8.1	20.7
Total Native Trees	**0**	**0**	**0**	**24**	**0**	**0**	**76**	**0**	**2**	**8**	**0**	**0**	**0**	**0**	**0**	**60**	**0**	**4**	**0**	**0**	**58**	**32**	**20**	**30**	**0**	**12.7**	**22.2**	**14.1**	**21.6**
Elaeagnus angustifolia	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0.6	2.8	0.1	0.5
Total Introduced Trees	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0.6**	**2.8**	**0.1**	**0.5**
Lichen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**
Bare Ground	0	2	0	2	0	0	0	0	0	0	0	0	10	4	6	0	0	4	0	2	0	6	12	8	0	2.1	3.5	2.4	3.8
Litter	0	2	20	46	36	2	0	38	0	20	0	8	16	38	24	8	14	18	34	10	0	14	22	4	2	15.0	14.3	15.4	15.2
Rock	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	4.4	1.9	5.9
Total Vegetation Cover	100	96	80	52	64	98	100	62	100	80	78	92	74	58	70	92	86	78	66	88	100	80	66	88	98	82.0	14.8	80.3	15.4
Total Vegetation Cover w/out SLCV	100	82	80	52	58	92	94	58	74	80	76	86	66	58	62	90	84	72	52	88	100	76	66	76	82	76.3	14.3	74.0	15.3
Total Vegetation w/Cryptograms	100	96	80	52	64	98	100	62	100	80	78	92	74	58	70	92	86	78	66	88	100	80	66	88	98	82.0	14.8	80.3	15.4
Total Vegetation w/Cryptograms w/out SLCV	100	82	80	52	58	92	94	58	74	80	76	86	66	58	62	90	84	72	52	88	100	76	66	76	82	76.3	14.3	74.0	15.3
Total Ground Cover	100	98	100	98	100	100	100	100	100	100	100	100	90	96	94	100	100	96	100	98	100	94	88	92	100	97.9	3.5	97.6	3.8
Total Ground Cover w/out SLCV	100	84	100	98	94	94	94	96	74	100	98	94	82	96	86	98	98	90	86	98	100	90	88	80	84	92.2	7.3	91.3	7.7
No. of Species Sampled excluding SLCV	9	14	8	5	7	12	5	7	9	5	6	4	11	4	7	8	9	11	10	8	4	6	7	13	10	8.0	2.8	7.9	2.8
No.of Species Observed excluding SLCV	3	4	6	4	8	1	2	6	4	5	6	2	8	6	7	4	3	10	6	8	3	6	6	9	2	5.2	2.4	5.6	2.7
Total No. of Species excluding SLCV	12	18	14	9	15	13	7	13	13	10	12	6	19	10	14	12	12	21	16	16	7	12	13	22	12	13.1	4.0	13.5	4.5
Total No. of SLCV	0	4	1	0	1	3	1	3	4	3	2	1	2	0	2	3	2	4	4	1	0	2	1	4	2	2.0	1.4	2.1	1.5

TFN 6 2/025
RECD NOV 14,2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																													Study Area n=30		Permit Area n=23	
	1*	2*	3*	4*	5*	7	8*	9*	10*	11	12	13	14*	15*	16*	17*	18*	19*	20*	21*	22	23*	24*	25*	26*	27*	28*	29*	30	31	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Bromus japonicus	0	0	0	2	0	10	0	0	4	0	2	2	0	14	2	0	2	6	6	2	0	2	0	0	4	4	2	2	0	6	2.4	3.3	2.3	3.2
Bromus tectorum	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	2	0	0	0	0	0	0.3	0.9	0.4	1.0
Total Introduced Annual Grasses	**0**	**0**	**2**	**2**	**0**	**10**	**0**	**0**	**4**	**0**	**2**	**2**	**0**	**14**	**2**	**0**	**2**	**6**	**10**	**4**	**0**	**2**	**0**	**0**	**6**	**4**	**2**	**2**	**0**	**6**	**2.7**	**3.5**	**2.7**	**3.5**
Achnatherum hymenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0.1	0.5	0.1	0.4
Elymus lanceolatus	0	0	2	0	0	0	2	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.5	1.4	0.7	1.6
Elymus smithii	0	2	4	0	0	14	0	0	4	16	2	0	0	14	16	0	6	0	4	8	2	0	0	4	2	4	0	4	0	18	4.1	5.7	3.1	4.4
Elymus spicatus	14	10	14	2	0	4	14	12	0	2	0	0	16	0	0	14	0	24	14	14	2	14	4	2	2	4	14	2	12	0	7.0	6.9	8.3	7.1
Hesperostipa comata	0	0	0	0	0	6	0	0	0	0	0	0	2	2	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0.7	2.1	0.6	2.1
Koeleria macrantha	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Nassella viridula	0	0	0	0	0	10	2	0	2	0	2	4	0	0	2	2	0	2	0	2	0	0	6	0	0	2	0	0	4	2	1.4	2.2	0.9	1.5
Poa secunda	0	0	2	0	0	0	0	0	0	0	0	4	10	0	2	0	2	0	0	0	0	0	0	0	0	4	2	0	0	0	0.9	2.1	1.0	2.2
Total Native Cool Season Perennial Grasses	**16**	**12**	**22**	**2**	**0**	**34**	**18**	**14**	**12**	**18**	**4**	**8**	**28**	**16**	**20**	**16**	**8**	**26**	**28**	**26**	**6**	**14**	**14**	**6**	**4**	**14**	**16**	**6**	**16**	**20**	**14.8**	**8.4**	**14.8**	**8.0**
Aristida purpurea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Bouteloua gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	0.4	0.1	0.4
Schizachyrium scoparium	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Total Native Warm Season Perennial Grasses	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0.3**	**0.6**	**0.2**	**0.6**
Agropyron cristatum	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Bromus inermis	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Poa bulbosa	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Total Introduced Perennial Grasses	**0**	**0**	**0**	**0**	**0**	**4**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.3**	**0.8**	**0.1**	**0.4**
Carex filifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	0.4	0.1	0.4
Total Native Grasslike Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.4**	**0.1**	**0.4**
Atriplex suckleyi	0	0	2	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2.9	0.9	3.3
Chenopodium berlandieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Plantago patagonica	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.3	0.9	0.3	0.9
Total Native Annual Forbs	**0**	**0**	**2**	**2**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1.1**	**3.0**	**1.2**	**3.4**
Alyssum desertorum	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0.4	1.5	0.2	0.6
Thlaspi arvense	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Total Introduced Annual Forbs	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0.5**	**1.5**	**0.2**	**0.6**
Tragopogon dubius	0	0	2	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.3	0.8	0.3	0.7
Total Introduced Biennial Forbs	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.3**	**0.8**	**0.3**	**0.7**
Achillea millefolium	0	0	0	0	0	2	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0.4	1.0	0.1	0.4
Comandra umbellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	4	0	0.3	0.9	0.2	0.6
Dalea candida	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8	0.3	0.9
Dalea purpurea	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.1	0.5	0.2	0.6
Eriogonum pauciflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0.1	0.7	0.2	0.8
Evolvulus nuttallianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0.2	1.1	0.3	1.3
Gaura coccinea	2	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.6	0.2	0.6
Grindelia squarrosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0.5	0.2	0.6
Heterotheca villosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	0.4	0.1	0.4
Machaeranthera tanacetifolia	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Musineon divaricatum	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0.5	0.1	0.4
Pediomelum argophyllum	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.5	0.2	0.6
Pediomelum esculentum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0.2	1.1	0.3	1.3

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																														Study Area n=30		Permit Area n=23	
	1*	2*	3*	4*	5*	7	8*	9*	10*	11	12	13	14*	15*	16*	17*	18*	19*	20*	21*	22	23*	24*	25*	26*	27*	28*	29*	30	31	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Phlox hoodii	2	0	4	0	0	0	0	4	0	0	0	0	2	0	2	0	0	0	2	0	0	0	6	0	6	4	0	2	6	0	1.3	2.1	1.5	2.0
Psoralidium tenuiflorum	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	4	8	0	10	0	0	0	0	2	0	2	0	1.1	2.4	1.3	2.7
Ratibida columnifera	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5	0.0	0.0
Sphaeralcea coccinea	0	0	0	0	0	2	0	0	0	0	0	0	0	2	2	0	0	0	0	2	0	0	0	0	2	2	0	2	0	0	0.5	0.9	0.5	0.9
Thermopsis rhombifolia	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0.2	0.6	0.2	0.6
Vicia americana	0	0	0	0	0	2	0	0	2	0	2	0	0	4	2	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0.5	1.0	0.5	1.1
Total Native Perennial Forbs	**4**	**6**	**8**	**0**	**2**	**8**	**4**	**4**	**2**	**4**	**6**	**2**	**2**	**8**	**8**	**0**	**4**	**8**	**8**	**10**	**0**	**18**	**8**	**4**	**16**	**10**	**4**	**4**	**14**	**4**	**5.9**	**4.5**	**6.5**	**4.5**
Cirsium arvense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.1	0.7	0.2	0.8
Convolvulus arvensis	0	0	2	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.5	1.9	0.6	2.1
Total Introduced Perennial Forbs	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.6**	**2.0**	**0.8**	**2.2**
Cirsium spp.	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Total Unknown Forb Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.4**	**0.1**	**0.4**
Artemisia cana	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.1	0.1	0.4
Artemisia tridentata	2	20	0	4	0	2	0	0	10	12	8	16	14	0	2	18	4	12	0	2	20	4	10	4	28	26	30	22	16	0	9.5	9.4	9.2	10.1
Atriplex canescens	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.0	0.0
Ericameria nauseosa	0	0	0	0	0	2	0	0	0	0	4	0	0	0	2	0	6	0	0	0	0	0	0	4	0	0	0	0	0	0	0.6	1.5	0.5	1.5
Rhus aromatica	0	2	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.5	0.4	1.7
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Rosa woodsii	2	0	2	0	0	0	0	0	0	2	4	0	0	0	0	0	8	0	0	0	0	0	0	0	2	0	0	0	0	0	0.7	1.7	0.6	1.8
Sarcobatus vermiculatus	0	0	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	4	0.9	2.4	0.5	1.8
Total Native Full Shrubs	**4**	**22**	**2**	**12**	**4**	**4**	**0**	**0**	**10**	**18**	**16**	**22**	**22**	**0**	**4**	**20**	**18**	**12**	**0**	**4**	**30**	**4**	**10**	**8**	**30**	**26**	**30**	**22**	**16**	**4**	**12.5**	**10.0**	**11.4**	**10.1**
Artemisia frigida	0	0	0	0	0	0	2	12	2	4	2	0	6	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	2	0	1.1	2.5	1.1	2.8
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.7	0.0	0.0
Artemisia pedatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0.4	0.0	0.0
Atriplex gardneri	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Gutierrezia sarothrae	4	0	0	0	0	0	4	8	0	0	0	2	0	0	2	0	0	0	0	0	0	2	2	0	0	0	0	2	4	2	1.1	1.9	1.0	2.0
Total Native Half &Sub-Shrubs	**4**	**0**	**0**	**0**	**2**	**0**	**6**	**20**	**2**	**8**	**2**	**2**	**6**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**4**	**6**	**4**	**2.5**	**4.0**	**2.2**	**4.3**
Juniperus scopulorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.1	0.4	0.1	0.4
Total Native Trees	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.4**	**0.1**	**0.4**
Lichen	0	0	0	0	0	0	6	0	0	0	4	0	0	0	2	0	0	0	0	0	0	2	12	0	2	2	4	0	4	4	1.4	2.6	1.3	2.8
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**12**	**0**	**2**	**2**	**4**	**0**	**4**	**4**	**1.4**	**2.6**	**1.3**	**2.8**
Bare Ground	32	24	20	66	52	12	12	18	34	38	50	50	4	26	48	48	56	26	30	38	36	12	10	60	18	6	6	26	20	36	30.3	17.4	29.0	18.4
Litter	18	10	10	14	10	14	40	24	18	4	10	10	12	22	10	14	8	10	18	8	6	32	30	4	8	26	22	28	16	20	15.7	8.9	17.0	9.4
Rock	22	26	30	2	14	6	10	20	16	8	4	0	26	2	0	2	4	12	2	6	20	14	10	16	10	10	16	8	8	0	10.8	8.4	12.0	8.6
Total Vegetation Cover	28	40	40	18	24	68	32	38	32	50	32	40	58	50	40	36	32	52	50	48	38	40	38	20	62	56	52	38	52	40	41.8	12.0	40.7	11.9
Total Vegetation Cover w/out SLCV	28	40	36	16	24	58	32	38	28	50	30	38	58	26	38	36	30	46	40	42	38	38	34	20	56	52	50	36	52	34	38.1	10.9	37.4	10.8
Total Vegetation w/Cryptograms	28	40	40	18	24	68	38	38	32	50	36	40	58	50	42	36	32	52	50	48	38	42	50	20	64	58	56	38	56	44	43.2	12.3	42.0	12.4
Total Vegetation w/Cryptograms w/out SLCV	28	40	36	16	24	58	38	38	28	50	34	38	58	26	40	36	30	46	40	42	38	40	46	20	58	54	54	36	56	38	39.5	11.3	38.7	11.5
Total Ground Cover	68	76	80	34	48	88	88	82	66	62	50	50	96	74	52	52	44	74	70	62	64	88	90	40	82	94	94	74	80	64	69.7	17.4	71.0	18.4
Total Ground Cover w/out SLCV	68	76	76	32	48	78	88	82	62	62	48	48	96	50	50	52	42	68	60	56	64	86	86	40	76	90	92	72	80	58	66.0	17.3	67.7	18.6
No. of Species Sampled	7	7	10	4	4	13	9	5	7	10	9	9	7	6	11	4	7	6	8	9	6	6	7	6	11	10	5	7	9	8	7.6	2.3	7.1	2.1

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Cover Sample Data
Sample Date: 7/01-12/2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values) 1*	2*	3*	4*	5*	7	8*	9*	10*	11	12	13	14*	15*	16*	17*	18*	19*	20*	21*	22	23*	24*	25*	26*	27*	28*	29*	30	31	Study Area n=30 Mean Absolute	Study Area n=30 Standard Deviation	Permit Area n=23 Mean Absolute	Permit Area n=23 Standard Deviation
excluding SLCV																																		
No.of Species Observed excluding SLCV	13	9	15	11	7	5	7	12	11	5	7	12	5	3	4	10	9	4	3	9	7	12	8	5	7	6	14	11	4	4	8.0	3.5	8.5	3.6
Total No. of Species excluding SLCV	20	16	25	15	11	18	16	17	18	15	16	21	12	9	15	14	16	10	11	18	13	18	15	11	18	16	19	18	13	12	15.5	3.6	15.6	3.7
Total No. of SLCV	1	1	2	1	0	1	1	2	1	2	1	2	0	3	2	1	2	1	2	3	1	1	3	0	2	1	1	2	0	2	1.4	0.9	1.4	0.9

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Scoria Grassland (SG)
Cover Sample Data
Sample Date: 7/01-12//2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																										Study Area and Permit Area n=28	
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16*	17*	18*	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	Mean Absolute	Standard Deviation
Echinochloa muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.1	0.8
Vulpia octoflora	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Native Annual Grasses	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0.2**	**0.8**
Bromus japonicus	0	0	0	6	2	0	2	0	18	8	6	10	0	6	2	0	0	6	0	0	6	0	10	0	0	0	0	0	2.9	4.5
Bromus tectorum	28	24	8	22	14	34	18	2	6	22	26	4	12	4	0	36	20	18	36	10	24	0	36	52	0	36	26	8	18.8	13.8
Total Introduced Annual Grasses	**28**	**24**	**8**	**28**	**16**	**34**	**20**	**2**	**24**	**30**	**32**	**14**	**12**	**10**	**2**	**36**	**20**	**24**	**36**	**10**	**30**	**0**	**46**	**52**	**0**	**36**	**26**	**8**	**21.7**	**13.9**
Elymus lanceolatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0.1	0.8
Elymus smithii	0	6	4	0	18	0	2	14	2	2	12	2	0	2	0	0	0	0	0	2	2	0	0	0	4	6	0	0	2.8	4.6
Elymus spicatus	8	2	10	12	2	0	6	16	8	0	2	6	0	16	12	0	8	10	8	0	0	18	4	6	22	0	0	2	6.4	6.3
Hesperostipa comata	0	2	4	0	0	2	2	0	14	0	0	4	20	0	6	0	0	14	2	8	16	4	10	0	2	0	4	8	4.4	5.7
Koeleria macrantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0.4
Nassella viridula	0	0	0	0	0	0	0	6	0	0	0	0	0	2	0	0	0	0	0	2	2	0	0	0	14	0	0	0	0.9	2.9
Poa secunda	0	0	0	0	0	2	0	6	4	0	0	4	0	6	8	2	2	0	0	4	0	0	0	0	0	0	0	4	1.5	2.3
Total Native Cool Season Perennial Grasses	**8**	**10**	**18**	**12**	**20**	**4**	**10**	**42**	**28**	**2**	**14**	**16**	**20**	**26**	**26**	**2**	**10**	**24**	**10**	**16**	**20**	**22**	**14**	**6**	**48**	**6**	**4**	**14**	**16.2**	**11.1**
Aristida purpurea	0	2	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	2	0	0.4	1.0
Bouteloua gracilis	0	0	0	0	0	0	2	0	0	0	6	2	0	0	4	0	0	2	0	4	0	0	0	0	0	0	0	0	0.7	1.6
Total Native Warm Season Perennial Grasses	**0**	**2**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**6**	**2**	**0**	**0**	**8**	**0**	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**1.1**	**2.0**
Bromus inermis	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Festuca ovina	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.4	1.9
Total Introduced Perennial Grasses	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.5**	**1.9**
Carex filifolia	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Total Native Grasslike Species	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.5**
Helianthus annuus	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Lappula redowskii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Native Annual Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.2**	**0.5**
Alyssum desertorum	0	0	0	4	2	0	0	0	2	0	0	2	0	2	0	2	0	0	0	2	0	0	4	0	0	0	0	0	0.7	1.2
Camelina microcarpa	0	0	0	4	4	0	0	0	6	0	0	0	0	0	0	6	0	0	0	0	0	0	2	0	0	2	0	0	0.9	1.8
Descurainia sophia	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Lepidium perfoliatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	0.4
Medicago lupulina	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	2	0	0.3	1.2
Total Introduced Annual Forbs	**0**	**2**	**2**	**10**	**8**	**0**	**0**	**0**	**8**	**0**	**0**	**2**	**0**	**2**	**0**	**8**	**0**	**0**	**6**	**2**	**0**	**0**	**8**	**0**	**0**	**2**	**2**	**0**	**2.2**	**3.2**
Melilotus officinalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Tragopogon dubius	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0.3	0.9
Total Introduced Biennial Forbs	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0.4**	**1.0**
Achillea millefolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Ambrosia tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.1	0.4
Comandra umbellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	0.4
Dalea purpurea	0	0	4	2	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	0	1.0	2.5
Evolvulus nuttallianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	4	0	0.3	0.9
Galium boreale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Gaura coccinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0.4
Glycyrrhiza lepidota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.1	0.4
Heterotheca villosa	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.8
Lactuca oblongifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	4	0.4	1.1

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RAMACO
Polygon: Scoria Grassland (SG)
Cover Sample Data
Sample Date: 7/01-12//2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																											Study Area and Permit Area n=28	
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16*	17*	18*	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	Mean Absolute	Standard Deviation
Pediomelum argophyllum	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0.3	1.2
Pediomelum esculentum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0.2	0.8
Phlox hoodii	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Psoralidium tenuiflorum	4	0	4	2	0	0	2	0	4	0	0	0	0	2	0	0	0	0	0	0	2	4	4	0	0	2	0	0	1.1	1.6
Ratibida columnifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0.4
Sphaeralcea coccinea	0	0	8	0	8	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	0	2	2	0	0	4	0	0	1.1	2.2
Thermopsis rhombifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	0.4
Vicia americana	0	0	4	0	0	0	0	0	2	2	0	0	0	6	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.6	1.4
Total Native Perennial Forbs	**4**	**2**	**26**	**4**	**8**	**0**	**14**	**2**	**6**	**2**	**0**	**2**	**2**	**8**	**2**	**2**	**0**	**6**	**10**	**0**	**8**	**12**	**8**	**0**	**2**	**12**	**14**	**6**	**6.1**	**5.9**
Convolvulus arvensis	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	6.4
Total Introduced Perennial Forbs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**34**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.2**	**6.4**
Astragalus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.1	0.4
Total Unknown Forb Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0.1**	**0.4**
Artemisia cana	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.5
Artemisia tridentata	14	0	0	0	0	4	2	14	0	0	6	2	0	14	0	0	10	2	0	30	2	8	0	0	0	2	0	6	4.1	6.9
Rhus aromatica	2	6	0	8	0	14	0	2	0	26	0	0	0	0	6	6	0	0	2	0	0	2	0	10	0	0	0	0	3.0	5.8
Total Native Full Shrubs	**16**	**6**	**0**	**8**	**8**	**18**	**2**	**16**	**0**	**26**	**6**	**2**	**0**	**14**	**6**	**6**	**10**	**2**	**2**	**30**	**2**	**10**	**0**	**10**	**0**	**2**	**0**	**6**	**7.4**	**7.9**
Artemisia frigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	2	0	0.2	0.6
Gutierrezia sarothrae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4	0	0	0	0	0	0	0.2	0.8
Linanthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0.4
Yucca glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0.2	0.8
Total Native Half &Sub-Shrubs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**0**	**2**	**0**	**4**	**2**	**0**	**0**	**2**	**2**	**0**	**0.7**	**1.7**
Lichen	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.3	0.9
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0.4
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**4**	**0.4**	**1.0**
Bare Ground	6	14	14	8	12	12	4	12	4	12	4	20	16	2	10	0	4	12	10	12	12	28	4	32	14	12	8	10	10.8	7.1
Litter	10	36	12	8	22	14	28	18	24	24	38	20	8	16	10	24	22	18	22	16	22	22	10	0	16	20	40	36	19.7	9.6
Rock	28	4	18	18	4	18	8	6	6	4	0	18	6	22	26	22	32	8	4	8	6	2	8	0	18	2	0	12	11.0	9.2
Total Vegetation Cover	56	46	56	66	62	56	58	64	66	60	58	40	70	60	54	54	42	62	64	64	60	48	78	68	50	66	52	38	58.1	9.3
Total Vegetation Cover w/out SLCV	28	22	48	38	46	22	38	62	42	30	26	26	24	50	52	18	22	38	28	54	30	46	32	16	50	30	26	30	34.8	12.2
Total Vegetation w/Cryptograms	56	46	56	66	62	56	60	64	66	60	58	42	70	60	54	54	42	62	64	64	60	48	78	68	52	66	52	42	58.5	8.9
Total Vegetation w/Cryptograms w/out SLCV	28	22	48	38	46	22	40	62	42	30	26	28	24	50	52	18	22	38	28	54	30	46	32	16	52	30	26	34	35.2	12.3
Total Ground Cover	94	86	86	92	88	88	96	88	96	88	96	80	84	98	90	100	96	88	90	88	88	72	96	68	86	88	92	90	89.2	7.1
Total Ground Cover w/out SLCV	66	62	78	64	72	54	76	86	72	58	64	66	38	88	88	64	76	64	54	78	58	70	50	16	86	52	66	82	65.9	15.9
No. of Species Sampled excluding SLCV	4	7	11	9	8	4	9	8	8	3	4	9	3	8	11	5	4	7	8	8	6	9	9	2	7	11	8	7	7.0	2.5
No.of Species Observed excluding SLCV	8	5	9	7	2	7	7	7	10	16	3	4	4	16	10	4	3	6	7	2	5	4	5	2	18	5	3	9	6.7	4.2
Total No. of Species excluding SLCV	12	12	20	16	10	11	16	15	18	19	7	13	7	24	21	9	7	13	15	10	11	13	14	4	25	16	11	16	13.8	5.1
Total No. of SLCV	1	2	1	2	2	1	2	1	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	2	1	2	2	1.7	0.5

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Upland Grassland (UG)
Cover Sample Data
Date: 7/01-12//2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																										Study Area and Permit Area n=28	
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	17*	18*	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	29*	Mean Absolute	Standard Deviation
Cenchrus longispinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0		0.1	0.8
Echinochloa muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	4	0	0	0	0	2	4	0.6	1.3
Vulpia octoflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0.4
Total Native Annual Grasses	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**4**	**0**	**0**	**0**	**2**	**6**	**4**	**0.8**	**1.7**
Bromus japonicus	2	0	2	0	6	0	2	6	0	2	4	0	2	4	0	16	2	0	20	0	4	8	26	4	4	0	12	8	4.8	6.5
Bromus tectorum	8	0	2	0	0	6	40	12	40	28	0	0	6	6	34	0	34	0	52	36	0	8	0	0	0	38	10	6	13.1	16.6
Total Introduced Annual Grasses	**10**	**0**	**4**	**0**	**6**	**6**	**42**	**18**	**40**	**30**	**4**	**0**	**8**	**10**	**34**	**16**	**36**	**0**	**72**	**36**	**4**	**16**	**26**	**4**	**4**	**38**	**22**	**14**	**17.9**	**17.6**
Elymus lanceolatus	0	0	0	2	0	0	0	0	0	0	2	8	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0.6	1.6
Elymus smithii	2	46	18	16	4	28	4	22	0	2	32	0	2	0	18	16	2	4	2	4	0	4	14	26	6	18	2	0	10.4	12.0
Elymus spicatus	24	0	2	0	0	0	0	0	10	10	0	0	2	12	0	4	0	2	0	8	12	8	0	0	4	0	10	2	3.9	5.8
Elymus trachycaulus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.4
Hesperostipa comata	0	0	0	4	0	0	6	0	12	20	0	0	10	12	0	0	12	10	4	0	16	12	4	0	8	0	8	12	5.4	6.0
Nassella viridula	4	6	2	0	0	0	0	0	0	0	0	0	0	2	0	4	0	8	0	0	0	0	4	0	0	0	0	2	1.1	2.1
Poa secunda	0	0	8	18	2	0	0	0	0	0	14	12	6	0	0	0	0	16	0	0	0	0	0	0	2	0	2	0	2.9	5.5
Total Native Cool Season Perennial Grasses	**30**	**52**	**30**	**40**	**6**	**28**	**10**	**22**	**22**	**32**	**48**	**20**	**20**	**26**	**18**	**24**	**14**	**42**	**6**	**16**	**28**	**24**	**22**	**26**	**20**	**18**	**22**	**16**	**24.4**	**11.1**
Aristida purpurea	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0.5
Bouteloua gracilis	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4	0	2	0	4	0	0	0	0.5	1.2
Distichlis stricta	0	0	0	4	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1.7
Total Native Warm Season Perennial Grasses	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**2**	**0**	**4**	**0**	**0**	**2**	**1.0**	**2.0**
Agropyron cristatum	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0.3	0.9
Poa bulbosa	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Introduced Perennial Grasses	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0.4**	**1.1**
Carex filifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.1	0.4
Total Native Grasslike Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.4**
Erigeron strigosus	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Lappula redowskii	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Plantago patagonica	0	0	0	4	2	0	0	0	0	0	0	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1.7
Total Native Annual Forbs	**0**	**0**	**0**	**4**	**2**	**0**	**2**	**2**	**0**	**0**	**0**	**10**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.8**	**2.1**
Alyssum desertorum	0	0	0	0	4	0	0	0	2	6	0	2	2	2	4	0	2	0	0	2	0	0	0	8	0	0	2	0	1.3	2.1
Camelina microcarpa	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.1	0.5
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	6	0	0	2	0	0	0	0	0	0	0	0	0.4	1.2
Thlaspi arvense	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.5
Total Introduced Annual Forbs	**0**	**2**	**0**	**2**	**4**	**0**	**0**	**2**	**2**	**6**	**0**	**2**	**2**	**2**	**6**	**0**	**8**	**0**	**0**	**4**	**0**	**0**	**0**	**8**	**0**	**0**	**4**	**0**	**1.9**	**2.5**
Melilotus officinalis	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.2	0.6
Tragopogon dubius	0	0	2	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.4	1.0
Total Introduced Biennial Forbs	**0**	**2**	**2**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**0**	**0.6**	**1.1**
Achillea millefolium	0	6	0	0	0	0	2	2	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0.6	1.4
Evolvulus nuttallianus	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Gaura coccinea	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Grindelia squarrosa	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.1	0.5
Lactuca oblongifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.4
Lygodesmia juncea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.1	0.4
Musineon divaricatum	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.8
Pediomelum argophyllum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0.2	0.6
Phlox hoodii	0	0	0	0	0	2	4	0	0	0	0	0	0	2	0	4	0	2	0	0	6	2	0	0	2	0	0	2	0.9	1.6
Psoralidium tenuiflorum	0	6	2	0	0	0	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1.3

TFN 6 2/025
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RAMACO
Polygon: Upland Grassland (UG)
Cover Sample Data
Date: 7/01-12//2013
Point Line Intercept Method

Plant Species	Sample Number Cover (*Denotes Sample Location Used to Calculate Permit Area Values)																											Study Area and Permit Area n=28	
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	17*	18*	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	29*	Mean Absolute	Standard Deviation
Sphaeralcea coccinea	8	0	0	0	0	0	0	0	0	2	0	0	0	2	4	2	0	0	0	4	0	0	0	0	0	0	0	0	0.8	1.8
Symphyotrichum falcatum	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0.5
Vicia americana	0	0	2	0	0	0	0	0	4	0	0	2	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2	0	0.5	1.0
Zigadenus venenosus	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Native Perennial Forbs	**8**	**12**	**4**	**0**	**4**	**4**	**6**	**2**	**6**	**4**	**0**	**6**	**4**	**8**	**4**	**10**	**2**	**4**	**0**	**8**	**8**	**6**	**2**	**0**	**4**	**2**	**2**	**2**	**4.3**	**3.1**
Convolvulus arvensis	0	8	0	0	0	6	2	18	4	0	4	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	1.7	3.8
Taraxacum officinale	0	4	0	0	0	0	6	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1.5
Total Introduced Perennial Forbs	**0**	**12**	**0**	**0**	**0**	**6**	**8**	**22**	**4**	**0**	**6**	**0**	**0**	**0**	**4**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2.3**	**4.9**
Astragalus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	0	0.2	0.8
Cirsium spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Lappula spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0.4
Polygonum spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Unknown Forb Species	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**2**	**0.5**	**1.1**
Artemisia cana	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0.3	1.0
Artemisia tridentata	0	0	4	0	0	10	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	6	0	0	0	0	0.9	2.3
Rhus aromatica	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0.2	0.6
Ribes cereum	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Symphoricarpos spp.	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0.5
Total Native Full Shrubs	**4**	**0**	**4**	**0**	**0**	**14**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**4**	**0**	**2**	**0**	**6**	**2**	**0**	**2**	**0**	**1.7**	**2.9**
Artemisia frigida	0	0	2	2	0	0	0	0	0	0	0	0	2	0	2	2	0	2	0	0	2	2	0	0	6	0	0	0	0.8	1.4
Gutierrezia sarothrae	0	2	0	0	2	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1.2
Total Native Half &Sub-Shrubs	**0**	**2**	**2**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**2**	**0**	**2**	**2**	**0**	**2**	**0**	**0**	**2**	**2**	**0**	**0**	**6**	**0**	**0**	**0**	**1.2**	**1.7**
Opuntia polyacantha	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Total Native Succulents	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0.4**
Lichen	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0.2	0.8
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total Cryptograms	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0.2**	**0.8**
Bare Ground	8	12	6	22	42	2	4	4	4	2	4	28	12	6	6	6	6	12	0	2	10	6	4	6	22	14	8	4	9.3	9.2
Litter	26	6	46	24	30	28	28	28	18	20	28	20	38	42	22	30	22	34	20	24	22	22	44	44	28	22	30	46	28.2	9.6
Rock	14	0	0	2	2	8	0	0	0	4	8	4	0	2	4	8	4	6	2	6	16	16	0	0	2	4	2	10	4.3	4.8
Total Vegetation Cover	52	82	48	52	26	62	68	68	78	74	60	46	50	50	68	56	68	48	78	68	52	56	52	46	48	60	60	40	58.0	12.7
Total Vegetation Cover w/out SLCV	42	74	44	52	20	50	24	32	34	44	52	46	42	40	30	38	32	48	6	32	48	40	26	42	44	22	38	26	38.1	13.0
Total Vegetation w/Cryptograms	52	82	48	52	26	62	68	68	78	74	60	48	50	50	68	56	68	48	78	68	52	56	52	50	48	60	60	40	58.2	12.5
Total Vegetation w/Cryptograms w/out SLCV	42	74	44	52	20	50	24	32	34	44	52	48	42	40	30	38	32	48	6	32	48	40	26	46	44	22	38	26	38.3	13.1
Total Ground Cover	92	88	94	78	58	98	96	96	96	98	96	72	88	94	94	94	94	88	100	98	90	94	96	94	78	86	92	96	90.7	9.2
Total Ground Cover w/out SLCV	82	80	90	78	52	86	52	60	52	68	88	72	80	84	56	76	58	88	28	62	86	78	70	90	74	48	70	82	70.8	15.5
No. of Species Sampled excluding SLCV	6	8	10	8	8	7	6	5	6	7	5	9	11	10	5	9	9	9	2	10	8	10	5	4	11	3	11	7	7.5	2.5
No.of Species Observed excluding SLCV	2	5	11	9	5	9	8	7	7	13	12	11	10	5	6	9	10	5	8	2	6	13	2	6	10	6	4	10	7.5	3.2
Total No. of Species excluding SLCV	8	13	21	17	13	16	14	12	13	20	17	20	21	15	11	18	19	14	10	12	14	23	7	10	21	9	15	17	15.0	4.3
Total No. of SLCV	2	3	2	1	2	3	3	5	3	2	2	2	2	2	2	2	2	2	2	2	1	4	1	1	1	1	2	2	2.1	0.9

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ATTACHMENT D8-1-I

Raw Production Data

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species

Sample Number
(*Denotes Sample Location Used to Calculate Permit Area Values)
Oven-dry Weight (grams/square meter)

	1	2	3*	4*	5*	24*	25*	26*	27*	28*	29*	30	31*	32*	33*	34*
Vulpia octoflora	11.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Grasses	**11.59**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.76**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Bromus japonicus	46.44	1.74	0.00	0.00	1.02	1.76	0.03	0.00	0.06	0.00	0.03	3.50	1.91	0.24	0.03	6.42
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.84	0.00	0.00	0.00	2.15	0.00	0.00
Total Introduced Annual Grasses	**46.44**	**1.74**	**0.00**	**0.00**	**1.02**	**1.76**	**0.03**	**0.00**	**0.06**	**42.84**	**0.03**	**3.50**	**1.91**	**2.39**	**0.03**	**6.42**
Achnatherum hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	42.54	0.91	0.00	0.00	0.00	3.96	0.00	0.00	0.00	0.00	0.00	6.19	3.31	2.24	0.00	0.00
Elymus spicatus	0.00	0.00	10.35	20.27	7.97	5.94	6.85	4.06	1.40	0.00	21.37	9.29	23.20	0.75	23.84	25.65
Festuca idahoensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hesperostipa comata	0.00	3.63	0.00	13.51	31.88	3.96	6.85	0.00	8.42	20.35	0.00	0.00	0.00	4.47	0.00	0.00
Nassella viridula	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	0.00	0.00	5.94	0.00	0.00	0.00	0.00	2.37	0.00	6.63	0.00	0.03	0.00
Total Native Cool Season Perennial Grasses	**42.54**	**4.54**	**10.35**	**33.78**	**39.85**	**19.81**	**13.70**	**4.06**	**14.03**	**20.35**	**23.74**	**15.48**	**33.14**	**7.45**	**23.87**	**25.65**
Aristida purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bouteloua gracilis	2.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.88
Total Native Warm Season Perennial Grasses	**2.11**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.88**
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromus inermis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Festuca ovina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa bulbosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**13.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Carex filifolia	0.00	0.00	0.00	0.00	0.00	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.33**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Lappula redowskii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Logfia arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plantago patagonica	5.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.47	0.38	0.03	0.00	0.00
Total Native Annual Forbs	**5.41**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.47**	**0.38**	**0.03**	**0.00**	**0.00**
Alyssum desertorum	0.00	0.03	0.76	0.00	1.30	2.37	0.03	0.00	0.03	0.00	0.03	0.00	7.25	0.03	0.03	2.69
Camelina microcarpa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Descurainia sophia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.05	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Annual Forbs	**0.00**	**0.03**	**0.76**	**0.00**	**1.30**	**2.37**	**0.03**	**0.00**	**0.03**	**13.05**	**0.03**	**0.00**	**7.25**	**0.03**	**0.03**	**2.69**
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	1.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.51	0.00	0.00	0.00	1.10
Total Introduced Biennial Forbs	**1.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.51**	**0.00**	**0.00**	**0.00**	**1.10**
Achillea millefolium	0.00	1.32	0.00	0.00	0.00	1.08	0.00	0.00	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brickellia eupatorioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.19	0.00	0.00	0.00	0.00	0.00	0.00
Calochortus nuttallii	0.00	0.00	0.00	0.00	0.00	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comandra umbellata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dalea purpurea	0.00	0.00	0.00	9.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaura coccinea	0.00	0.00	0.00	0.00	0.00	0.00	3.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Heterotheca villosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lygodesmia juncea	0.00	0.00	2.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mertensia ciliata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	3.88	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00
Pediomelum esculentum	0.00	0.00	0.00	0.00	0.00	0.00	3.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phlox hoodii	0.00	0.00	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00

TFN 6 2/025
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RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)															
Psoralidium tenuiflorum	3.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.00	16.17	0.00	0.00	0.03	0.03	0.00
Sphaeralcea coccinea	0.00	0.00	0.00	0.00	0.00	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thermopsis rhombifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.89	0.00	0.00	0.00	0.00
Vicia americana	0.00	0.00	0.00	0.00	0.00	2.51	0.00	0.00	0.00	0.00	0.00	2.11	0.00	0.00	0.00	0.00
Total Native Perennial Forbs	**3.87**	**1.32**	**2.31**	**9.85**	**0.00**	**8.86**	**9.09**	**0.00**	**1.52**	**4.19**	**16.17**	**5.00**	**1.28**	**0.12**	**0.03**	**0.00**
Taraxacum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Production	**113.52**	**7.63**	**13.42**	**43.63**	**42.17**	**32.80**	**27.19**	**17.08**	**15.64**	**85.19**	**39.97**	**29.96**	**43.96**	**10.02**	**23.96**	**38.74**

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RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species

Sample Number
(*Denotes Sample Location Used to Calculate Permit Area Values)
Oven-dry Weight (grams/square meter)

	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*	46*	47*	48*	49*	50*
Vulpia octoflora	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Bromus japonicus	0.03	0.06	0.03	3.38	8.37	0.00	0.00	0.03	0.00	0.00	32.26	0.06	0.71	1.08	29.71	6.77
Bromus tectorum	0.00	0.00	0.00	2.25	12.55	11.72	1.57	0.00	0.00	0.00	8.06	0.00	4.03	0.00	0.00	0.00
Total Introduced Annual Grasses	**0.03**	**0.06**	**0.03**	**5.63**	**20.92**	**11.72**	**1.57**	**0.03**	**0.00**	**0.00**	**40.32**	**0.06**	**4.74**	**1.08**	**29.71**	**6.77**
Achnatherum hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.11	0.00	0.00	0.00	0.00	0.00
Elymus smithii	1.52	0.00	3.63	0.00	4.20	0.00	13.19	0.00	0.00	2.57	2.55	0.00	0.00	0.00	48.95	0.00
Elymus spicatus	10.62	6.17	7.86	0.00	18.90	10.80	0.00	45.98	5.22	23.13	0.00	7.04	15.15	20.20	0.00	45.47
Festuca idahoensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hesperostipa comata	0.00	14.39	0.00	2.94	0.00	43.20	0.00	0.00	7.82	0.00	2.55	7.04	11.99	0.00	0.00	8.53
Nassella viridula	0.00	0.00	0.00	0.00	18.90	0.00	0.00	9.20	0.00	0.00	0.00	0.00	0.00	0.00	5.44	2.84
Poa secunda	1.52	0.00	0.60	0.00	0.00	0.00	0.00	6.13	0.00	0.00	2.55	0.00	2.77	0.00	0.00	0.00
Total Native Cool Season Perennial Grasses	**13.65**	**20.55**	**12.09**	**2.94**	**42.01**	**54.00**	**13.19**	**61.31**	**13.04**	**25.70**	**12.77**	**14.07**	**29.91**	**20.20**	**54.39**	**56.84**
Aristida purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.81	0.00	0.00	0.00	0.00
Bouteloua gracilis	4.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Warm Season Perennial Grasses	**4.09**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**8.81**	**0.00**	**0.00**	**0.00**	**0.00**
Agropyron cristatum	1.52	3.13	0.00	0.00	0.00	0.00	3.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromus inermis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Festuca ovina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa bulbosa	0.00	0.03	0.00	0.00	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Grasses	**1.52**	**3.16**	**0.00**	**0.00**	**0.00**	**0.00**	**3.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Carex filifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Lappula redowskii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Logfia arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00
Plantago patagonica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Alyssum desertorum	0.03	0.03	0.00	8.20	12.05	0.00	3.92	0.03	0.00	2.81	0.00	0.09	0.03	2.63	0.06	3.06
Camelina microcarpa	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Descurainia sophia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Annual Forbs	**0.03**	**0.03**	**0.00**	**8.20**	**12.63**	**0.00**	**3.92**	**0.03**	**0.00**	**2.81**	**0.00**	**0.09**	**0.03**	**2.63**	**0.06**	**3.06**
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	1.59	0.00	0.00	0.00	1.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Biennial Forbs	**0.00**	**0.00**	**1.59**	**0.00**	**0.00**	**0.00**	**1.42**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Achillea millefolium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brickellia eupatorioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calochortus nuttallii	0.00	0.00	0.00	0.00	3.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comandra umbellata	0.00	0.00	0.00	0.00	0.00	0.00	4.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dalea purpurea	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00	5.64	0.00	0.00	0.00	0.68	0.00	0.00	0.00
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaura coccinea	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00
Heterotheca villosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.86	0.00	0.00	0.00	0.00	0.00
Lygodesmia juncea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mertensia ciliata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pediomelum esculentum	5.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.95
Phlox hoodii	2.06	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.00

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RECD NOV 14,2014

RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species

Sample Number
(*Denotes Sample Location Used to Calculate Permit Area Values)
Oven-dry Weight (grams/square meter)

	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*	46*	47*	48*	49*	50*
Psoralidium tenuiflorum	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaeralcea coccinea	0.00	0.00	2.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.33	0.00	0.00
Thermopsis rhombifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vicia americana	3.09	0.03	0.00	0.00	0.00	0.00	0.00	1.59	0.00	2.12	0.00	0.00	0.00	1.70	0.00	7.06
Total Native Perennial Forbs	**10.31**	**0.12**	**2.95**	**1.30**	**3.81**	**0.00**	**4.74**	**1.65**	**8.96**	**2.12**	**4.86**	**0.03**	**1.70**	**17.03**	**0.00**	**10.01**
Taraxacum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.45	0.00
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**5.45**	**0.00**
Total Production	**29.63**	**23.92**	**16.66**	**18.07**	**79.37**	**65.72**	**28.65**	**63.02**	**22.00**	**30.63**	**59.17**	**23.06**	**36.38**	**40.94**	**89.61**	**76.68**

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RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)															
	51	52*	53*	54*	55	56*	57*	58*	59*	60	61*	62*	63*	64	65*	66*
Vulpia octoflora	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Bromus japonicus	3.86	9.31	4.02	0.00	9.55	0.00	0.00	0.03	0.00	0.00	4.42	0.00	1.55	4.54	1.35	0.00
Bromus tectorum	0.00	0.00	0.45	0.00	6.36	0.03	0.00	0.03	11.22	4.80	0.00	0.00	13.91	0.00	3.16	1.82
Total Introduced Annual Grasses	**3.86**	**9.31**	**4.47**	**0.00**	**15.91**	**0.03**	**0.00**	**0.06**	**11.22**	**4.80**	**4.42**	**0.00**	**15.46**	**4.54**	**4.51**	**1.82**
Achnatherum hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	9.99	1.40	2.20	0.00	6.59	0.00	0.00	2.49	0.00	14.17	0.00	13.71	2.52	29.02	0.00	0.00
Elymus spicatus	0.00	9.81	0.00	0.00	0.00	11.27	9.24	11.20	0.00	0.00	0.00	0.00	2.52	0.00	8.02	7.83
Festuca idahoensis	0.00	0.00	0.00	0.00	12.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hesperostipa comata	0.00	8.41	0.00	0.00	0.00	3.76	0.00	11.20	18.28	0.00	0.00	13.71	0.00	0.00	12.03	0.00
Nassella viridula	0.00	8.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.74	8.95	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	3.24	0.00	0.00	0.00	0.00	0.00	1.57	0.00	6.86	0.00	2.16	0.00	0.00
Total Native Cool Season Perennial Grasses	**9.99**	**28.02**	**2.20**	**3.24**	**18.98**	**15.03**	**9.24**	**24.89**	**18.28**	**31.48**	**8.95**	**34.28**	**5.04**	**31.18**	**20.05**	**7.83**
Aristida purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bouteloua gracilis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.11**	**0.00**	**0.00**
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromus inermis	0.00	0.00	0.00	20.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Festuca ovina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.55	0.00	0.00	0.00
Poa bulbosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Grasses	**0.00**	**0.00**	**0.00**	**20.86**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**7.55**	**0.00**	**0.00**	**0.00**
Carex filifolia	0.00	0.00	0.00	0.00	0.00	0.00	2.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.17**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Lappula redowskii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.52	0.00	0.00	0.00	0.00	0.00	0.00
Logfia arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00
Plantago patagonica	1.21	0.00	0.00	0.00	5.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00
Total Native Annual Forbs	**1.21**	**0.00**	**0.00**	**0.00**	**5.31**	**0.00**	**0.00**	**0.00**	**0.00**	**2.52**	**0.00**	**0.00**	**0.00**	**0.40**	**0.00**	**0.00**
Alyssum desertorum	0.06	0.03	0.03	0.03	5.31	0.09	0.00	0.03	0.06	2.52	5.64	0.03	4.98	0.13	5.20	2.85
Camelina microcarpa	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Descurainia sophia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Annual Forbs	**0.06**	**0.03**	**0.09**	**0.03**	**5.31**	**0.09**	**0.00**	**0.03**	**0.09**	**2.52**	**5.64**	**0.03**	**4.98**	**0.13**	**5.20**	**2.85**
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	0.00	2.83	1.60	0.00	0.00	0.00	0.00	0.00	1.31	0.00	0.00	1.19	0.00	0.00
Total Introduced Biennial Forbs	**0.00**	**0.00**	**0.00**	**2.83**	**1.60**	**0.00**	**0.00**	**1.60**	**0.00**	**0.00**	**1.31**	**0.00**	**0.00**	**1.19**	**0.00**	**0.00**
Achillea millefolium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.27	0.00	0.00	0.00	1.06	0.00	0.00
Brickellia eupatorioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calochortus nuttallii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comandra umbellata	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dalea purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaura coccinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heterotheca villosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lygodesmia juncea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mertensia ciliata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44	0.00	0.00	0.00	0.00

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RECD NOV 14, 2014

RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)															
	51	52*	53*	54*	55	56*	57*	58*	59*	60	61*	62*	63*	64	65*	66*
Pediomelum esculentum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09
Phlox hoodii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Psoralidium tenuiflorum	0.00	0.00	0.00	0.00	0.00	0.00	1.78	0.00	0.00	26.18	0.00	0.00	0.00	0.00	0.00	0.00
Sphaeralcea coccinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.27	0.00	0.00	0.00	1.06	0.00	0.00
Thermopsis rhombifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vicia americana	18.97	0.03	0.00	0.03	28.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Perennial Forbs	**18.97**	**0.03**	**0.00**	**0.12**	**28.07**	**0.00**	**1.78**	**1.96**	**2.98**	**32.73**	**0.00**	**2.44**	**0.00**	**2.11**	**0.00**	**1.09**
Taraxacum officinale	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.00**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Production	**34.09**	**37.39**	**6.76**	**27.14**	**75.18**	**15.15**	**13.19**	**28.54**	**32.57**	**74.04**	**20.32**	**36.75**	**33.03**	**39.66**	**29.76**	**13.59**

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RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)		Study Area n=50		Permit Area n=43	
	67*	68*	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Vulpia octoflora	0.00	0.00	0.3	1.8	0.1	0.7
Total Native Annual Grasses	**0.00**	**0.00**	**0.3**	**1.8**	**0.1**	**0.7**
Bromus japonicus	0.03	0.00	3.7	8.9	2.7	6.8
Bromus tectorum	0.03	1.60	2.6	6.8	2.7	7.3
Total Introduced Annual Grasses	**0.06**	**1.60**	**6.3**	**11.2**	**5.4**	**10.2**
Achnatherum hymenoides	0.00	0.00	0.1	0.7	0.1	0.8
Elymus smithii	0.00	0.00	4.4	10.0	2.5	7.8
Elymus spicatus	5.40	0.00	8.9	10.9	10.1	11.2
Festuca idahoensis	0.00	0.00	0.2	1.8	0.0	0.0
Hesperostipa comata	0.00	21.53	5.6	9.0	6.4	9.4
Nassella viridula	0.00	0.00	1.5	4.0	1.3	3.7
Poa secunda	2.32	0.00	0.9	1.9	1.0	2.0
Total Native Cool Season Perennial Grasses	**7.72**	**21.53**	**21.6**	**14.8**	**21.4**	**15.1**
Aristida purpurea	0.00	0.00	0.2	1.2	0.2	1.3
Bouteloua gracilis	0.00	0.00	0.2	0.8	0.2	0.8
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**0.4**	**1.4**	**0.4**	**1.5**
Agropyron cristatum	0.00	0.00	0.4	1.9	0.5	2.1
Bromus inermis	0.00	0.00	0.4	3.0	0.5	3.2
Festuca ovina	0.00	0.00	0.2	1.1	0.2	1.2
Poa bulbosa	0.00	0.00	0.01	0.1	0.0	0.1
Total Introduced Perennial Grasses	**0.000**	**0.00**	**1.0**	**3.6**	**1.2**	**3.9**
Carex filifolia	0.00	5.03	0.2	0.9	0.2	1.0
Total Native Grasslike Species	**0.00**	**5.03**	**0.2**	**0.9**	**0.2**	**1.0**
Lappula redowskii	0.00	0.00	0.1	0.4	0.0	0.0
Logfia arvensis	0.00	0.00	0.03	0.2	0.0	0.2
Plantago patagonica	0.00	0.00	0.3	1.2	0.0	0.1
Total Native Annual Forbs	**0.00**	**0.00**	**0.4**	**1.3**	**0.0**	**0.2**
Alyssum desertorum	1.71	6.89	1.7	2.7	1.7	2.8
Camelina microcarpa	0.00	0.00	0.01	0.1	0.0	0.1
Descurainia sophia	0.00	0.00	0.3	1.8	0.3	2.0
Total Introduced Annual Forbs	**1.71**	**6.89**	**2.0**	**3.2**	**2.0**	**3.3**
Melilotus officinalis	0.00	0.00	0.03	0.2	0.0	0.2
Tragopogon dubius	0.00	0.00	0.3	0.6	0.2	0.6
Total Introduced Biennial Forbs	**0.00**	**0.00**	**0.3**	**0.7**	**0.2**	**0.6**
Achillea millefolium	0.00	0.00	0.2	0.5	0.1	0.2
Brickellia eupatorioides	0.00	0.00	0.1	0.6	0.1	0.6
Calochortus nuttallii	0.00	0.00	0.1	0.6	0.1	0.6
Comandra umbellata	0.00	0.00	0.1	0.7	0.1	0.7
Dalea purpurea	8.42	0.00	0.6	2.0	0.7	2.1
Evolvulus nuttallianus	0.00	0.00	0.1	0.5	0.1	0.5
Gaura coccinea	0.00	0.00	0.1	0.4	0.1	0.5
Heterotheca villosa	0.00	0.00	0.1	0.7	0.1	0.7
Lygodesmia juncea	0.00	0.00	0.04	0.3	0.1	0.4
Mertensia ciliata	0.00	0.00	0.01	0.1	0.0	0.1
Pediomelum argophyllum	0.00	0.00	0.1	0.6	0.2	0.7
Pediomelum esculentum	1.49	0.00	0.3	0.9	0.3	1.0
Phlox hoodii	0.00	0.00	0.1	0.4	0.1	0.4

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)		Study Area n=50		Permit Area n=43	
	67*	68*	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Psoralidium tenuiflorum	0.00	0.00	1.0	4.3	0.4	2.5
Sphaeralcea coccinea	0.00	0.00	0.5	2.2	0.5	2.4
Thermopsis rhombifolia	0.00	0.00	0.1	0.4	0.0	0.0
Vicia americana	0.00	0.00	1.3	4.8	0.4	1.3
Total Native Perennial Forbs	**9.91**	**0.00**	**4.9**	**7.1**	**3.4**	**4.5**
Taraxacum officinale	0.00	0.00	0.1	0.8	0.1	0.8
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.1**	**0.8**	**0.1**	**0.8**
Total Production	**19.40**	**35.05**	**37.5**	**23.7**	**34.4**	**20.5**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Bottomland Sagebrush Grassland (BSG)
Production Sample Data
Sample Dates: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																									Study Area n=25		Permit Area n=17	
	1*	2*	3*	4*	5*	6*	7*	8*	9	10*	11*	12	13*	14	15*	16	17*	18*	19*	20*	21*	22*	23*	24	25	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Bromus japonicus	3.36	0.00	19.33	0.00	0.00	0.00	8.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.83	1.41	4.81	0.00	0.00	6.62	10.11	0.59	8.54	0.06	2.6	4.7	3.2	5.3
Bromus tectorum	0.00	0.00	0.00	0.00	14.08	0.00	0.00	0.00	0.00	1.39	0.00	0.00	38.27	0.00	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.35	2.13	0.00	2.5	8.0	3.6	9.6
Total Introduced Annual Grasses	**3.36**	**0.00**	**19.33**	**0.00**	**14.08**	**0.00**	**8.73**	**0.00**	**0.00**	**1.39**	**0.00**	**0.00**	**38.30**	**0.00**	**2.29**	**0.83**	**1.41**	**4.81**	**0.00**	**0.00**	**6.62**	**10.11**	**5.94**	**10.67**	**0.06**	**5.1**	**8.7**	**6.8**	**9.8**
Achnatherum hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.60	0.00	0.00	0.00	0.2	0.9	0.3	1.1
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.09	0.4	2.0	0.0	0.0
Elymus smithii	0.00	1.33	14.94	0.00	53.63	24.27	26.25	0.00	0.00	30.97	0.00	0.00	9.13	15.37	1.33	265.21	14.30	75.10	78.97	29.98	41.00	82.73	5.39	71.09	10.09	34.0	55.4	28.8	28.4
Elymus trachycaulus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.83	0.00	0.00	0.00	12.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.8	2.8	0.0	0.0
Hordeum jubatum	0.00	0.00	0.00	0.00	0.00	56.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.27	0.00	0.00	0.00	0.00	0.00	4.60	0.00	0.00	0.00	2.8	11.4	3.6	13.7
Nassella viridula	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.85	27.34	0.00	8.09	0.00	2.52	2.0	6.1	2.8	7.2
Total Native Cool Season Perennial Grasses	**0.00**	**1.33**	**14.94**	**0.00**	**53.63**	**80.89**	**26.25**	**7.83**	**0.00**	**30.97**	**0.00**	**12.04**	**9.13**	**15.37**	**1.33**	**273.48**	**14.30**	**75.10**	**78.97**	**46.77**	**68.34**	**91.92**	**13.48**	**71.09**	**22.70**	**40.2**	**57.4**	**35.7**	**32.8**
Spartina pectinata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.7	8.3	0.0	0.0
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**41.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.7**	**8.3**	**0.0**	**0.0**
Agropyron cristatum	0.00	64.93	0.00	0.00	0.54	0.00	91.88	0.00	0.00	34.21	38.58	0.00	0.00	0.00	11.96	0.00	1.59	0.00	184.26	22.35	0.00	0.00	0.00	0.00	0.00	18.0	41.7	26.5	48.7
Bromus inermis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	212.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.70	9.4	42.5	0.0	0.0
Phleum pratense	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7	3.6	0.0	0.0
Poa bulbosa	0.00	0.00	0.00	0.00	0.00	0.00	13.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5	2.6	0.8	3.2
Poa pratensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.04	0.2	1.0	0.0	0.0
Total Introduced Perennial Grasses	**0.00**	**64.93**	**0.00**	**0.00**	**0.54**	**0.00**	**105.01**	**0.00**	**0.00**	**34.21**	**38.58**	**18.07**	**0.00**	**212.06**	**11.96**	**0.00**	**1.59**	**0.00**	**184.26**	**22.35**	**0.00**	**0.00**	**0.00**	**0.00**	**27.74**	**28.8**	**56.9**	**27.3**	**49.9**
Carex nebrascensis	0.00	0.00	0.00	322.99	0.00	0.00	0.00	71.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.8	65.6	0.0	0.0
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**322.99**	**0.00**	**0.00**	**0.00**	**71.13**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**15.8**	**65.6**	**0.0**	**0.0**
Carex spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.0	5.2	0.0	0.0
Total Unknown Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**25.79**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.0**	**5.2**	**0.0**	**0.0**
Lappula redowskii	2.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.1	0.5	0.2	0.6
Total Native Annual Forbs	**2.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.31**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.1**	**0.5**	**0.2**	**0.6**
	0.79	3.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	4.71	0.00	0.03	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.24	21.84	0.00	1.4	4.4	0.8	1.5

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Bottomland Sagebrush Grassland (BSG)
Production Sample Data
Sample Dates: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																									Study Area n=25		Permit Area n=17	
	1*	2*	3*	4*	5*	6*	7*	8*	9	10*	11*	12	13*	14	15*	16	17*	18*	19*	20*	21*	22*	23*	24	25	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Alyssum desertorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.1	0.4	0.1	0.5
Camelina microcarpa	0.00	0.00	0.00	0.00	0.00	2.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.1	0.6
Lepidium perfoliatum	0.00	0.00	0.00	0.00	10.18	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	2.0	0.6	2.5
Thlaspi arvense	0.00	0.00	0.00	0.00	10.18	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	2.0	0.6	2.5
Total Introduced Annual Forbs	**0.79**	**3.67**	**0.00**	**0.00**	**10.18**	**3.03**	**0.00**	**0.00**	**0.00**	**2.31**	**4.71**	**0.00**	**0.03**	**0.00**	**2.78**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.24**	**21.93**	**0.00**	**2.0**	**4.8**	**1.6**	**2.7**
Lactuca serriola	0.00	0.00	1.81	0.00	0.00	0.00	0.00	0.00	157.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.4	31.5	0.1	0.4
Tragopogon dubius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.00	0.00	0.00	0.85	0.00	0.00	0.00	10.13	0.00	0.00	0.5	2.0	0.7	2.4
Total Introduced Biennial Forbs	**0.00**	**0.00**	**1.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**157.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.04**	**0.00**	**0.00**	**0.00**	**0.85**	**0.00**	**0.00**	**0.00**	**10.13**	**0.00**	**0.00**	**6.9**	**31.5**	**0.8**	**2.5**
Achillea millefolium	0.00	0.00	4.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.58	0.00	0.00	0.00	0.00	0.00	2.4	10.9	3.5	13.2
Ambrosia psilostachya	0.00	0.00	6.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.71	0.00	0.00	0.00	16.53	0.00	0.00	0.00	0.00	4.2	16.3	6.1	19.7
Lygodesmia juncea	0.00	9.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	1.8	0.5	2.2
Sphaeralcea coccinea	0.00	2.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.11	0.00	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.5	1.4	0.7	1.6
Total Native Perennial Forbs	**0.00**	**11.32**	**11.21**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.09**	**0.00**	**0.00**	**0.00**	**2.11**	**0.00**	**6.25**	**0.00**	**80.71**	**0.00**	**0.00**	**54.58**	**16.53**	**0.00**	**1.00**	**0.00**	**0.00**	**7.5**	**19.1**	**10.8**	**22.5**
Cirsium arvense	0.00	0.00	0.00	7.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.00	0.00	0.00	6.83	0.00	0.00	0.00	0.00	6.54	1.0	2.3	0.4	1.7
Convolvulus arvensis	28.87	0.00	12.27	0.00	0.00	0.00	31.47	0.00	0.00	0.00	0.00	0.00	2.74	0.00	0.00	0.00	13.89	0.00	0.00	49.47	6.57	0.00	0.00	0.00	0.00	5.8	12.6	8.5	14.6
Rumex crispus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.80	0.00	0.7	2.7	0.0	0.0
Taraxacum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.69	0.1	0.5	0.0	0.0
Total Introduced Perennial Forbs	**28.87**	**0.00**	**12.27**	**7.47**	**0.00**	**0.00**	**31.47**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.74**	**0.00**	**0.00**	**16.03**	**13.89**	**0.00**	**0.00**	**56.30**	**6.57**	**0.00**	**0.00**	**3.80**	**9.23**	**7.6**	**13.5**	**8.9**	**15.9**
Astragalus spp.	0.00	0.00	0.00	0.00	0.00	0.00	6.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.2	0.4	1.5
Chenopodium spp.	0.00	0.00	0.00	7.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5	1.7	0.0	0.0
Polygonum spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.8	4.0	0.0	0.0
Sonchus spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	6.9	0.0	0.0
Trifolium spp.	0.00	0.00	10.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	2.2	0.6	2.7
Total Unknown Forb Species	**0.00**	**0.00**	**10.94**	**7.97**	**0.00**	**0.00**	**6.22**	**0.00**	**34.26**	**0.00**	**0.00**	**19.90**	**0.00**	**0.00**	**0.00**	**3.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.3**	**8.0**	**1.0**	**3.0**
Total Production	**35.37**	**81.25**	**70.50**	**338.43**	**78.43**	**83.92**	**177.68**	**120.42**	**192.08**	**68.88**	**43.29**	**75.80**	**52.31**	**227.43**	**25.96**	**293.53**	**111.90**	**79.91**	**264.08**	**180.00**	**98.06**	**102.03**	**31.82**	**107.49**	**59.73**	**120.0**	**85.2**	**93.3**	**62.2**

TFN 6 2/025
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RAMACO
Polygon: Riparian Woodland (RW)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Sample Number
(*Denotes Sample Location Used to Calculate Permit Area Values)
Oven-dry Weight (grams/square meter)

Plant Species	1	2	3	4*	5*	6*	7	8	9*	10	11*	12*	13	14	15*	16*	17	18*	19*	20*	21*	22	23*	25	26	27*	28*
Bromus japonicus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.00	66.52	4.30	0.00	9.87	0.00	68.75	0.00	0.00	1.83	16.37	0.00	0.00	11.18	1.93	0.00	44.52	0.00
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.00	7.39	0.00	0.00	9.87	0.00	0.00	0.00	0.00	7.34	38.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Annual Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.02**	**0.00**	**73.91**	**4.30**	**0.00**	**19.74**	**0.00**	**68.75**	**0.00**	**0.00**	**9.17**	**54.56**	**0.00**	**0.00**	**11.18**	**1.93**	**0.00**	**44.52**	**0.00**
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.87	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	0.00	0.00	0.00	62.47	0.00	2.85	0.00	0.00	37.15	0.00	64.70	52.81	0.00	0.70	20.15	4.94	0.00	0.00	0.00	15.10	10.87	0.00	179.02	6.51	0.00	8.34	0.00
Elymus trachycaulus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	208.08	7.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	321.76	0.00	0.00	0.00	0.00	0.00
Hordeum jubatum	0.00	0.00	1.67	0.00	0.00	45.62	0.71	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0.00	0.00	100.64	0.00	0.00	43.47	0.00	0.00	0.00	0.00	0.00	0.00
Nassella viridula	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	0.00	0.00	2.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.59	0.00	0.00	0.00	0.00	0.00	0.00	2.08	0.00	0.00
Total Native Cool Season Perennial Grasses	**0.00**	**0.00**	**1.67**	**62.47**	**0.00**	**51.32**	**0.71**	**208.08**	**44.58**	**0.00**	**64.70**	**52.81**	**0.78**	**2.79**	**20.15**	**4.94**	**0.00**	**106.23**	**0.00**	**15.10**	**65.21**	**321.76**	**179.02**	**6.51**	**2.08**	**8.34**	**0.00**
Spartina pectinata	94.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Warm Season Perennial Grasses	**94.86**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Agropyron cristatum	0.00	0.00	0.00	0.00	264.67	0.00	0.00	0.00	59.44	0.00	43.14	0.00	0.00	0.00	60.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.33	0.00	0.00	33.34	213.87
Agrostis capillaris	0.00	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromus inermis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	132.19	0.00	0.00	0.00	43.47	0.00	0.00	0.00	0.00	0.00	0.00
Poa pratensis	0.00	30.00	0.00	0.00	0.03	5.70	0.00	0.00	7.43	40.75	0.00	0.00	0.00	11.14	0.00	0.00	0.00	5.59	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00
Total Introduced Perennial Grasses	**0.00**	**31.55**	**0.00**	**0.00**	**264.70**	**5.70**	**0.00**	**0.00**	**104.02**	**40.75**	**43.14**	**0.00**	**0.00**	**11.14**	**60.46**	**0.00**	**132.19**	**5.59**	**0.00**	**0.00**	**43.47**	**0.00**	**22.33**	**4.73**	**0.00**	**33.34**	**213.87**
Festuca spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.56	0.00	0.00
Total Unknown Grass Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**61.56**	**0.00**	**0.00**
Carex nebrascensis	20.14	0.00	82.05	0.00	0.00	0.00	123.87	0.00	0.00	0.00	0.00	0.00	107.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Schoenoplectus pungens	0.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Grasslike Species	**20.14**	**1.41**	**82.05**	**0.00**	**0.00**	**0.00**	**123.87**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**107.87**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Chenopodium berlandieri	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Descurainia pinnata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.21	0.00	0.00	2.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Galium aparine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Helianthus annuus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**19.59**	**0.00**	**0.00**	**2.61**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Alyssum desertorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.21	6.14	0.00	0.00	3.92	5.59	0.00	0.00	0.00	0.03	0.00	0.00	0.00
Atriplex heterosperma	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camelina microcarpa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37	0.00	0.00	0.29	4.21	9.21	0.00	0.00	2.61	3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Descurainia sophia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lepidium perfoliatum	0.00	0.00	0.00	0.00	0.00	3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.59	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Medicago lupulina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
Polygonum convolvulus	3.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thlaspi arvense	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37	0.00	0.00	0.00	0.00	30.71	0.00	0.00	3.92	0.00	0.00	0.00	0.00	0.09	0.00	0.00	5.36
Total Introduced Annual Forbs	**3.37**	**0.00**	**0.00**	**0.00**	**0.00**	**3.72**	**0.00**	**0.00**	**0.00**	**0.00**	**4.74**	**0.00**	**0.00**	**0.29**	**8.42**	**46.06**	**0.00**	**78.67**	**10.45**	**9.31**	**0.03**	**0.00**	**0.00**	**0.18**	**0.00**	**0.00**	**5.36**
Cynoglossum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lactuca serriola	0.00	0.00	38.36	0.00	0.03	0.83	0.00	0.00	0.00	0.00	2.37	0.00	0.00	0.00	0.00	0.00	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.00	0.00
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.61	0.00

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																										
	1	2	3	4*	5*	6*	7	8	9*	10	11*	12*	13	14	15*	16*	17	18*	19*	20*	21*	22	23*	25	26	27*	28*
Total Introduced Biennial Forbs	**0.00**	**0.00**	**38.36**	**0.00**	**0.03**	**0.83**	**0.00**	**0.00**	**0.00**	**8.42**	**2.37**	**1.70**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.33**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.87**	**0.00**	**5.61**	**0.00**
Achillea millefolium	0.00	0.00	0.00	29.29	0.00	0.00	0.00	0.00	0.00	12.23	38.37	0.00	0.00	13.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agoseris aurantiaca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95	0.00	0.00	0.00
Apocynum cannabinum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asclepias speciosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brickellia eupatorioides	0.00	0.00	0.00	0.00	0.00	33.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comandra umbellata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.53	0.00	0.00	0.00	0.00	0.00	0.00
Equisetum laevigatum	0.00	0.00	0.00	21.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Galium boreale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glycyrrhiza lepidota	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grindelia squarrosa	0.00	0.00	0.00	0.00	0.00	3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.77	0.00	0.00	0.00	0.00	0.00	0.00
Lactuca oblongifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lepidium fremontii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Linum lewisii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Symphyotrichum falcatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Typha latifolia	0.00	0.00	1.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vicia americana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wyethia amplexicaulis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Perennial Forbs	**0.00**	**0.00**	**1.84**	**50.62**	**0.00**	**36.82**	**0.00**	**0.00**	**0.00**	**12.23**	**39.55**	**0.00**	**0.00**	**13.57**	**0.00**	**15.14**	**1.35**	**0.00**	**38.64**	**0.00**	**8.30**	**0.00**	**0.00**	**1.95**	**0.00**	**0.00**	**0.00**
Cardaria draba	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cirsium arvense	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.67	0.00
Convolvulus arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.55	32.24	0.00	0.00	0.00	0.00	0.00	0.00	20.62	0.00	27.67	0.00	0.00	0.00	0.00	0.00	0.00
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rumex crispus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.74	0.00
Taraxacum officinale	11.29	1.70	0.00	0.00	0.00	0.00	5.56	1.96	1.72	3.16	0.00	0.00	3.67	14.44	0.00	0.00	0.00	0.00	0.00	0.00	16.60	0.00	0.00	2.77	0.93	0.00	0.00
Trifolium repens	0.00	2.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
Total Introduced Perennial Forbs	**11.29**	**4.57**	**0.00**	**0.00**	**0.00**	**0.00**	**5.56**	**1.96**	**1.72**	**3.16**	**3.55**	**32.24**	**3.67**	**14.44**	**0.00**	**0.00**	**0.00**	**0.00**	**20.62**	**0.00**	**44.27**	**0.00**	**0.00**	**2.83**	**0.93**	**34.41**	**0.00**
Astragalus spp.	0.00	0.00	0.00	0.00	0.00	0.00	1.62	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asteraceae spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.64	0.00	0.00	2.77	0.00	0.00	0.00	0.00	0.00	0.00
Chenopodium spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.46	0.00	0.00	0.00	0.00	0.00
Sonchus spp.	30.36	0.00	0.00	0.00	0.00	0.00	3.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Unknown Forb Species	**30.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.63**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.58**	**0.00**	**0.00**	**0.00**	**16.64**	**0.00**	**0.00**	**2.77**	**2.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Production	**160.02**	**37.53**	**123.92**	**113.09**	**264.73**	**98.39**	**134.77**	**210.04**	**156.34**	**68.29**	**231.96**	**91.05**	**112.32**	**62.55**	**89.03**	**154.48**	**133.54**	**210.46**	**81.49**	**78.97**	**164.05**	**324.22**	**212.53**	**19.00**	**64.57**	**126.22**	**219.23**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																					Study Area n=48		Permit Area n=24	
	29	30*	31*	32	33	34	35	36	37*	38	39*	40	41*	42	43*	44*	45	46*	47*	48*	49	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Bromus japonicus	0.00	34.34	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	9.57	0.00	0.00	1.38	0.00	1.36	0.00	0.00	0.00	5.7	15.5	11.0	20.8
Bromus tectorum	0.00	34.34	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	1.36	0.00	0.00	0.00	2.1	7.5	3.9	10.2
Total Introduced Annual Grasses	**0.00**	**68.68**	**0.00**	**0.00**	**0.00**	**0.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**9.57**	**0.00**	**0.00**	**2.30**	**0.00**	**2.72**	**0.00**	**0.00**	**0.00**	**7.8**	**19.4**	**14.9**	**25.5**
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	10.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	2.1	0.5	2.2
Elymus smithii	0.00	0.00	0.00	0.00	0.00	31.14	3.06	0.00	0.00	8.00	0.00	5.76	10.74	0.00	0.00	0.00	42.61	46.84	14.91	0.00	0.00	13.1	30.0	22.1	39.5
Elymus trachycaulus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	230.95	16.4	63.2	0.3	1.5
Hordeum jubatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.74	0.00	0.00	5.0	17.8	9.8	24.5
Nassella viridula	0.00	0.00	0.00	0.00	0.00	24.91	0.00	0.00	0.00	4.00	0.00	5.76	0.00	0.00	0.00	0.00	0.00	0.00	44.74	0.00	0.00	1.7	7.3	1.9	9.1
Poa secunda	0.00	0.00	0.00	0.00	0.00	6.23	0.00	0.00	0.00	1.40	0.00	1.39	0.00	0.00	0.00	0.00	28.41	0.00	0.00	0.00	0.00	1.0	4.2	0.4	1.3
Total Native Cool Season Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**62.28**	**13.26**	**17.76**	**0.00**	**13.40**	**0.00**	**12.91**	**10.74**	**0.00**	**0.00**	**0.00**	**71.02**	**46.84**	**104.39**	**0.00**	**230.95**	**37.6**	**68.3**	**35.0**	**45.6**
Spartina pectinata	0.00	0.00	130.74	0.00	31.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	118.01	0.00	7.8	28.5	4.9	24.1
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**130.74**	**0.00**	**31.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**118.01**	**0.00**	**7.8**	**28.5**	**4.9**	**24.1**
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	136.59	0.00	0.00	0.00	42.98	188.99	426.45	0.00	0.00	0.00	0.00	0.00	0.00	31.1	82.3	54.3	105.9
Agrostis capillaris	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.2	0.0	0.0
Bromus inermis	115.50	0.00	0.00	0.00	0.00	0.00	0.00	155.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.44	0.00	10.3	33.7	3.8	11.5
Poa pratensis	6.08	0.00	0.00	0.00	0.00	0.00	7.14	0.00	0.00	8.00	11.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	7.6	1.3	3.1
Total Introduced Perennial Grasses	**121.58**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**7.14**	**155.83**	**136.59**	**8.00**	**11.75**	**0.00**	**42.98**	**188.99**	**426.45**	**0.00**	**0.00**	**0.00**	**0.00**	**10.44**	**0.00**	**44.3**	**85.0**	**59.4**	**105.0**
Festuca spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.74	0.00	0.00	2.2	10.9	1.9	9.1
Total Unknown Grass Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**44.74**	**0.00**	**0.00**	**2.2**	**10.9**	**1.9**	**9.1**
Carex nebrascensis	0.00	0.00	0.00	177.48	74.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.2	36.9	0.0	0.0
Schoenoplectus pungens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.1	0.3	0.1	0.3
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**177.48**	**74.66**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.33**	**0.00**	**0.00**	**12.3**	**36.9**	**0.1**	**0.3**
Chenopodium berlandieri	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.5	0.4	2.1
Descurainia pinnata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3	1.4	0.5	1.9
Galium aparine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.0	0.0
Helianthus annuus	0.00	20.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	2.9	0.9	4.2
Total Native Annual Forbs	**0.00**	**20.42**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.0**	**4.1**	**1.8**	**5.6**
Alyssum desertorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1.45	0.00	0.00	0.00	0.4	1.4	0.9	1.9
Atriplex heterosperma	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7	4.6	1.3	6.5
Camelina microcarpa	0.00	10.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.8	2.2	1.5	2.9
Descurainia sophia	0.00	10.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.5	0.4	2.1
Lepidium perfoliatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.0	6.7	2.1	9.5
Medicago lupulina	0.00	0.00	0.00	0.00	0.00	0.00	1.94	0.00	0.00	8.42	0.00	27.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.8	4.2	0.0	0.0
Polygonum convolvulus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.0	0.0
Thlaspi arvense	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.9	4.5	1.8	6.3
Total Introduced Annual Forbs	**0.00**	**20.42**	**0.00**	**0.00**	**0.00**	**0.00**	**1.94**	**0.00**	**0.00**	**8.42**	**0.00**	**27.82**	**0.00**	**1.97**	**0.00**	**4.46**	**0.03**	**1.45**	**0.00**	**0.00**	**0.00**	**4.9**	**13.7**	**8.0**	**18.1**
Cynoglossum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.2	0.0	0.0

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																					Study Area n=48		Permit Area n=24	
	29	30*	31*	32	33	34	35	36	37*	38	39*	40	41*	42	43*	44*	45	46*	47*	48*	49	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Lactuca serriola	0.00	10.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.2	5.7	0.7	2.2
Melilotus officinalis	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.1	0.0	0.0
Tragopogon dubius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.19	0.00	0.00	0.00	0.00	0.2	0.9	0.3	1.2
Total Introduced Biennial Forbs	**0.00**	**10.21**	**0.00**	**0.00**	**0.76**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.19**	**0.00**	**0.00**	**0.00**	**0.00**	**1.6**	**5.8**	**1.0**	**2.4**
Achillea millefolium	0.00	0.00	0.00	0.00	0.00	1.22	2.91	0.00	0.00	7.02	0.00	6.96	0.00	0.00	0.00	0.00	12.04	0.00	0.00	0.00	0.00	2.6	7.4	2.8	9.6
Agoseris aurantiaca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3	0.0	0.0
Apocynum cannabinum	0.00	0.00	0.00	0.00	6.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	1.0	0.0	0.0
Asclepias speciosa	0.00	0.00	12.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3	1.9	0.0	0.0
Brickellia eupatorioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7	4.8	1.4	6.8
Comandra umbellata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.8	0.2	1.1
Equisetum laevigatum	6.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.61	0.00	0.7	3.3	1.2	4.5
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.8	5.6	1.6	7.9
Galium boreale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.9	0.3	1.3
Glycyrrhiza lepidota	0.00	0.00	0.00	0.00	4.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.7	0.0	0.0
Grindelia squarrosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.10	0.00	0.00	0.00	1.78	0.00	7.76	0.00	0.00	1.9	10.9	3.7	15.3
Lactuca oblongifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.3	0.4	1.8
Lepidium fremontii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.2	0.0	0.2
Linum lewisii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.00	0.00	0.03	0.2	0.0	0.0
Symphyotrichum falcatum	9.74	0.00	0.00	0.00	0.00	5.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.76	0.00	0.00	0.5	1.9	0.3	1.6
Typha latifolia	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3	0.0	0.0
Vicia americana	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.1	0.0	0.0
Wyethia amplexicaulis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.2	0.0	0.0
Total Native Perennial Forbs	**16.39**	**0.00**	**12.83**	**0.03**	**11.74**	**6.93**	**3.88**	**0.00**	**0.00**	**7.02**	**0.00**	**6.96**	**75.10**	**0.00**	**0.00**	**0.00**	**15.02**	**0.00**	**15.52**	**6.61**	**0.00**	**8.3**	**15.4**	**11.9**	**20.6**
Cardaria draba	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	186.26	0.00	0.00	0.00	0.00	148.66	0.00	0.00	1.29	0.00	0.00	7.0	34.0	14.0	47.6
Cirsium arvense	0.00	0.00	35.01	0.00	0.00	5.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	6.7	1.3	6.3
Convolvulus arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.8	6.7	3.5	9.2
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.8	0.0	0.0
Rumex crispus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.2	0.8
Taraxacum officinale	0.00	0.00	0.00	0.00	0.00	1.22	13.57	0.00	0.00	11.23	0.00	27.82	0.00	0.00	0.00	0.00	10.84	0.00	2.59	0.00	0.00	2.7	5.7	0.9	3.4
Trifolium repens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4	0.0	0.0
Total Introduced Perennial Forbs	**0.00**	**0.00**	**35.01**	**0.00**	**0.00**	**6.98**	**13.57**	**0.00**	**0.00**	**11.23**	**186.26**	**33.38**	**0.00**	**1.85**	**0.00**	**148.66**	**10.84**	**0.00**	**3.88**	**0.00**	**0.00**	**13.3**	**34.6**	**19.9**	**47.6**
Astragalus spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.74	0.9	6.2	0.0	0.0
Asteraceae spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.47	0.00	0.00	0.5	2.6	1.1	3.6
Chenopodium spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4	0.0	0.0
Sonchus spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7	4.4	0.0	0.0
Total Unknown Forb Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.47**	**0.00**	**42.74**	**2.2**	**7.8**	**1.1**	**3.6**
Total Production	**137.97**	**119.73**	**178.58**	**177.51**	**118.30**	**76.31**	**39.79**	**173.59**	**136.59**	**48.07**	**198.01**	**81.07**	**138.39**	**192.81**	**426.45**	**155.42**	**98.10**	**51.01**	**176.33**	**135.06**	**273.69**	**143.3**	**78.1**	**159.9**	**78.8**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species

Sample Number
(*Denotes Sample Location Used to Calculate Permit Area Values)
Oven-dry Weight (grams/square meter)

	1*	2*	3*	4*	5*	6*	7	8*	9*	10*	11	12	13	14*	15*	32*	33*	34*	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*	46
Bromus japonicus	0.00	0.00	0.00	0.03	0.00	0.00	2.41	0.00	0.00	0.00	0.03	6.77	0.24	0.00	0.00	0.00	0.00	3.51	0.00	2.81	0.00	0.09	0.00	1.56	0.00	0.00	0.00	90.79	19.12	0.00
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	4.47	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50	0.00	22.70	0.00	0.00
Total Introduced Annual Grasses	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**2.41**	**0.00**	**0.03**	**0.00**	**0.03**	**6.77**	**4.71**	**0.00**	**0.03**	**0.00**	**0.00**	**3.51**	**0.00**	**2.81**	**0.00**	**0.09**	**0.00**	**1.56**	**0.00**	**18.50**	**0.00**	**113.49**	**19.12**	**0.00**
Elymus lanceolatus	0.00	0.00	0.00	0.00	2.01	0.00	0.00	0.00	0.00	6.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	3.29	0.00	0.00	0.00	2.01	3.17	3.12	6.16	2.89	0.00	0.00	0.94	0.17	0.00	16.90	1.82	1.26	7.39	0.00	14.66	1.68	8.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus spicatus	29.62	13.91	26.05	14.91	0.00	0.00	0.00	7.04	0.00	0.00	0.00	0.00	0.00	15.16	0.00	16.41	23.89	66.55	27.68	34.22	13.40	75.37	17.46	23.78	19.71	0.00	18.59	0.00	18.63	28.01
Hesperostipa comata	0.00	0.00	0.00	0.00	0.00	0.00	8.06	0.00	0.00	0.00	4.38	0.94	0.00	3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.26	0.00	15.87	0.00	0.00
Koeleria macrantha	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nassella viridula	0.00	0.00	0.00	0.00	0.00	0.00	2.04	4.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Cool Season Perennial Grasses	**37.11**	**13.91**	**26.05**	**14.91**	**4.02**	**3.17**	**13.22**	**17.59**	**4.26**	**6.69**	**4.38**	**1.88**	**0.17**	**18.95**	**16.90**	**18.23**	**25.15**	**73.94**	**27.68**	**48.88**	**16.75**	**83.74**	**17.46**	**23.78**	**19.71**	**26.26**	**18.59**	**15.87**	**18.63**	**28.01**
Bouteloua gracilis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Schizachyrium scoparium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Carex filifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Atriplex suckleyi	0.00	0.00	0.00	0.00	1.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Logfia arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00	0.00	0.00
Plantago patagonica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**1.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.06**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.89**	**0.00**	**0.79**	**0.00**	**0.00**
Alyssum desertorum	0.00	0.00	0.00	0.00	0.03	0.00	2.55	0.00	2.94	0.00	0.00	1.16	0.00	0.00	0.06	0.00	0.00	0.03	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chenopodium album	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medicago lupulina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.92	0.00	
Total Introduced Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.28**	**0.00**	**2.55**	**0.00**	**2.94**	**0.03**	**0.00**	**2.38**	**0.00**	**0.00**	**0.06**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.03**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.92**	**0.00**	
Lactuca serriola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	4.17	0.00	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.43	0.00	0.00	0.00	0.00
Total Introduced Biennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.17**	**0.00**	**3.89**	**0.00**	**0.00**	**0.00**	**0.00**	**1.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.43**	**0.00**	**0.00**	**0.00**	**0.00**
Achillea millefolium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.02	1.46	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00
Agoseris glauca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Allium textile	0.00	0.00	0.00	0.00	2.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Antennaria microphylla	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calochortus nuttallii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comandra umbellata	0.00	0.00	0.00	0.00	0.00	0.00	6.45	0.00	0.00	0.00	12.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.21	0.00
Dalea candida	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dalea purpurea	0.00	0.00	13.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.02	0.00	0.00	0.00	3.05	0.00	0.00	0.00
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaura coccinea	0.00	1.26	0.00	0.00	0.00	4.63	9.59	0.85	0.00	0.00	15.22	0.00	0.00	0.00	0.00	0.00	2.49	0.00	3.98	0.00	0.00	1.29	0.00	0.00	9.49	0.00	0.00	0.00	0.00	0.00
Glycyrrhiza lepidota	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grindelia squarrosa	0.00	4.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.05	0.00	0.00	0.00	0.00	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00
Machaeranthera grindelioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Musineon divaricatum	0.00	0.00	0.00	0.00	0.00	0.46	2.85	0.00	3.17	0.00	0.00	2.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oxytropis lambertii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oxytropis sericea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76	0.00	0.00
Packera cana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species — Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) — Oven-dry Weight (grams/square meter)

	1*	2*	3*	4*	5*	6*	7	8*	9*	10*	11	12	13	14*	15*	32*	33*	34*	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*	46
Pediomelum argophyllum	0.00	11.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pediomelum esculentum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phlox hoodii	13.51	0.00	5.25	8.14	0.00	0.00	0.00	0.00	3.17	0.00	0.00	0.00	0.00	3.28	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09
Psoralidium lanceolatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.84	0.00	0.00	0.00	3.29	0.00	0.00	4.26	0.00	0.00	0.00	0.00
Psoralidium tenuiflorum	0.00	12.61	7.88	18.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00	11.56	0.00	4.04	11.02	0.00	0.00	1.35	0.00	0.00	0.00	0.00	0.00	0.00
Ratibida columnifera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaeralcea coccinea	0.00	0.00	0.00	0.00	0.00	0.00	1.07	4.26	4.22	0.00	0.00	0.00	0.00	0.00	5.10	0.00	0.00	0.03	0.00	0.00	0.00	3.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stenotus armerioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.24	0.00	0.00	0.00	0.00	0.00	0.00	2.01	0.00	0.00	0.00	0.00
Symphyotrichum falcatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.28	0.00	0.00	0.00	2.61	0.00	0.00	0.00	0.00	0.00	0.00
Vicia americana	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	1.29	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	0.00	0.17	0.00	0.00	0.81	0.00	0.00	0.00
Total Native Perennial Forbs	**13.51**	**30.12**	**26.26**	**27.13**	**2.28**	**5.09**	**20.02**	**6.81**	**10.56**	**1.29**	**28.03**	**5.41**	**7.32**	**3.97**	**5.10**	**4.88**	**7.54**	**11.59**	**13.37**	**10.32**	**11.05**	**10.34**	**8.91**	**9.51**	**9.49**	**0.00**	**10.13**	**3.76**	**2.21**	**1.09**
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Convolvulus arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.31	0.00	0.00	0.00	0.00	0.00	0.00	17.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.37	0.00	1.77	38.45	0.00	0.00	0.00	0.00
Taraxacum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**5.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**17.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.59**	**18.37**	**0.00**	**1.77**	**38.45**	**0.00**	**0.00**	**0.00**	**0.00**
Eriogonum spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Penstemon spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.38
Total Unknown Forb Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.38**
Total Production	**50.62**	**44.03**	**52.31**	**42.07**	**8.29**	**12.43**	**38.20**	**33.30**	**17.79**	**8.01**	**32.44**	**16.47**	**16.74**	**22.92**	**39.13**	**23.14**	**32.69**	**89.07**	**41.05**	**62.01**	**27.83**	**96.79**	**44.74**	**34.85**	**30.97**	**90.53**	**28.72**	**133.91**	**43.88**	**33.48**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																				Study Area n=50		Permit Area n=38	
	47*	48*	49*	50	51*	52*	53	54	55	56	57*	58	59*	60	61*	62*	63*	64*	65*	66*	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Bromus japonicus	0.00	0.00	0.00	7.20	0.74	0.00	7.42	10.84	0.87	7.21	0.06	5.29	0.00	5.29	0.00	0.00	3.84	0.00	1.64	0.00	3.6	13.1	3.3	14.9
Bromus tectorum	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39	0.00	0.00	0.41	0.00	1.1	4.3	1.3	4.8
Total Introduced Annual Grasses	**0.00**	**0.00**	**0.00**	**7.23**	**0.74**	**0.00**	**7.42**	**10.84**	**0.87**	**7.21**	**0.06**	**5.29**	**0.00**	**5.29**	**0.00**	**8.39**	**3.84**	**0.00**	**2.05**	**0.00**	**4.7**	**16.3**	**4.6**	**18.7**
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.94	0.00	0.00	0.00	13.73	17.66	5.19	0.00	7.39	6.08	1.2	3.5	1.6	3.9
Elymus smithii	0.00	0.00	0.00	7.20	0.00	4.81	1.38	13.67	0.00	0.00	0.00	2.34	2.25	9.76	0.00	10.60	2.22	0.00	0.00	0.00	2.6	4.2	2.4	4.2
Elymus spicatus	16.68	18.27	14.06	0.00	37.37	43.33	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0.00	0.00	0.00	0.00	20.50	4.93	14.18	13.2	16.9	16.7	17.6
Hesperostipa comata	0.00	0.00	0.00	28.80	0.00	0.00	1.93	0.00	2.05	0.00	0.00	0.00	20.22	1.72	0.00	0.00	0.00	0.00	0.00	0.00	2.3	6.4	1.7	5.8
Koeleria macrantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6	0.1	0.7
Nassella viridula	8.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.20	0.00	0.00	0.00	0.00	0.00	0.00	7.06	0.00	0.00	0.00	0.00	0.6	2.0	0.5	1.9
Poa secunda	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.1	0.5
Total Native Cool Season Perennial Grasses	**27.80**	**18.27**	**14.06**	**36.00**	**37.37**	**48.14**	**3.31**	**13.67**	**10.25**	**0.00**	**5.35**	**2.34**	**22.47**	**11.48**	**13.73**	**35.32**	**7.41**	**20.50**	**12.32**	**20.26**	**20.1**	**16.8**	**23.1**	**17.1**
Bouteloua gracilis	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00	1.80	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6	0.1	0.6
Schizachyrium scoparium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.0	0.0
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**3.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.80**	**0.00**	**0.78**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.2**	**0.7**	**0.1**	**0.6**
Carex filifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.52	2.27	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4	0.0	0.0
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.52**	**2.27**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.1**	**0.4**	**0.0**	**0.0**
Atriplex suckleyi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.2	0.0	0.3
Descurainia pinnata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.1	0.0	0.1
Logfia arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.1	0.0	0.1
Plantago patagonica	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.03	0.2	0.0	0.1
Total Native Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.09**	**0.00**	**0.00**	**1.11**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.31**	**0.00**	**0.00**	**0.00**	**0.1**	**0.3**	**0.1**	**0.3**
Alyssum desertorum	0.03	0.00	0.00	0.03	0.00	0.03	2.96	0.00	0.03	1.93	0.03	1.44	0.00	0.00	0.00	3.14	0.00	0.03	0.03	0.00	0.3	0.9	0.2	0.7
Chenopodium album	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.0	0.0	0.0
Medicago lupulina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	0.7	0.1	0.6
Total Introduced Annual Forbs	**0.03**	**0.00**	**0.00**	**0.03**	**0.00**	**0.06**	**2.96**	**0.00**	**2.48**	**1.93**	**0.03**	**1.44**	**0.00**	**0.00**	**0.00**	**3.14**	**0.00**	**0.03**	**0.03**	**0.00**	**0.5**	**1.1**	**0.3**	**0.9**
Lactuca serriola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.2	0.0	0.0
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6	0.1	0.7
Tragopogon dubius	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.00	0.00	0.00	0.3	1.2	0.4	1.4
Total Introduced Biennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.78**	**0.00**	**0.00**	**0.00**	**0.4**	**1.3**	**0.5**	**1.5**
Achillea millefolium	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.2	0.7	0.2	0.7
Agoseris glauca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6	0.0	0.0
Allium textile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3	0.1	0.4
Antennaria microphylla	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.1	0.2	1.3
Calochortus nuttallii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.1	0.0	0.1
Comandra umbellata	0.00	1.84	0.00	0.00	0.00	0.00	0.00	0.00	1.57	0.00	0.00	4.12	1.44	3.36	0.00	0.00	0.00	0.00	0.00	0.00	0.7	2.1	0.2	0.6
Dalea candida	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.76	0.00	2.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3	1.2	0.1	0.8
Dalea purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.82	0.5	2.0	0.6	2.3
Evolvulus nuttallianus	0.00	0.00	1.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.2	0.0	0.3
Gaura coccinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.42	0.00	0.00	4.05	0.00	0.00	0.00	1.72	0.00	0.00	0.00	0.00	0.00	1.1	2.9	0.8	1.9
Glycyrrhiza lepidota	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.67	0.2	1.7	0.3	1.9
Grindelia squarrosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3	1.1	0.4	1.2
Machaeranthera grindelioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3	0.0	0.0
Musineon divaricatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.18	0.00	0.00	0.00	0.2	0.7	0.2	0.6
Oxytropis lambertii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3	0.0	0.0
Oxytropis sericea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.1	0.6

TFN 6 2/025
RECD NOV 14,2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																				Study Area n=50		Permit Area n=38	
	47*	48*	49*	50	51*	52*	53	54	55	56	57*	58	59*	60	61*	62*	63*	64*	65*	66*	Mean Production	Standard Deviation	Mean Production	Standard Deviation
Packera cana	0.00	4.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6	0.2	0.7
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.6	0.3	1.8
Pediomelum esculentum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.2	0.0	0.1
Phlox hoodii	1.61	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	2.53	0.00	0.00	0.00	0.00	0.00	0.62	7.07	2.20	11.27	1.3	2.9	1.7	3.3
Psoralidium lanceolatum	0.00	0.00	0.00	0.00	6.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	1.4	0.5	1.6
Psoralidium tenuiflorum	0.00	6.21	4.03	0.00	0.00	5.33	0.00	0.00	3.59	0.00	0.00	0.00	1.89	0.00	0.00	0.00	0.00	0.00	0.00	14.09	2.1	4.4	2.6	4.9
Ratibida columnifera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.2	0.0	0.0
Sphaeralcea coccinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	0.00	0.4	1.2	0.5	1.4
Stenotus armerioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.3	0.1	0.4
Symphyotrichum falcatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.0	0.2	1.1
Vicia americana	7.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3	1.1	0.3	1.3
Total Native Perennial Forbs	**14.09**	**12.24**	**5.79**	**0.00**	**6.90**	**9.33**	**0.00**	**1.42**	**14.65**	**6.76**	**7.60**	**8.33**	**11.33**	**5.02**	**1.72**	**0.00**	**2.81**	**7.07**	**4.39**	**39.84**	**9.2**	**8.5**	**9.7**	**8.5**
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3	0.0	0.3
Convolvulus arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.77	5.04	0.00	17.68	0.00	2.1	6.8	2.7	7.7
Taraxacum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.1	0.4	0.1	0.5
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.81**	**0.00**	**0.00**	**2.86**	**5.04**	**0.00**	**17.68**	**0.00**	**2.2**	**6.8**	**2.8**	**7.7**
Eriogonum spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.53	0.00	0.00	0.00	2.58	0.00	0.00	0.00	0.00	0.00	0.1	0.5	0.1	0.6
Penstemon spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6	0.0	0.0
Total Unknown Forb Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.53**	**0.00**	**0.00**	**0.00**	**2.58**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.2**	**0.8**	**0.1**	**0.6**
Total Production	**41.92**	**30.51**	**23.37**	**43.26**	**45.01**	**61.53**	**13.78**	**25.93**	**29.77**	**21.08**	**15.57**	**18.18**	**35.61**	**21.82**	**18.03**	**49.71**	**22.19**	**27.60**	**36.47**	**60.10**	**37.7**	**24.0**	**41.3**	**26.0**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Scoria Grassland (SG)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Sample Number
(*Denotes Sample Location Used to Calculate Permit Area Values)
Oven-dry Weight (grams/square meter)

Plant Species	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16*	17*	18*	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	29*	30*
Echinochloa muricata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Bromus japonicus	0.00	9.99	0.00	2.62	4.07	0.00	5.48	0.00	7.11	0.00	0.00	1.13	0.00	0.00	0.03	8.27	0.00	2.26	0.00	0.00	8.43	0.00	0.00	0.06	0.09	0.00	0.00	0.00	0.00	2.50
Bromus tectorum	22.34	89.90	0.00	49.81	23.09	42.99	0.00	0.06	36.38	1.78	0.00	10.21	120.42	0.00	0.03	19.29	0.00	5.27	0.09	0.09	33.73	0.00	31.30	105.02	0.00	52.70	0.00	15.33	36.18	0.62
Total Introduced Annual Grasses	**22.34**	**99.89**	**0.00**	**52.43**	**27.16**	**42.99**	**5.48**	**0.06**	**43.49**	**3.55**	**0.00**	**11.34**	**120.42**	**0.00**	**0.06**	**27.55**	**0.00**	**7.53**	**0.09**	**0.09**	**42.16**	**0.00**	**31.30**	**105.08**	**0.09**	**52.70**	**0.00**	**15.33**	**36.18**	**3.12**
Elymus smithii	0.00	0.00	0.00	0.00	1.21	0.00	0.00	5.50	0.00	0.76	0.00	9.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus spicatus	0.00	0.00	5.26	0.00	23.07	0.00	12.62	12.83	0.00	14.44	53.11	1.14	0.00	11.47	20.95	1.48	64.39	0.00	0.00	28.06	0.00	25.56	0.00	0.00	17.26	0.00	2.64	15.74	4.64	58.90
Festuca idahoensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92	0.00	0.00	0.00
Hesperostipa comata	0.00	10.96	5.26	0.00	0.00	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.74	23.28	0.00	0.00	62.13	62.13	7.01	9.68	0.00	25.61	0.00	4.93	0.00	0.00	0.00	0.00	0.00
Nassella viridula	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.55	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	1.91	2.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.47	0.00	0.00	0.00	0.00	0.00
Total Native Cool Season Perennial Grasses	**0.00**	**10.96**	**10.53**	**0.00**	**24.28**	**3.20**	**12.62**	**18.42**	**0.00**	**21.75**	**53.11**	**11.36**	**0.00**	**19.12**	**46.56**	**1.48**	**64.39**	**62.13**	**62.13**	**35.07**	**9.68**	**34.08**	**25.61**	**0.00**	**24.66**	**0.00**	**5.56**	**15.74**	**4.64**	**58.90**
Aristida purpurea	0.00	0.00	2.63	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bouteloua gracilis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.57
Buchloe dactyloides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**2.63**	**0.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.26**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.57**
Festuca ovina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Descurainia pinnata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	0.00	
Helianthus annuus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.17	0.00	0.00	0.00
Logfia arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00
Total Native Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.06**	**0.00**	**0.00**	**0.00**	**66.69**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**5.17**	**0.00**	**2.78**	**0.00**
Alyssum desertorum	4.19	0.00	0.03	1.83	0.00	0.03	8.91	0.03	0.03	0.03	0.00	9.45	0.00	0.06	0.03	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	4.66	0.03	0.76	0.00	0.00
Camelina microcarpa	0.00	0.00	0.00	0.00	3.94	0.00	0.00	0.00	7.30	0.00	0.00	0.00	0.00	0.00	0.00	50.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	2.09	0.81
Descurainia sophia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sisymbrium altissimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.84	0.00	0.00	0.00	0.00
Total Introduced Annual Forbs	**4.19**	**0.00**	**0.03**	**1.83**	**3.94**	**0.03**	**8.91**	**0.03**	**7.36**	**0.03**	**0.00**	**9.45**	**0.00**	**0.06**	**0.03**	**50.79**	**0.00**	**0.00**	**0.03**	**0.00**	**0.03**	**0.00**	**0.03**	**0.00**	**0.03**	**14.50**	**0.09**	**1.53**	**2.09**	**0.81**
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	2.73	6.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Biennial Forbs	**0.00**	**0.00**	**0.00**	**1.25**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**2.73**	**6.91**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Ambrosia psilostachya	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	0.00	0.00	0.00
Brickellia eupatorioides	11.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dalea purpurea	0.00	0.00	9.46	15.76	0.00	0.00	7.38	0.00	1.32	0.00	0.00	0.74	0.00	6.05	3.49	0.00	0.00	0.00	0.00	0.00	5.32	0.00	0.00	0.00	0.00	0.00	0.00	3.05	0.00	6.53
Eriogonum pauciflorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.53
Evolvulus nuttallianus	22.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Galium boreale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaura coccinea	0.00	0.00	0.00	0.00	0.00	1.50	0.00	4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lactuca tatarica	0.00	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lomatium foeniculaceum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lygodesmia juncea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Musineon divaricatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oxytropis sericea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.08	0.00	0.00	0.00	0.00	5.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Scoria Grassland (SG)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																													
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16*	17*	18*	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	29*	30*
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	0.00	3.69	0.00	0.00	0.00	0.00	1.72	0.00	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pediomelum esculentum	0.00	0.00	0.00	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phlox hoodii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.11	0.00	3.12	0.00	0.00	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Psoralidium tenuiflorum	79.63	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.74	4.28	0.00	0.00	0.00	0.00	7.64	0.00	0.00
Sphaeralcea coccinea	0.00	0.00	1.03	0.00	2.50	0.00	9.45	8.05	4.87	4.69	0.00	0.00	0.00	0.86	0.00	6.55	0.00	22.40	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	0.00	0.00	0.00
Symphyotrichum falcatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vicia americana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Perennial Forbs	**113.51**	**1.35**	**10.61**	**17.15**	**2.50**	**1.50**	**20.52**	**40.27**	**8.68**	**7.81**	**0.00**	**2.46**	**14.76**	**13.96**	**6.98**	**6.55**	**0.00**	**28.40**	**0.03**	**0.00**	**5.32**	**2.80**	**34.84**	**0.00**	**0.00**	**0.00**	**7.75**	**10.69**	**0.00**	**13.06**
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00
Taraxacum officinale	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.34**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.43**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.05**	**0.00**	**0.00**
Cryptantha spp.	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eriogonum spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17	0.00	0.00	0.00	0.00	0.00
Total Unknown Forb Species	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**1.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.17**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Production	**140.04**	**112.20**	**24.17**	**73.56**	**57.88**	**48.72**	**47.53**	**58.78**	**60.91**	**33.17**	**55.84**	**41.52**	**201.87**	**35.83**	**53.66**	**86.37**	**64.39**	**98.06**	**62.28**	**35.16**	**57.19**	**36.88**	**91.78**	**105.08**	**28.95**	**67.20**	**18.57**	**46.34**	**45.69**	**78.46**

TFN 6 2/025
RECD NOV 14, 2014

Polygon: Scoria Grassland (SG)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																				Study Area and Permit Area n=50	
	31*	32*	33*	34*	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*	46*	47*	48*	49*	50*	Mean Production	Standard Deviation
Echinochloa muricata	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1
Total Native Annual Grasses	**0.00**	**0.00**	**0.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.1**
Bromus japonicus	0.00	1.53	5.65	9.32	0.00	0.00	1.06	0.03	0.00	1.21	1.91	0.00	0.00	0.00	5.05	2.14	0.00	0.00	0.00	0.03	1.6	2.8
Bromus tectorum	24.83	75.03	5.65	37.29	8.73	15.88	1.58	10.83	0.00	0.00	0.00	0.00	37.08	0.00	0.00	19.23	29.15	0.00	23.87	0.00	19.7	28.2
Total Introduced Annual Grasses	**24.83**	**76.56**	**11.29**	**46.61**	**8.73**	**15.88**	**2.64**	**10.86**	**0.00**	**1.21**	**1.91**	**0.00**	**37.08**	**0.00**	**5.05**	**21.37**	**29.15**	**0.00**	**23.87**	**0.03**	**21.3**	**28.9**
Elymus smithii	0.00	0.00	15.96	0.00	14.35	0.00	0.00	0.00	1.36	0.00	0.00	0.00	0.00	0.00	7.31	0.03	0.00	0.00	13.52	0.00	1.6	4.0
Elymus spicatus	0.00	0.00	0.00	0.00	0.00	0.00	15.48	52.75	52.04	22.38	18.86	0.00	0.00	70.74	65.83	19.23	0.00	63.65	0.00	42.00	15.9	21.9
Festuca idahoensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4
Hesperostipa comata	2.15	0.00	9.57	2.34	0.00	11.26	0.00	0.00	0.00	0.00	0.00	0.00	9.65	0.00	0.00	8.96	9.77	0.00	0.00	0.00	5.5	13.0
Nassella viridula	0.00	16.80	0.00	0.00	0.00	0.00	23.21	0.00	0.00	0.00	4.71	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.0	4.1
Poa secunda	0.00	0.00	6.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3	1.0
Total Native Cool Season Perennial Grasses	**2.15**	**16.80**	**31.91**	**2.34**	**14.35**	**11.26**	**38.69**	**52.75**	**53.40**	**22.38**	**23.57**	**0.06**	**9.65**	**70.74**	**73.14**	**30.36**	**9.77**	**63.65**	**13.52**	**42.00**	**24.4**	**22.3**
Aristida purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4
Bouteloua gracilis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4
Buchloe dactyloides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3
Calamagrostis purpurascens	0.00	0.00	0.00	0.00	9.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.4
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**9.70**	**0.00**	**0.00**	**0.00**	**1.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.4**	**1.5**
Festuca ovina	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.2
Total Introduced Perennial Grasses	**1.44**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.2**
Descurainia pinnata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3
Helianthus annuus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	9.4
Logfia arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.1
Total Native Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**1.5**	**9.4**
Alyssum desertorum	3.88	0.00	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	9.81	0.00	0.03	13.89	0.00	0.00	0.00	0.00	1.2	3.0
Camelina microcarpa	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	7.2
Descurainia sophia	0.00	0.00	0.00	2.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3
Sisymbrium altissimum	6.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3	1.6
Total Introduced Annual Forbs	**10.34**	**3.00**	**0.00**	**2.15**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.03**	**0.00**	**9.81**	**0.00**	**0.03**	**13.89**	**0.00**	**0.00**	**0.00**	**0.00**	**2.9**	**7.9**
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.47	0.00	0.00	0.00	0.00	0.1	0.5
Tragopogon dubius	2.58	9.35	0.00	0.00	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5	1.7
Total Introduced Biennial Forbs	**2.58**	**9.35**	**0.00**	**0.00**	**1.45**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.47**	**0.00**	**0.00**	**0.00**	**0.00**	**0.6**	**1.7**
Ambrosia psilostachya	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5
Brickellia eupatorioides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.6
Dalea purpurea	2.18	0.00	2.93	34.57	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	12.76	0.00	0.00	0.00	0.00	0.00	2.2	5.8
Eriogonum pauciflorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.0
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5	3.2
Galium boreale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.01	0.1
Gaura coccinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6
Lactuca tatarica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.2
Lomatium foeniculaceum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.3
Lygodesmia juncea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.7

TFN 6 2/025
RECD NOV 14, 2014

Polygon: Scoria Grassland (SG)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																				Study Area and Permit Area n=50	
	31*	32*	33*	34*	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*	46*	47*	48*	49*	50*	Mean Production	Standard Deviation
Musineon divaricatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.1
Oxytropis sericea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.0	4.7
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.0
Pediomelum esculentum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.5
Phlox hoodii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4	2.3
Psoralidium tenuiflorum	1.87	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	11.3
Sphaeralcea coccinea	2.18	0.00	0.00	0.00	5.12	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	2.45	0.00	0.00	0.00	7.34	0.00	1.6	3.8
Symphyotrichum falcatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11	0.00	0.00	0.2	1.4
Vicia americana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.38	0.00	2.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.2	0.7
Total Native Perennial Forbs	**6.22**	**0.00**	**2.93**	**34.57**	**5.12**	**0.00**	**0.00**	**4.41**	**2.86**	**2.50**	**1.15**	**0.00**	**16.10**	**0.00**	**15.24**	**0.00**	**0.00**	**10.11**	**8.15**	**0.00**	**9.4**	**17.9**
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.2
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4
Taraxacum officinale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.1
Total Introduced Perennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.2**	**0.5**
Cryptantha spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.1
Eriogonum spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6
Total Unknown Forb Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.1**	**0.6**
Total Production	**47.56**	**105.71**	**46.86**	**85.67**	**39.35**	**27.14**	**41.33**	**68.05**	**57.27**	**26.09**	**26.66**	**0.06**	**72.64**	**70.74**	**93.46**	**69.09**	**38.95**	**73.76**	**45.54**	**42.03**	**60.8**	**33.8**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Upland Grassland (UG)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Sample Number

(*Denotes Sample Location Used to Calculate Permit Area Values)

Oven-dry Weight (grams/square meter)

Plant Species	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	29*	30*	31*	32*	33*	34*	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*
Bromus japonicus	0.00	0.90	0.28	0.81	5.60	0.00	12.19	0.03	0.92	0.00	0.00	1.54	5.07	1.98	0.00	1.94	11.45	11.93	0.03	16.76	7.46	2.66	1.53	0.00	0.00	0.00	0.00	0.00	3.07	32.14
Bromus tectorum	0.00	0.23	5.26	0.00	0.00	0.00	12.19	0.00	8.29	10.10	0.00	0.00	0.56	17.86	0.00	0.00	0.00	11.93	0.00	5.59	0.00	0.00	1.53	0.00	0.00	0.00	61.96	0.00	0.00	74.98
Total Introduced Annual Grasses	**0.00**	**1.13**	**5.54**	**0.81**	**5.60**	**0.00**	**24.37**	**0.03**	**9.21**	**10.10**	**0.00**	**1.54**	**5.63**	**19.84**	**0.00**	**1.94**	**11.45**	**23.85**	**0.03**	**22.34**	**7.46**	**2.66**	**3.05**	**0.00**	**0.00**	**0.00**	**61.96**	**0.00**	**3.07**	**107.12**
Elymus lanceolatus	0.00	0.00	22.80	15.20	0.00	0.00	0.00	0.00	0.00	0.00	7.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.79	0.00	0.00	9.07	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	25.58	92.75	0.00	81.08	28.60	72.23	29.42	12.46	0.00	0.00	44.30	0.00	7.59	6.61	27.47	4.14	36.81	29.14	52.70	7.68	22.19	0.00	26.30	5.44	0.00	62.32	6.60	21.15	30.80	0.90
Elymus spicatus	30.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.98	0.00	0.00	0.00	0.00	59.48	0.00	33.14	0.00	0.00	0.00	30.71	0.00	44.49	26.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hesperostipa comata	0.00	0.00	2.53	0.00	0.00	0.00	6.62	0.00	14.56	6.33	0.00	0.00	11.39	0.00	11.77	4.14	0.00	0.00	0.00	0.00	0.00	11.12	0.00	0.00	0.00	0.00	0.00	21.15	0.00	26.51
Nassella viridula	0.00	0.00	22.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	1.94	0.00	4.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.58	0.00	0.00
Poa secunda	0.00	0.00	2.53	5.07	19.07	0.00	0.74	0.00	0.00	0.00	2.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.86	3.63	0.00	0.00	0.00	0.00	3.42	0.00
Total Native Cool Season Perennial Grasses	**56.35**	**92.75**	**50.67**	**101.35**	**47.67**	**72.23**	**36.78**	**12.46**	**48.54**	**6.33**	**58.07**	**0.00**	**37.96**	**66.09**	**39.24**	**41.42**	**38.75**	**29.14**	**57.39**	**38.39**	**36.98**	**55.61**	**62.45**	**18.13**	**0.00**	**62.32**	**6.60**	**52.88**	**34.22**	**27.41**
Aristida purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bouteloua gracilis	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.49	0.00	6.34	0.00	5.97	0.00	0.00	2.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Distichlis stricta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sporobolus cryptandrus	0.00	0.00	0.00	0.00	0.00	0.00	4.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**0.58**	**0.00**	**0.00**	**0.00**	**4.25**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.21**	**0.00**	**4.49**	**0.00**	**6.34**	**0.00**	**5.97**	**0.00**	**0.00**	**2.37**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	2.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Festuca ovina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa bulbosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	0.00	0.00	0.00	3.29	0.00	0.00	0.00	0.00	3.87	0.00	0.00
Total Introduced Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.44**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.17**	**0.00**	**0.00**	**0.00**	**3.29**	**0.00**	**0.00**	**0.00**	**0.00**	**3.87**	**0.00**	**0.00**
Carex filifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**25.31**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Lappula redowskii	0.00	0.00	0.00	0.00	0.00	0.00	0.03	54.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Logfia arvensis	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plantago patagonica	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.69	0.00	0.92	0.00	0.00	0.00	0.03	4.77	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Annual Forbs	**0.00**	**0.00**	**0.06**	**0.00**	**0.00**	**0.00**	**0.03**	**54.13**	**0.00**	**0.00**	**6.09**	**0.00**	**0.92**	**0.00**	**0.00**	**0.00**	**0.06**	**4.77**	**0.00**	**0.00**	**0.00**	**0.09**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**
Alyssum desertorum	0.00	0.00	0.00	0.03	4.46	0.00	0.03	0.03	0.00	0.90	1.40	0.68	0.03	4.54	0.00	0.03	0.00	4.77	0.00	0.00	0.06	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.62	0.00
Total Introduced Annual Forbs	**0.00**	**0.00**	**0.00**	**0.03**	**4.46**	**0.00**	**0.03**	**0.03**	**0.00**	**0.95**	**1.40**	**0.68**	**0.03**	**4.54**	**0.00**	**0.03**	**0.00**	**4.77**	**0.00**	**0.00**	**0.06**	**0.03**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.62**	**0.00**
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	0.00	0.00	2.61	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	6.38	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Introduced Biennial Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**2.61**	**0.00**	**0.00**	**0.53**	**0.00**	**0.00**	**1.17**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.75**	**6.38**	**0.00**	**0.00**	**0.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Achillea millefolium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.15	0.00	0.00	0.00	0.00	3.68	0.00	0.00	0.00	4.70	0.00	0.00	0.00	0.00	3.70	0.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00
Agoseris glauca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ambrosia psilostachya	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.95	0.00	0.00	0.00
Antennaria microphylla	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cirsium flodmanii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dalea purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gaura coccinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grindelia squarrosa	0.00	0.00	0.00	0.00	4.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Musineon divaricatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.18
Pediomelum esculentum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Upland Grassland (UG)
Production Sample Data
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Sample Number

(*Denotes Sample Location Used to Calculate Permit Area Values)

Oven-dry Weight (grams/square meter)

Plant Species	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	29*	30*	31*	32*	33*	34*	35*	36*	37*	38*	39*	40*	41*	42*	43*	44*	45*
Phlox hoodii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.36	0.00	0.00	0.65	0.06	0.00	0.00	0.00	0.00	4.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Psoralidium tenuiflorum	0.00	6.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.76	0.00	1.74	0.00	0.00	0.00	0.00	0.00	0.00	11.14	15.42	0.00	0.00	0.00	0.00	0.00	0.00	6.55
Sphaeralcea coccinea	2.77	0.00	1.50	0.00	0.00	0.85	0.00	0.00	0.00	4.66	0.78	0.00	3.68	1.43	0.00	7.12	0.00	0.00	0.00	2.74	0.00	3.70	0.00	0.00	0.00	0.00	0.00	2.66	10.30	0.00
Thermopsis rhombifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.31	0.00	0.00	0.00	0.00
Vicia americana	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.42	0.00	1.17	0.00	0.00	12.13	0.00	0.00	0.00	4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Native Perennial Forbs	**4.62**	**6.65**	**1.50**	**0.00**	**4.01**	**0.85**	**0.00**	**10.15**	**7.42**	**4.66**	**2.46**	**0.00**	**17.49**	**14.27**	**1.74**	**12.94**	**5.34**	**4.30**	**0.00**	**2.74**	**0.00**	**23.47**	**15.42**	**0.59**	**0.00**	**7.31**	**3.95**	**2.66**	**10.30**	**8.73**
Convolvulus arvensis	0.00	0.00	0.00	0.00	0.00	2.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taraxacum officinale	0.00	1.90	0.00	0.00	0.00	0.00	7.30	3.38	0.00	0.00	0.00	0.00	0.00	0.00	1.74	0.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	1.37	0.00	0.00	0.00	0.00	0.00	2.18
Total Introduced Perennial Forbs	**0.00**	**1.90**	**0.00**	**0.00**	**0.00**	**2.59**	**7.30**	**3.38**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.74**	**0.00**	**0.59**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.37**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.18**
Eriogonum spp.	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Penstemon spp.	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Unknown Forb Species	**0.00**	**0.95**	**1.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Production	**60.97**	**103.38**	**59.35**	**102.19**	**64.35**	**78.11**	**72.76**	**80.71**	**65.17**	**47.35**	**69.19**	**2.22**	**64.24**	**104.74**	**47.21**	**56.33**	**62.53**	**66.83**	**65.31**	**69.85**	**44.50**	**84.23**	**85.02**	**20.09**	**0.03**	**69.63**	**72.51**	**59.41**	**48.21**	**145.47**

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RAMACO
Polygon: Upland Grassland (UG)
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																			Study Area and Permit Area n=50	
	46*	47*	48*	49*	50*	51*	52*	53*	54*	55*	56*	57*	58*	59*	60*	61*	62*	63*	64*	65*	Mean Production	Standard Deviation
Bromus japonicus	6.86	2.61	0.00	0.06	2.73	7.57	12.42	0.00	6.58	0.00	25.15	0.00	0.00	16.16	2.18	0.00	10.14	29.12	0.00	0.00	4.8	7.7
Bromus tectorum	10.29	6.08	0.00	0.06	10.90	1.89	12.42	51.19	0.00	44.70	16.76	27.66	83.44	16.16	0.00	0.00	10.14	43.69	0.00	0.00	10.9	20.0
Total Introduced Annual Grasses	**17.15**	**8.69**	**0.00**	**0.12**	**13.63**	**9.46**	**24.83**	**51.19**	**6.58**	**44.70**	**41.91**	**27.66**	**83.44**	**32.32**	**2.18**	**0.00**	**20.27**	**72.81**	**0.00**	**0.00**	**15.7**	**23.8**
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	4.6
Elymus smithii	8.84	2.35	77.71	1.99	10.43	8.00	0.00	0.00	0.00	0.00	26.00	21.41	0.00	6.33	0.00	0.00	21.23	0.00	43.52	53.15	20.3	24.5
Elymus spicatus	0.00	16.45	0.00	27.85	0.00	6.00	26.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.32	0.00	0.00	0.00	0.00	0.00	7.9	16.1
Hesperostipa comata	20.64	0.00	0.00	3.98	6.26	23.99	0.00	5.91	0.00	0.00	0.00	0.00	0.00	25.33	0.00	0.00	0.00	4.08	0.00	0.00	4.1	7.5
Nassella viridula	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	1.9	6.5
Poa secunda	0.00	4.70	4.09	3.98	4.17	2.00	2.98	0.00	0.03	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	3.2
Total Native Cool Season Perennial Grasses	**29.48**	**23.50**	**81.80**	**37.80**	**20.85**	**39.99**	**29.82**	**5.91**	**0.03**	**0.00**	**26.53**	**21.41**	**0.00**	**31.66**	**61.32**	**0.00**	**56.61**	**4.08**	**43.52**	**53.15**	**37.0**	**24.9**
Aristida purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.6
Bouteloua gracilis	0.00	0.00	0.00	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.08	0.00	0.00	0.00	0.6	1.7
Distichlis stricta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
Sporobolus cryptandrus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.08	0.00	0.00	0.00	0.2	1.2
Total Native Warm Season Perennial Grasses	**0.00**	**0.00**	**0.00**	**1.99**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**11.42**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**14.15**	**0.00**	**0.00**	**0.00**	**1.0**	**2.9**
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.35	0.00	0.00	0.00	0.00	0.4	2.8
Festuca ovina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6
Poa bulbosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	0.7
Total Introduced Perennial Grasses	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**19.35**	**0.00**	**0.00**	**0.00**	**0.00**	**0.7**	**2.9**
Carex filifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5	3.6
Total Native Grasslike Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.5**	**3.6**
Lappula redowskii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	7.7
Logfia arvensis	0.00	0.00	0.00	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.3
Plantago patagonica	0.00	0.00	0.00	0.00	1.30	0.00	0.00	1.69	2.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.3	1.0
Total Native Annual Forbs	**0.00**	**0.00**	**0.00**	**0.00**	**2.59**	**0.00**	**0.00**	**1.69**	**2.16**	**0.00**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**1.5**	**7.7**
Alyssum desertorum	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	1.44	0.00	0.00	2.02	0.00	0.06	0.00	0.00	0.03	0.00	0.00	0.00	0.4	1.1
Total Introduced Annual Forbs	**0.00**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**1.44**	**0.00**	**0.00**	**2.02**	**0.00**	**0.06**	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.4**	**1.1**
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.1	0.3
Tragopogon dubius	0.00	1.27	1.70	0.00	2.32	0.00	0.00	0.00	0.79	0.00	2.19	3.86	0.00	0.00	0.00	0.00	0.00	2.00	2.26	0.00	0.5	1.2
Total Introduced Biennial Forbs	**0.00**	**1.27**	**1.70**	**0.00**	**2.32**	**0.00**	**0.00**	**0.00**	**0.79**	**0.00**	**2.19**	**3.86**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.00**	**2.26**	**1.83**	**0.6**	**1.2**
Achillea millefolium	0.00	0.00	8.25	0.00	1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7	2.0
Agoseris glauca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Ambrosia psilostachya	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	3.12	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.2	0.7
Antennaria microphylla	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Cirsium flodmanii	0.00	0.00	0.00	7.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.1
Dalea purpurea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.83	0.00	0.00	0.00	0.00	11.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5	2.6
Evolvulus nuttallianus	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.00	24.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5	3.4
Gaura coccinea	0.00	0.00	4.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6
Grindelia squarrosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.6
Musineon divaricatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
Pediomelum argophyllum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.23	0.00	0.00	0.00	0.00	0.00	0.1	0.7
Pediomelum esculentum	0.00	5.60	0.00	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.8
Phlox hoodii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	0.00	0.00	0.00	0.00	0.3	1.3
Psoralidium tenuiflorum	0.00	0.00	0.00	17.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	0.00	1.36	0.00	0.00	0.00	1.3	3.8
Sphaeralcea coccinea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.32	0.00	0.00	0.00	1.0	2.3
Thermopsis rhombifolia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	1.3

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Addendum D8-1-398

RAMACO
Polygon: Upland Grassland (UG)
Sample Date: 7/01-12/2013
Plot Size: 1.0 Square Meter

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Oven-dry Weight (grams/square meter)																				Study Area and Permit Area n=50	
	46*	47*	48*	49*	50*	51*	52*	53*	54*	55*	56*	57*	58*	59*	60*	61*	62*	63*	64*	65*	Mean Production	Standard Deviation
Vicia americana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.90	0.00	0.00	0.00	1.1	4.1
Total Native Perennial Forbs	**0.00**	**5.60**	**12.37**	**25.83**	**1.54**	**1.64**	**0.96**	**14.83**	**0.00**	**24.07**	**0.00**	**0.00**	**14.78**	**0.00**	**7.13**	**0.00**	**36.58**	**0.03**	**0.00**	**0.00**	**6.4**	**8.2**
Convolvulus arvensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.4
Taraxacum officinale	0.00	0.00	4.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.5	1.3
Total Introduced Perennial Forbs	**0.00**	**0.00**	**4.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.83**	**0.6**	**1.4**
Eriogonum spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.13
Penstemon spp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.14
Total Unknown Forb Species	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.0**	**0.19**
Total Production	**46.63**	**39.06**	**99.99**	**65.77**	**40.93**	**51.09**	**55.61**	**77.56**	**11.00**	**80.19**	**70.75**	**54.95**	**98.22**	**64.04**	**70.63**	**19.35**	**127.64**	**78.95**	**45.78**	**56.80**	**64.4**	**27.9**

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ATTACHMENT D8-1-J

Raw Shrub Density Data

TFN 6 2/025
RECD NOV 14, 2014

Polygon: Big Sagebrush Shrubland (BSS)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect																						
	1	2	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16	17*	18*	19*	20	21*	22*	23*
Artemisia cana	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0
Artemisia tridentata	209	165	73	16	93	79	57	87	60	62	71	105	65	61	83	52	140	73	42	58	95	116	116
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	14	0
Ericameria nauseosa	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhus aromatica	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	7	0	0	0	0	1
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**209**	**200**	**73**	**17**	**95**	**80**	**57**	**87**	**60**	**62**	**71**	**105**	**66**	**61**	**83**	**53**	**140**	**80**	**45**	**58**	**107**	**130**	**117**
Artemisia frigida	12	8	12	28	45	0	2	0	2	6	4	0	2	1	9	13	15	0	22	8	68	36	19
Gutierrezia sarothrae	0	0	6	20	63	0	0	0	6	22	0	53	0	5	2	3	1	0	0	29	3	0	2
Yucca glauca	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**12**	**8**	**18**	**50**	**108**	**0**	**2**	**0**	**8**	**28**	**4**	**53**	**2**	**6**	**11**	**16**	**16**	**0**	**22**	**37**	**71**	**36**	**21**
Total Density	**221**	**208**	**91**	**67**	**203**	**80**	**59**	**87**	**68**	**90**	**75**	**158**	**68**	**67**	**94**	**69**	**156**	**80**	**67**	**95**	**178**	**166**	**138**

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RAMACO

Polygon: Big Sagebrush Shrubland (BSS)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect																						
	64	65*	66*	67*	68*	69*	70*	71	72	73*	74*	75	76*	77*	78	79	80*	81	82*	83	84*	85*	86*
Artemisia cana	0	0	0	0	0	0	21	63	0	8	0	0	0	0	0	34	0	18	7	0	0	0	0
Artemisia tridentata	57	97	50	153	42	110	58	177	67	78	92	80	53	174	87	252	102	40	66	78	63	71	104
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0
Ericameria nauseosa	0	0	1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1
Rhus aromatica	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**63**	**97**	**51**	**165**	**42**	**110**	**79**	**240**	**67**	**86**	**92**	**80**	**53**	**174**	**87**	**286**	**142**	**58**	**73**	**78**	**63**	**77**	**105**
Artemisia frigida	18	0	5	21	8	0	69	27	0	4	77	5	0	23	24	37	31	27	7	6	1	14	21
Gutierrezia sarothrae	2	0	18	11	0	0	0	0	32	0	0	12	0	76	14	41	0	0	0	2	0	27	14
Yucca glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**20**	**0**	**23**	**32**	**8**	**0**	**69**	**27**	**32**	**4**	**77**	**17**	**0**	**99**	**38**	**78**	**31**	**27**	**7**	**8**	**1**	**41**	**35**
Total Density	**83**	**97**	**74**	**197**	**50**	**110**	**148**	**267**	**99**	**90**	**169**	**97**	**53**	**273**	**125**	**364**	**173**	**85**	**80**	**86**	**64**	**118**	**140**

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RECD NOV 14, 2014

RAMACO
Polygon: Big Sagebrush Shrubland (BSS)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect				Study Area n=50		Permit Area n=38	
	87*	88*	89*	90*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Artemisia cana	0	0	0	0	3.3	10.7	1.3	4.1
Artemisia tridentata	130	101	56	118	90.7	45.5	84.5	32.8
Chrysothamnus viscidiflorus	0	0	0	0	1.1	6.0	1.5	6.8
Ericameria nauseosa	0	0	0	0	1.1	5.2	0.5	2.2
Rhus aromatica	0	0	0	0	0.3	1.1	0.3	1.2
Ribes cereum	0	0	0	0	<0.01	<0.01	0.0	0.0
Symphoricarpos albus	0	0	0	0	0.1	0.6	0.0	0.0
Total Native Full Shrubs	**130**	**101**	**56**	**118**	**96.6**	**52.3**	**88.2**	**34.5**
Artemisia frigida	0	3	16	2	15.2	18.4	15.1	20.2
Gutierrezia sarothrae	0	24	9	0	9.9	17.2	9.5	18.1
Yucca glauca	0	0	0	0	0.04	0.3	0.1	0.3
Total Native Half &Sub-Shrubs	**0**	**27**	**25**	**2**	**25.1**	**26.4**	**24.7**	**28.5**
Total Density	**130**	**128**	**81**	**120**	**121.7**	**64.5**	**112.9**	**50.7**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Bottomland Sagebrush Grassland (BSG)
Density Sample Data
Sample Date: 7/01-12//2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect													
	1*	2*	3*	4*	5*	6*	7*	8*	9	10*	11*	12	13*	14
Artemisia cana	0	0	0	0	6	0	5	0	0	0	0	0	18	4
Rhus aromatica	0	0	0	0	3	0	2	0	0	0	0	0	0	0
Rosa woodsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	25	0	0	0	0	2
Symphoricarpos occidentalis	0	0	0	0	0	0	52	0	0	0	0	0	0	0
Symphoricarpos spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**0**	**0**	**0**	**0**	**9**	**0**	**59**	**0**	**25**	**0**	**0**	**0**	**18**	**6**
Artemisia frigida	0	6	0	0	0	0	4	0	0	7	0	0	7	0
Artemisia ludoviciana	17	0	143	0	97	0	2	0	0	1	70	0	2	2
Total Native Half &Sub-Shrubs	**17**	**6**	**143**	**0**	**97**	**0**	**6**	**0**	**0**	**8**	**70**	**0**	**9**	**2**
Total	**17**	**6**	**143**	**0**	**106**	**0**	**65**	**0**	**25**	**8**	**70**	**0**	**27**	**8**

TFN 6 2/025
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RAMACO
Polygon: Bottomland Sagebrush Grassland (BSG)
Density Sample Data
Sample Date: 7/01-12//2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect											Study Area n=25		Permit Area n=17	
	15*	16	17*	18*	19*	20*	21*	22*	23*	24	25	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Artemisia cana	20	0	0	29	7	0	0	0	192	0	18	12.0	38.4	16.3	46.1
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0	0.2	0.7	0.3	0.8
Rosa woodsii	0	0	0	0	0	0	0	0	0	0	2	0.1	0.4	0.0	0.0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	1.1	5.0	0.0	0.0
Symphoricarpos occidentalis	0	0	0	5	63	0	0	25	0	0	48	7.7	18.4	8.5	19.5
Symphoricarpos spp.	0	10	0	0	0	0	0	0	0	0	0	0.4	2.0	0.0	0.0
Total Native Full Shrubs	**20**	**10**	**0**	**34**	**70**	**0**	**0**	**25**	**192**	**0**	**68**	**21.5**	**41.7**	**25.1**	**48.2**
Artemisia frigida	0	0	0	3	0	0	2	0	18	0	0	1.9	4.1	2.8	4.7
Artemisia ludoviciana	0	3	0	31	122	0	133	163	0	0	0	31.4	54.2	45.9	60.9
Total Native Half &Sub-Shrubs	**0**	**3**	**0**	**34**	**122**	**0**	**135**	**163**	**18**	**0**	**0**	**33.3**	**53.5**	**48.7**	**59.2**
Total	**20**	**13**	**0**	**68**	**192**	**0**	**135**	**188**	**210**	**0**	**68**	**54.8**	**68.3**	**73.8**	**74.5**

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RECD NOV 14, 2014

RAMACO
Polygon: Pine and Juniper Woodland (PJW)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect															Study Area and Permit Area n=15	
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	Mean Absolute	Standard Deviation
Artemisia tridentata	0	15	0	7	13	19	0	0	9	17	0	0	0	41	0	8.1	11.6
Chrysothamnus viscidiflorus	0	2	0	0	0	15	0	0	0	0	0	0	0	0	0	1.1	3.9
Ericameria nauseosa	2	0	1	28	14	4	0	0	0	0	0	0	0	0	0	3.3	7.8
Rhus aromatica	7	21	0	1	1	5	0	0	0	3	0	0	0	11	0	3.3	5.9
Ribes cereum	0	0	0	0	0	0	0	3	0	0	15	7	3	0	0	1.9	4.1
Rosa woodsii	0	39	0	0	2	0	0	0	0	0	0	0	0	0	0	2.7	10.0
Total Native Full Shrubs	**9**	**77**	**1**	**36**	**30**	**43**	**0**	**3**	**9**	**20**	**15**	**7**	**3**	**52**	**0**	**20.4**	**22.9**
Artemisia frigida	0	15	0	0	10	0	36	0	48	8	6	62	7	13	4	13.9	19.3
Artemisia ludoviciana	0	135	0	0	0	0	0	0	0	0	0	0	0	0	0	9.0	34.9
Gutierrezia sarothrae	66	28	7	24	46	17	5	0	0	0	0	18	0	0	0	14.1	19.9
Total Native Half &Sub-Shrubs	**66**	**178**	**7**	**24**	**56**	**17**	**41**	**0**	**48**	**8**	**6**	**80**	**7**	**13**	**4**	**37.0**	**46.5**
Total Density	**75**	**255**	**8**	**60**	**86**	**60**	**41**	**3**	**57**	**28**	**21**	**87**	**10**	**65**	**4**	**57.4**	**62.2**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Prairie Dog Modified Grassland (PDMG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect														
	1*	2	3*	4*	5*	6*	7*	8*	9	10*	11*	12	13*	14	15
Artemisia cana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia tridentata	0	52	0	1	0	0	1	0	0	0	0	2	0	11	0
Chrysothamnus viscidiflorus	0	0	0	0	43	0	0	0	0	0	0	0	2	0	0
Ericameria nauseosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**0**	**52**	**0**	**1**	**43**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**2**	**11**	**0**
Artemisia frigida	0	0	0	0	0	0	3	0	0	10	0	12	39	2	6
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gutierrezia sarothrae	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**10**	**0**	**12**	**39**	**2**	**6**
Total Density	**0**	**52**	**0**	**1**	**43**	**0**	**15**	**0**	**0**	**10**	**0**	**14**	**41**	**13**	**6**

TFN 6 2/025
RCD NOV 14, 2014

RAMACO
Polygon: Prairie Dog Modified Grassland (PDMG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect														
	16*	17*	18*	19*	20*	21*	22	23*	24*	25*	26*	27*	28*	29*	30*
Artemisia cana	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Artemisia tridentata	0	0	2	0	0	0	0	1	0	0	0	18	8	0	18
Chrysothamnus viscidiflorus	0	0	0	0	2	1	0	2	2	0	26	0	0	0	0
Ericameria nauseosa	0	0	56	0	0	0	0	0	0	0	0	0	0	0	0
Rhus aromatica	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Total Native Full Shrubs	**0**	**0**	**58**	**0**	**2**	**1**	**0**	**4**	**3**	**0**	**26**	**18**	**8**	**0**	**26**
Artemisia frigida	10	27	0	0	109	26	2	1	64	136	388	0	0	0	7
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115
Gutierrezia sarothrae	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**19**	**27**	**0**	**0**	**109**	**26**	**2**	**1**	**64**	**136**	**388**	**0**	**0**	**0**	**122**
Total Density	**19**	**27**	**58**	**0**	**111**	**27**	**2**	**5**	**67**	**136**	**414**	**18**	**8**	**0**	**148**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Prairie Dog Modified Grassland (PDMG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect										Study Area n=40		Permit Area n=34	
	31*	32*	33*	34*	35*	36*	37*	38*	39*	40*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Artemisia cana	0	0	0	0	0	0	0	0	0	0	0.03	0.2	0.0	0.2
Artemisia tridentata	0	0	0	12	0	0	0	3	2	0	3.3	9.2	1.9	4.8
Chrysothamnus viscidiflorus	1	0	0	0	0	0	0	0	0	0	2.0	7.8	2.3	8.5
Ericameria nauseosa	0	0	0	2	0	0	0	0	0	0	1.5	8.9	1.7	9.6
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0.03	0.2	0.0	0.2
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0.2	1.3	0.2	1.4
Total Native Full Shrubs	**1**	**0**	**0**	**14**	**0**	**0**	**0**	**3**	**2**	**0**	**7.1**	**14.4**	**6.2**	**13.3**
Artemisia frigida	9	0	0	0	71	0	0	12	111	0	26.1	67.7	30.1	72.8
Artemisia ludoviciana	0	0	0	0	0	0	7	0	0	0	3.1	18.2	3.6	19.7
Gutierrezia sarothrae	0	0	2	71	5	0	0	0	0	0	2.5	11.4	2.9	12.3
Total Native Half &Sub-Shrubs	**9**	**0**	**2**	**71**	**76**	**0**	**7**	**12**	**111**	**0**	**31.7**	**69.3**	**36.6**	**74.2**
Total Density	**10**	**0**	**2**	**85**	**76**	**0**	**7**	**15**	**113**	**0**	**38.8**	**73.0**	**42.8**	**78.2**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Reclaimed Grassland (RG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect										Study Area n=10		Permit Area n=8	
	1*	2*	3*	4*	5*	6	7*	8	9*	10*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Artemisia cana	4	0	0	0	0	0	0	0	0	0	0.4	1.3	0.5	1.4
Artemisia tridentata	1	0	0	0	0	0	0	0	0	0	0.1	0.3	0.1	0.4
Atriplex canescens	1	0	0	35	0	0	0	0	0	2	3.8	11.0	4.8	12.2
Ericameria nauseosa	0	0	0	0	0	0	0	4	0	0	0.4	1.3	0.0	0.0
Total Native Full Shrubs	**6**	**0**	**0**	**35**	**0**	**0**	**0**	**4**	**0**	**2**	**4.7**	**10.9**	**5.4**	**12.2**
Artemisia frigida	0	0	0	0	0	1	0	0	0	0	0.1	0.3	0.0	0.0
Total Native Half &Sub-Shrubs	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0.1**	**0.3**	**0.0**	**0.0**
Total Density	**6**	**0**	**0**	**35**	**0**	**1**	**0**	**4**	**0**	**2**	**4.8**	**10.8**	**5.4**	**12.2**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect																	
	1	2	3	4*	5*	6*	7	8	9*	10	11*	12*	13	14	15*	16*	17	18*
Artemisia cana	0	0	0	9	1	1	0	0	0	19	0	6	0	105	88	38	0	0
Artemisia tridentata	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0
Ericameria nauseosa	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ribes cereum	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosa woodsii	0	0	0	18	0	0	0	0	15	0	0	0	0	1	0	7	0	0
Shepherdia canadensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	20	35	50	317	230	2	0	0	265	0	470	704	25	0	150	135	99	65
Symphoricarpos occidentalis	0	0	325	0	0	0	0	0	0	0	0	0	0	101	0	0	0	0
Total Native Full Shrubs	**20**	**35**	**375**	**346**	**231**	**3**	**0**	**0**	**281**	**19**	**470**	**710**	**25**	**216**	**238**	**180**	**99**	**65**
Artemisia frigida	0	2	0	0	0	1	0	0	0	0	0	0	0	10	0	0	0	0
Artemisia ludoviciana	0	0	0	49	0	0	0	0	0	21	0	48	0	42	0	0	0	0
Gutierrezia sarothrae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**0**	**2**	**0**	**49**	**0**	**1**	**0**	**0**	**0**	**21**	**0**	**48**	**0**	**52**	**0**	**0**	**0**	**0**
Total Density	**20**	**37**	**375**	**395**	**231**	**4**	**0**	**0**	**281**	**40**	**470**	**758**	**25**	**268**	**238**	**180**	**99**	**65**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect														
	19*	20*	21*	22	23*	24*	25	26	27*	28*	29	30*	31*	32	33
Artemisia cana	44	51	0	0	8	35	0	0	25	115	0	0	0	0	0
Artemisia tridentata	4	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Ericameria nauseosa	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ribes cereum	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0
Rosa woodsii	0	0	0	0	0	0	3	180	1	0	0	0	0	117	0
Shepherdia canadensis	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Symphoricarpos albus	112	22	0	0	178	116	140	186	334	60	25	545	0	107	76
Symphoricarpos occidentalis	0	17	100	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**160**	**90**	**100**	**0**	**186**	**156**	**145**	**382**	**364**	**175**	**25**	**545**	**0**	**224**	**76**
Artemisia frigida	19	0	0	0	0	4	0	0	3	0	0	0	0	0	0
Artemisia ludoviciana	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0
Gutierrezia sarothrae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**19**	**0**	**30**	**0**	**0**	**4**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**
Total Density	**179**	**90**	**130**	**0**	**186**	**160**	**145**	**382**	**367**	**175**	**25**	**545**	**0**	**224**	**76**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Riparian Woodland (RW)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect													Study Area n=46		Permit Area n=23	
	34	35	36	37*	38	39*	40	41*	42	43*	44*	45	46*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Artemisia cana	0	30	0	160	64	42	77	13	7	0	0	24	0	20.9	36.3	27.7	42.1
Artemisia tridentata	0	0	0	0	12	0	0	0	0	0	0	0	13	0.9	2.9	0.8	2.8
Ericameria nauseosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.6	0.3	0.9
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0	1	0	0.02	0.1	0.0	0.0
Ribes cereum	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	0.5	0.2	0.5
Rosa woodsii	5	0	0	0	3	7	1	9	0	0	0	0	7	8.1	31.2	2.8	5.2
Shepherdia canadensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2.4	0.0	0.0
Symphoricarpos albus	0	0	15	10	0	513	0	270	0	0	489	0	37	126.1	175.6	218.4	206.1
Symphoricarpos occidentalis	8	26	0	0	28	0	12	0	0	0	0	38	0	14.2	51.6	5.1	21.0
Total Native Full Shrubs	**13**	**56**	**15**	**170**	**107**	**563**	**90**	**292**	**7**	**0**	**489**	**63**	**57**	**170.8**	**177.2**	**255.3**	**191.6**
Artemisia frigida	0	0	0	0	8	0	1	0	0	0	0	0	44	2.0	7.2	3.1	9.8
Artemisia ludoviciana	65	12	0	0	0	0	0	0	57	0	15	0	0	7.4	17.1	6.2	15.0
Gutierrezia sarothrae	0	0	0	0	0	0	0	0	0	0	0	0	2	0.04	0.3	0.1	0.4
Total Native Half &Sub-Shrubs	**65**	**12**	**0**	**0**	**8**	**0**	**1**	**0**	**57**	**0**	**15**	**0**	**46**	**9.4**	**18.3**	**9.4**	**17.0**
Total Density	**78**	**68**	**15**	**170**	**115**	**563**	**91**	**292**	**64**	**0**	**504**	**63**	**103**	**180.2**	**179.3**	**264.7**	**195.6**

TFN 6 2/025
DEQ NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per transect																
	1*	2*	3*	4*	5*	6*	7	8*	9*	10*	11	12	13	14*	15*	16*	17*
Artemisia cana	0	17	3	0	0	0	0	0	0	0	0	0	15	0	0	0	0
Artemisia tridentata	22	86	2	27	14	13	66	17	102	61	192	151	48	55	1	196	111
Atriplex canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	9	0	0	2	0	0	0	0
Ericameria nauseosa	0	0	5	11	15	4	20	31	0	9	0	58	0	0	0	71	12
Rhus aromatica	7	4	6	0	0	0	0	0	0	0	0	0	0	7	0	0	0
Rosa woodsii	70	0	35	0	0	0	0	0	0	0	29	107	69	0	0	60	15
Sarcobatus vermiculatus	0	0	0	61	29	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0
Total Native Full Shrubs	**99**	**107**	**51**	**99**	**58**	**17**	**86**	**48**	**102**	**79**	**221**	**316**	**145**	**62**	**1**	**327**	**138**
Artemisia frigida	13	14	77	0	0	0	7	16	55	19	38	17	0	29	89	38	0
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0
Artemisia pedatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex gardneri	0	0	0	4	12	0	0	0	0	0	0	0	0	0	0	0	0
Gutierrezia sarothrae	62	26	42	7	0	56	0	35	120	1	0	0	1	0	73	0	7
Juniperus horizontalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Linanthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yucca glauca	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**76**	**40**	**119**	**11**	**12**	**56**	**7**	**51**	**175**	**20**	**55**	**17**	**1**	**29**	**162**	**38**	**7**
Total Density	**175**	**147**	**170**	**110**	**70**	**73**	**93**	**99**	**277**	**99**	**276**	**333**	**146**	**91**	**163**	**365**	**145**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per transect															
	18*	19*	20*	21*	22	23*	24*	25*	26*	27*	28*	29*	30	31	52*	53
Artemisia cana	0	31	0	0	0	0	0	0	0	0	5	0	0	0	0	0
Artemisia tridentata	86	186	79	194	23	125	95	43	0	15	25	10	49	34	83	47
Atriplex canescens	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ericameria nauseosa	28	21	4	85	2	54	22	32	0	0	5	83	8	52	8	0
Rhus aromatica	0	0	0	0	2	0	0	4	0	0	8	0	0	0	0	0
Rosa woodsii	70	0	55	39	0	37	40	25	175	0	0	0	0	187	0	2
Sarcobatus vermiculatus	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**184**	**238**	**138**	**318**	**27**	**216**	**159**	**104**	**178**	**15**	**43**	**93**	**59**	**273**	**91**	**49**
Artemisia frigida	0	37	5	18	68	0	0	33	21	60	56	21	0	0	21	0
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia pedatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex gardneri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gutierrezia sarothrae	12	18	56	21	153	0	3	8	117	45	6	25	11	13	41	0
Juniperus horizontalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Linanthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0
Yucca glauca	0	0	0	0	0	0	0	0	0	4	12	0	0	0	0	0
Total Native Half &Sub-Shrubs	**12**	**55**	**61**	**39**	**221**	**0**	**3**	**41**	**138**	**109**	**74**	**46**	**19**	**13**	**62**	**0**
Total Density	**196**	**293**	**199**	**357**	**248**	**216**	**162**	**145**	**316**	**124**	**117**	**139**	**78**	**286**	**153**	**49**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Rough Breaks Mixed Shrubland (RBMS)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per transect																Study Area n=49		Permit Area n=35	
	54	55	56	57*	58	59*	60	61*	62*	63*	64*	65*	66*	67	68*	69*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Artemisia cana	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1.5	5.4	1.7	5.9
Artemisia tridentata	0	23	60	30	90	28	21	108	107	37	62	53	21	68	3	93	62.5	53.6	62.6	54.8
Atriplex canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0.3	0.0	0.0
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0.4	2.0	0.6	2.4
Ericameria nauseosa	0	5	0	24	36	142	8	0	4	0	1	0	0	1	0	9	17.8	28.8	19.4	31.7
Rhus aromatica	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.9	2.1	1.1	2.4
Rosa woodsii	86	1	0	0	0	3	61	0	0	0	10	0	0	15	0	0	24.3	42.9	18.1	35.2
Sarcobatus vermiculatus	0	0	25	0	0	0	0	0	0	0	0	0	0	0	6	0	2.6	10.1	2.9	11.3
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.1	0.4	0.1	0.5
Symphoricarpos occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1.6	0.0	0.0
Total Native Full Shrubs	**88**	**30**	**85**	**54**	**126**	**173**	**90**	**108**	**111**	**37**	**85**	**53**	**23**	**84**	**9**	**105**	**110.3**	**81.6**	**106.5**	**79.3**
Artemisia frigida	57	6	0	25	0	0	30	13	55	12	7	0	18	10	0	10	20.3	23.2	21.8	23.5
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0.6	2.9	0.3	1.9
Artemisia pedatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0.2	1.6	0.3	1.9
Atriplex gardneri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.8	0.5	2.1
Gutierrezia sarothrae	20	1	0	38	9	7	75	25	5	8	0	8	52	50	43	13	26.8	34.4	28.0	30.8
Juniperus horizontalis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.02	0.1	0.0	0.0
Linanthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1.1	0.0	0.0
Yucca glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.8	0.5	2.1
Total Native Half &Sub-Shrubs	**77**	**7**	**0**	**63**	**9**	**7**	**105**	**38**	**60**	**31**	**7**	**8**	**70**	**61**	**54**	**23**	**48.7**	**49.0**	**51.4**	**44.0**
Total Density	**165**	**37**	**85**	**117**	**135**	**180**	**195**	**146**	**171**	**68**	**92**	**61**	**93**	**145**	**63**	**128**	**159.0**	**83.1**	**157.9**	**80.0**

TFN 6 2/025
RECD NOV 14, 2014

RAMACO
Polygon: Scoria Grassland (SG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect																	
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	16*	17*	18*
Artemisia cana	0	0	0	3	22	0	0	0	0	2	0	0	0	0	0	0	0	0
Artemisia tridentata	31	0	0	2	0	19	10	108	0	0	15	5	0	26	0	0	37	15
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Ericameria nauseosa	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0
Rhus aromatica	4	16	2	12	0	15	1	5	5	25	0	2	0	0	10	2	5	0
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosa woodsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos occidentalis	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**35**	**16**	**2**	**17**	**22**	**34**	**11**	**115**	**5**	**28**	**15**	**7**	**0**	**29**	**10**	**2**	**43**	**15**
Artemisia frigida	0	0	0	12	17	0	29	45	0	4	0	0	0	40	28	6	11	13
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gutierrezia sarothrae	0	0	0	9	0	0	5	17	5	0	0	0	0	1	3	0	0	8
Krascheninnikovia lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yucca glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0
Total Native Half &Sub-Shrubs	**0**	**0**	**0**	**21**	**17**	**0**	**34**	**62**	**5**	**4**	**0**	**0**	**0**	**41**	**55**	**6**	**11**	**21**
Total Density	**35**	**16**	**2**	**38**	**39**	**34**	**45**	**177**	**10**	**32**	**15**	**7**	**0**	**70**	**65**	**8**	**54**	**36**

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RAMACO
Polygon: Scoria Grassland (SG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect																		
	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	29*	30*	31*	32*	33*	34*	35*	36*	37*
Artemisia cana	0	0	0	0	0	0	4	0	0	0	0	0	0	46	0	0	0	0	10
Artemisia tridentata	13	48	8	60	0	0	0	0	0	21	9	50	20	0	45	18	1	41	0
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Ericameria nauseosa	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4
Rhus aromatica	0	0	1	7	5	8	0	12	4	11	19	10	1	27	0	4	0	0	8
Ribes cereum	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Rosa woodsii	0	0	0	0	0	20	22	6	0	6	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Symphoricarpos occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**13**	**48**	**9**	**67**	**5**	**28**	**27**	**20**	**4**	**38**	**30**	**60**	**21**	**73**	**47**	**22**	**1**	**41**	**24**
Artemisia frigida	8	0	0	0	0	0	100	20	0	5	12	4	1	40	40	0	0	0	11
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	0	0	0	63	0	0	0	0	0
Gutierrezia sarothrae	0	0	0	15	0	0	20	0	0	12	0	3	2	11	0	0	0	0	5
Krascheninnikovia lanata	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Yucca glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total Native Half &Sub-Shrubs	**8**	**0**	**0**	**15**	**0**	**0**	**122**	**20**	**0**	**17**	**12**	**7**	**3**	**114**	**40**	**0**	**1**	**0**	**16**
Total Density	**21**	**48**	**9**	**82**	**5**	**28**	**149**	**40**	**4**	**55**	**42**	**67**	**24**	**187**	**87**	**22**	**2**	**41**	**40**

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RAMACO
Polygon: Scoria Grassland (SG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect													Study Area and Permit Area n=50	
	38*	39*	40*	41*	42*	43*	44*	45*	46*	47*	48*	49*	50*	Mean Absolute	Standard Deviation
Artemisia cana	0	0	0	0	0	0	0	0	0	0	23	25	0	2.7	8.5
Artemisia tridentata	20	3	47	0	62	9	45	0	42	17	0	0	70	18.3	23.9
Chrysothamnus viscidiflorus	0	0	0	0	0	0	3	0	0	0	0	0	0	0.1	0.5
Ericameria nauseosa	0	0	0	0	37	0	0	0	0	0	0	0	0	0.9	5.3
Rhus aromatica	18	5	6	11	0	7	0	7	5	1	5	6	15	6.1	6.7
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0.3
Rosa woodsii	0	0	0	8	15	0	0	0	0	0	0	0	0	1.5	4.8
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.4
Symphoricarpos occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.1
Total Native Full Shrubs	**38**	**8**	**53**	**19**	**114**	**16**	**48**	**7**	**47**	**18**	**28**	**31**	**85**	**29.8**	**26.2**
Artemisia frigida	10	0	6	0	12	1	2	15	0	6	2	2	10	10.2	17.7
Artemisia ludoviciana	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	8.9
Gutierrezia sarothrae	0	31	3	0	16	0	0	5	0	0	16	0	0	3.7	6.7
Krascheninnikovia lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0.3
Yucca glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3.4
Total Native Half &Sub-Shrubs	**10**	**31**	**9**	**0**	**28**	**1**	**2**	**20**	**0**	**6**	**18**	**2**	**10**	**15.7**	**25.7**
Total Density	**48**	**39**	**62**	**19**	**142**	**17**	**50**	**27**	**47**	**24**	**46**	**33**	**95**	**45.5**	**42.0**

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RAMACO
Polygon: Upland Grassland (UG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect																	
	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*	17*	18*	19*
Artemisia cana	0	0	0	0	0	39	0	0	0	0	1	0	0	17	0	0	1	0
Artemisia tridentata	0	0	15	10	0	43	0	0	1	1	0	12	0	35	0	3	0	25
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ericameria nauseosa	0	0	0	0	19	0	0	2	0	0	0	9	3	0	0	0	0	0
Rhus aromatica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ribes cereum	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Rosa woodsii	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Full Shrubs	**5**	**0**	**15**	**10**	**19**	**82**	**0**	**17**	**1**	**1**	**1**	**34**	**3**	**52**	**0**	**5**	**1**	**25**
Artemisia frigida	0	20	19	11	0	7	0	2	12	2	33	0	113	3	2	59	1	39
Artemisia pedatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gutierrezia sarothrae	0	15	0	0	12	0	0	0	0	0	0	21	0	0	0	0	0	0
Kraschenninnikovia lanata	0	45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yucca glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Native Half &Sub-Shrubs	**0**	**80**	**19**	**12**	**12**	**7**	**0**	**2**	**12**	**2**	**33**	**21**	**113**	**3**	**2**	**59**	**1**	**40**
Total Density	**5**	**80**	**34**	**22**	**31**	**89**	**0**	**19**	**13**	**3**	**34**	**55**	**116**	**55**	**2**	**64**	**2**	**65**

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RAMACO
Polygon: Upland Grassland (UG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect																					
	20*	21*	22*	23*	24*	25*	26*	27*	28*	29*	63*	64*	65*	66*	67*	68*	69*	70*	71*	72*	73*	74*
Artemisia cana	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0
Artemisia tridentata	0	2	0	0	0	0	2	0	0	7	2	0	0	7	0	0	28	0	9	0	0	0
Chrysothamnus viscidiflorus	0	0	2	0	0	0	9	0	0	0	0	0	23	3	0	0	0	1	0	0	0	0
Ericameria nauseosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhus aromatica	0	0	0	0	0	1	0	0	0	0	0	0	3	5	0	0	0	0	0	1	0	1
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosa woodsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos albus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0
Total Native Full Shrubs	**0**	**2**	**2**	**0**	**0**	**1**	**11**	**0**	**0**	**7**	**2**	**11**	**26**	**15**	**0**	**0**	**28**	**1**	**69**	**1**	**0**	**1**
Artemisia frigida	2	5	87	9	78	3	18	0	0	98	0	0	40	37	2	42	5	3	49	27	0	0
Artemisia pedatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gutierrezia sarothrae	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0
Krascheninnikovia lanata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yucca glauca	0	0	1	0	0	0	0	0	3	0	0	0	1	0	0	0	0	7	1	0	2	0
Total Native Half &Sub-Shrubs	**2**	**5**	**88**	**9**	**98**	**3**	**18**	**0**	**3**	**98**	**0**	**0**	**41**	**37**	**2**	**42**	**5**	**10**	**50**	**44**	**2**	**0**
Total Density	**2**	**7**	**90**	**9**	**98**	**4**	**29**	**0**	**3**	**105**	**2**	**11**	**67**	**52**	**2**	**42**	**33**	**11**	**119**	**45**	**2**	**1**

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RAMACO
Polygon: Upland Grassland (UG)
Density Sample Data
Sample Date: 7/01-12/2013
Plot Size: 100 Square Meters

Plant Species	Sample Number (*Denotes Sample Location Used to Calculate Permit Area Values) Number per Transect												Study Area n=52		Permit Area n=50	
	75*	76*	77*	78	79*	80*	81*	82*	83*	84	85*	86*	Mean Absolute	Standard Deviation	Mean Absolute	Standard Deviation
Artemisia cana	0	0	0	0	0	0	0	0	0	0	0	0	1.3	6.0	1.4	6.2
Artemisia tridentata	0	0	0	0	0	0	0	0	0	0	12	0	4.1	9.3	4.3	9.5
Chrysothamnus viscidiflorus	0	4	0	4	0	0	20	17	0	0	0	0	1.6	4.9	1.6	5.0
Ericameria nauseosa	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2.9	0.7	3.0
Rhus aromatica	2	0	0	0	0	1	6	0	0	0	0	0	0.4	1.2	0.4	1.2
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.7	0.1	0.8
Rosa woodsii	0	0	0	5	0	0	0	0	0	0	0	0	0.4	2.2	0.3	2.1
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1.8	0.3	1.9
Symphoricarpos albus	0	0	0	0	0	0	1	0	0	0	0	0	1.2	8.3	1.2	8.6
Total Native Full Shrubs	**2**	**4**	**0**	**9**	**0**	**1**	**27**	**17**	**0**	**0**	**12**	**0**	**10.0**	**17.2**	**10.3**	**17.7**
Artemisia frigida	1	2	34	74	1	0	45	78	78	0	0	0	21.9	30.5	21.3	30.2
Artemisia pedatifida	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.1	0.0	0.1
Gutierrezia sarothrae	0	0	0	0	2	0	0	0	0	0	0	0	1.7	5.2	1.7	5.3
Krascheninnikovia lanata	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6.2	0.9	6.4
Yucca glauca	0	0	0	0	0	0	5	0	0	0	0	0	0.4	1.3	0.4	1.3
Total Native Half &Sub-Shrubs	**1**	**2**	**34**	**74**	**3**	**0**	**50**	**78**	**78**	**0**	**0**	**0**	**24.9**	**32.1**	**24.3**	**31.9**
Total Density	**3**	**6**	**34**	**83**	**3**	**1**	**77**	**95**	**78**	**0**	**12**	**0**	**34.9**	**36.7**	**34.6**	**36.7**

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ATTACHMENT D8-1-K

Sampling Plan

TFN 6 2/025
RECD NOV 14, 2014

RAMACO

Brook Mine

Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Matthew H. Mead, Governor

Todd Parfitt, Director

August 28, 2013

Dawn Gardner
BKS Environmental Associates, Inc.
P.O. box 3467
Gillette, WY 82717

RE: Sampling Plan for Ramaco Surface Coal Mine, TFN 6 2/025

Dear Dawn:

I approve the attached sampling plan. I corrected the acreage table and added a page 13 with the agreements that we made during your sampling.

If you have questions please call me.

Sincerely,

Stacy Page

Stacy Page

sp\

attachment

cc: Cheyenne File w/attachment

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AJK 8/28/13

Herschler Building · 122 West 25th Street · Cheyenne, WY 82002 · http://deq.state.wy.us

ADMIN/OUTREACH	ABANDONED MINES	AIR QUALITY	INDUSTRIAL SITING	LAND QUALITY	SOLID & HAZ. WASTE	WATER QUALITY
(307) 777-7758	(307) 777-6145	(307) 777-7391	(307) 777-7369	(307) 777-7756	(307) 777-7752	(307) 777-7781
FAX 777-7682	FAX 777-6462	FAX 777-5616	FAX 777-5973	FAX 777-5864	FAX 777-5973	FAX 777-5973

Sampling Methods for Baseline Vegetation Study
Ramaco Wyoming Coal Co. - Ramaco Surface Coal Mine
June 20, 2013

INTRODUCTION

A baseline vegetation study will be performed in Sheridan County northeast of Ranchester, Wyoming, within the proposed Ramaco Surface Coal Mine permit area. The proposed permit area includes approximately 5,902 acres and is located in all or portions of:

- Sections 10, 11, 12, 13, 14, 15, 21, 22, 23, 24, 26, and 27 T57N R85W.
- Sections 7, 8, 9, 10, 15, 17, 18, 19, 20, and 22 T57N R84W.

The following 10 vegetation communities are located within the proposed permit area: Agricultural Lands, Bottomland Sagebrush Grassland, Big Sagebrush Shrubland, Prairie Dog Modified Grassland, Juniper Woodland, Reclaimed, Rough Breaks Mixed Shrubland, Riparian Woodland, Scoria Grassland, and Upland Grassland. Disturbed areas are also present within the proposed permit area and consist primarily of roads and facilities associated with abandoned mine land activity, as well as existing Big Horn Coal and other historic surface coal mines. Refer to Table 1 for mapping acreages.

Potential wetland areas have been identified predominantly within the Bottomland Sagebrush Grassland and Riparian Woodland vegetation communities which encompass approximately 206.05 acres of the proposed permit area. Potential wetland areas include areas along Slater Creek and unnamed tributaries, Hidden Water Creek and unnamed tributaries, seeps, drainages, and reservoirs. Potential wetland areas were identified using color infra-red (CIR) photography and field observation of areas that visually contained plant species more adapted to moist and/or saline conditions. These areas may not be jurisdictional wetlands under the U.S. Army Corps of Engineers (USACE) delineation criteria.

Table 1: Vegetation Map Units, Symbols, and Associated Acreages.

Vegetation Map Units	Map Unit Symbol	Permit Area Acreage June 2013 Methodology	Permit Area Acreage for Final Mapping Acreage
Agricultural Lands	AG	508.52	495.02
Bottomland Sagebrush Grassland	BSG	76.67	76.71
Big Sagebrush Shrubland	BSS	1,385.93	1,368.90
Prairie Dog Modified Grassland	PDMG	504.38	517.68
Juniper Woodland	JW	50.93	51.03
Reclaimed	R	541.17	542.45
Rough Breaks Mixed Shrubland	RBMS	782.42	738.53
Riparian Woodland	RW	129.38	132.08
Scoria Grassland	SG	539.08	582.23
Upland Grassland	UG	1,253.30	1,245.68
Disturbed	D	115.05	115.25
Water/Seep	W	15.45	15.48
TOTAL		**5,902.28**	**5,881.04**

Baseline vegetation sampling will be conducted no later than August 31, 2013. Sampling, once initiated, will be completed within a three-week period. If sampling within a three week period is not possible, BKS will notify the Wyoming Department of Environmental Quality, Land Quality Division (LQD) immediately. Vegetation baseline sampling will be conducted using the procedures described in this document. Vegetation parameter sampling will be conducted by vegetation community as specified in Table 2. Wetlands will not be sampled as part of the baseline study but will be included under USACE delineation requirements.

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Table 2: Baseline Vegetation Sampling – Measured Parameters.

Parameter	AG	BLG	BSS	PDMG	JW	R	RBMS	RW	SG	UG
% Absolute Total Ground Cover	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First Hit % Absolute Total Vegetation Cover	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multiple Hit Vegetation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Production	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Shrub/Sub-shrub Density	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tree Count and Distribution	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

VEGETATION COMMUNITY CLASSIFICATION & MAPPING

Vegetation communities within the proposed permit area were classified and mapped prior to commencing vegetation sampling. Mapping and classification identified the following 10 vegetation communities (disturbed and water not included):

- Agricultural Lands
- Bottomland Sagebrush Grassland
- Big Sagebrush Shrubland
- Prairie Dog Modified Grassland
- Juniper Woodland
- Reclaimed
- Rough Breaks Mixed Shrubland
- Riparian Woodland
- Scoria Grassland
- Upland Grassland

Vegetation communities were mapped using August 2011 ArcGIS Online World Imagery and verified through field surveys in April and June 2013. The acreages will be verified in the field throughout the duration of the study and may change slightly from this original methodology. The following apply to the mapping and/or sampling:

1) Disturbed areas and open water within the proposed permit area were also identified and mapped, based on the scale of available mapping. Disturbed areas and open water will be excluded from all vegetation parameter sampling.
2) Prairie dog towns are scattered throughout the proposed permit and were mapped to the extent possible based on the scale of available mapping, independent of size.
3) The areas of the 2001 and 2011 burn, due to the lack of shrubs, were placed in the Upland Grassland vegetation community regardless of the likely pre-fire vegetation type.
4) Marginal older agricultural areas containing a limited amount of crested wheatgrass which are not hayed will be included in the Upland Grassland vegetation community.
5) A seep area that consists of approximately one acre will be mapped and described, but not sampled.

All areas within ½ mile of the proposed permit area will be mapped, based on a review of August 2011 ArcGIS Online World Imagery and known expression of this imagery within the proposed permit area. It

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will not be necessary to field verify mapping within ½ mile of the proposed permit area; in addition, vegetation sampling will not be conducted within this area.

TRANSECT ORIGIN SELECTION

A computerized systematic grid (through ArcGIS) will be used to randomly locate sample points within each vegetation community. Due to changes in the permit boundary between cage placement and sampling portions of this project, separate sample point locations will be generated for production and cover/shrub density sampling. These computer generated random numbers will be uploaded to a hand-held GPS unit for actual location in the field. Sample points will be sampled in numerical order until the minimum sample size is attained and then until either sample adequacy is met or the required maximum number of samples has been collected.

LINE TRANSECT LAYOUT

A 50-meter line transect will be used in the 10 vegetation communities to be sampled: Agricultural Lands, Bottomland Sagebrush Grassland, Big Sagebrush Shrubland, Prairie Dog Modified Grassland, Juniper Woodland, Reclaimed, Rough Breaks Mixed Shrubland, Riparian Woodland, Scoria Grassland, and Upland Grassland. Each 50-meter line transect will begin at its specified random origin point and extend in a randomly generated compass direction.

Transects that exceed the boundaries of the vegetation community being sampled will be redirected back into its vegetation community at a 90 degree angle from the original transect direction at the point of intercept. In instances where a 90 degree angle of reflection does not place the transect within the sampled vegetation community, a 45 degree angle of reflection will be used.

GROUND COVER

Line-transect point-intercept methods will be used to collect percent absolute cover data from the 10 vegetation communities. Each 50-meter transect will represent a single sample point. Percent cover measurements will be taken from point-intercepts at 1-meter intervals along a 50-meter transect using a laser pointer. Should a transect run out of the vegetation community boundary or a non-vegetated feature, it will be redirected as described above. Each point-intercept will represent 2% of the cover measurements.

Percent cover measurements will record "first-hit" point-intercepts by live foliar vegetation species, litter, rock, or bare ground. Litter will include all non-living organic material. Manure will be included with bare ground. Rock fragments will be recorded when they are equal to or greater than one centimeter in size (i.e., sheet flow, minimum non-erodable particle size). First-hit data will be recorded and tabulated to evaluate total ground cover and total vegetation cover. Multiple hits on vegetation will be recorded, but used only for the purpose of constructing a plant species list for each vegetation community.

Total Vegetation Cover

Vegetation cover is the vertical projection of the general outline of plants to the ground surface. Vegetation cover data will be recorded by species using first hit data. All point intercepts of living vegetation and growth produced during the current growing season will be counted toward total vegetation cover. Total vegetation cover measurements will be expressed in absolute percentages for each sample point. Relative cover values for percent species cover may be provided. Total vegetation cover WILL NOT include lichen and moss.

Total Ground Cover

Total ground cover is the sum of cover values for percent vegetation, percent litter, and percent rock. Total ground cover data will be recorded by live vegetation, litter, rock, or bare ground. Litter will include all dead organic matter that is recognizable. Total ground cover measurements will be expressed in absolute percentages for each sample point. Total ground cover WILL include lichen and moss.

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Species Diversity

Species diversity will be determined by noting all plant species observed or sampled within a 100-square meter belt transect centered over the cover transect (1-meter on either side of the 50-meter cover transect). The number of belt transects will equal the number of cover transects for a given vegetation community. Sample adequacy will not be calculated for species diversity. Species diversity will be summarized by lifeform and vegetation community.

PRODUCTION

Annual herbaceous production will be quantitatively sampled within each vegetation community, excluding Agricultural Lands, Prairie Dog Modified Grassland, Juniper Woodland and Reclaimed. Each production quadrat will cover an area of no less than 0.5 m square meter. All standing 2013 biomass will be clipped as close to the ground as possible and placed in paper bags. Major species (contributing greater than 2% relative cover) will be collected and bagged by species. Minor species (contributing less than 2% relative cover) will be collected by lifeform, and relative percent contribution estimated by species. Species lacking creditable value, full shrubs, succulents, *Yucca* species, cushion plants, mosses, lichens, and trees will not be clipped. Although clipping annual forbs is not required, annual forbs will be collected in the field, and 2013 annual forb data will be reported.

Clipped biomass will be dried in a forced air oven at 105° C for 24 hours and weighed on an electronic balance scale to the nearest 0.10 gram. Clipped samples contributing less than 0.10 gram of matter will be considered trace samples and calculated at 0.033 grams of weight. The bag weight will be calculated and subtracted from the sample weight to yield only the dry weight of the vegetative matter. The final results will be reported in grams/m^2 and pounds/acre.

Production quadrats will be sampled until either sample adequacy is achieved or the maximum number of samples is reached for a given vegetation community. All production quadrats will be sampled within grazing exclosures. Exclosures will be established as soon as field conditions permit. Each exclosure will exceed the quadrat size to accommodate the sample quadrat and a buffer area. Permanent fences used to control livestock grazing are considered a type of grazing exclosure.

Production within the Agricultural Lands vegetation community will not be quantitatively sampled, but a ten-year county-wide productivity mean (2003-2012) based on Wyoming Agriculture Statistics Service yield data will be provided.

SHRUB DENSITY

Shrub density data will be collected in conjunction with randomly selected cover transects, wherever possible. All shrubs, full or sub, will be counted within 1-meter on either side of the 50-meter cover transect (100-square meter belt transect). Shrub density data will be quantitatively evaluated and sample adequacy will be calculated for shrub density transects. Shrub density belt transects will be sampled until either sample adequacy is achieved or the maximum number of samples is reached for a given vegetation community. If sample adequacy has not been reached LQD will be notified for a decision about the need for additional sampling. No shrub height measurements will be statistically summarized. General approximations of shrub heights will be recorded.

TREE DENSITY

It is anticipated that trees will be found within the proposed permit area. No tree density sampling will be carried out; however, if trees are observed within the proposed permit area, they will be noted and qualitatively summarized within the report text.

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SAMPLE ADEQUACY

Table 3 lists the minimum and maximum number of cover, production, and/or shrub density transects per vegetation community that will be sampled in the Agricultural Lands, Bottomland Grassland, Big Sagebrush Shrubland, Prairie Dog Modified Grassland, Pine and Juniper Woodland, Reclaimed, Rough

Breaks Mixed Shrubland, Riparian Woodland, Scoria Grassland, and Upland Grassland. Sample adequacy will be calculated after the minimum sample size is attainted and an incremental number of cover, production, and/or shrub density transects will be sampled until either sample adequacy is met or the maximum number of samples has been collected. The sample adequacy formula outlined in LQD Handbook of Approved Sampling and Statistical Methods for Evaluation of Revegetation Success on Wyoming Coal Mines will be utilized to determine the minimum required size of the sample population.

Table 3: Vegetation Monitoring Minimum/Maximum Sample Population Requirements for Sampled Vegetation Communities.

Vegetation Community	Parameter	Plant Community Minimum Sample Size	Plant Community Maximum Sample Size
Agricultural Lands	Ground Cover Vegetation Cover Shrub Density	20	50
Bottomland Sagebrush Grassland	Ground Cover Vegetation Cover Shrub Density Total Production	15	25
Big Sagebrush Shrubland	Ground Cover Vegetation Cover Shrub Density Total Production	20	50[1]
Prairie Dog Modified Grassland	Ground Cover Vegetation Cover Shrub Density	20	50
Juniper Woodland	Ground Cover Vegetation Cover Shrub Density	10	15
Reclaimed[2]	Ground Cover Vegetation Cover Shrub Density	10	10
Rough Breaks Mixed Grassland	Ground Cover Vegetation Cover Shrub Density Total Production	20	50[1]
Riparian Woodland	Ground Cover Vegetation Cover Shrub Density Total Production	20	50[1]
Scoria Grassland	Ground Cover Vegetation Cover Shrub Density Total Production	20	50[1]
Upland Grassland	Ground Cover Vegetation Cover Shrub Density Total Production	20	50[1]
Total		**175**	**400**

[1]If sample adequacy is not met for shrub density with the maximum number of transects, LQD will be notified and a decision will be made about additional sampling.
[2] There are five data sets for this community and the semi-quantitative methods in Ch. 2 Coal Regulations are acceptable.

The 10 sampled vegetation communities have been identified as either "grassland", "shrubland", or "woodland". Using Table 1 in LQD Handbook of Approved Sampling and Statistical Methods for Evaluation of Revegetation Success on Wyoming Coal Mines, the constant values to be used in statistical

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test are (for both grassland and shrubland total vegetation cover, total cover, total production, and shrub density): "z"=1.28 and "d" = 0.1. All sampled vegetation will be included in the sample adequacy test (i.e., "Species Lacking Creditable Value" will not be eliminated from the equation).

PLANT SPECIES LISTS

A plant species list by scientific name, common name, and lifeform will be developed individually for each of the 10 vegetation communities. This list will be compiled from species noted during all vegetation monitoring activities including point-intercept line transect cover measurements, species diversity belt transect measurements, and other opportunistic observations of the sampling area.

OTHER DATA COLLECTED

Habitat and species surveys for any United States Fish and Wildlife Service (USFWS) threatened, endangered, or candidate species or any state species of special concern listed in the Wyoming Natural Heritage database will be conducted during the appropriate period based on phenology, and any identified individuals or populations or appropriate habitat will be identified on the baseline vegetation map. All state listed noxious weeds will be noted and significant concentrations identified on the baseline vegetation map.

Photographs will be taken of the 10 vegetation communities. Photographic locations will be documented and illustrated on the baseline vegetation map.

EXTENDED REFERENCE AREA MAPPING & JUSTIFICATION

As noted in the Vegetation Community Classification & Mapping section, all lands within the proposed permit area were mapped as one of 10 vegetation communities, disturbed lands, or water. All Agricultural Land, Bottomland Sagebrush Grassland, Big Sagebrush Shrubland, Prairie Dog Modified Grassland, Juniper Woodland, Reclaimed, Rough Breaks Mixed Shrubland, Riparian Woodland, Scoria Grassland, and Upland Grassland areas unaffected by the mining operation will serve as Extended Reference Area (EXREFA). For the purposes of this permit, EXREFA means a land unit which will be used to evaluate revegetation success for each of the same vegetation communities which were affected by the mining operation. The EXREFA will be a subset of the mapped vegetation communities and will be included as potential sample points for the sampling program. The EXREFA will remain unaffected over the course of the mining operation and will be as large as practical, at least two acres, considering land ownership patterns, and land management history. The permit application Appendix D-8 will show the EXREFA on the vegetation map and will include text justifying the choice of the EXREFA.

BASELINE VEGETATION SURVEY REPORT

A summary of all field data collected and will include the following major headings and content:

I. Table of Contents

II. Approved mapping and sampling methods

- Text that briefly lists the title and date for the approval for the approved methods and includes a reference to the location of the approved methods in Appendix D-8.
- Text making a clear statement that all sampling methods were executed as approved.
- Text noting the time periods when field sampling occurred.

III. Map of the Agricultural Land, Bottomland Sagebrush Grassland, Big Sagebrush Shrubland, Prairie Dog Modified Grassland, Juniper Woodland, Reclaimed, Rough Breaks Mixed Shrubland, Riparian Woodland, Scoria Grassland, Upland Grassland, and Extended Reference Areas

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- Map with appropriate legend information for all entries.
- Identify photo locations.
- Identify sample points in each vegetation community.
- Identify projected affected area and tabulate acreage.
- Tabulate acreage of each map unit.

IV. Present and discuss sample numbers.

- Tabular presentation

Plant Community	Total Vegetation Cover (%)	Actual Sample Size	Computed Adequate Sample Size	Computed Z-Value	Confidence Level Achieved
Agricultural Land					
Bottomland Sagebrush Grassland					
Big Sagebrush Shrubland					
Prairie Dog Modified Grassland					
Juniper Woodland					
Reclaimed					
Rough Breaks Mixed Shrubland					
Riparian Woodland					
Scoria Grassland					
Upland Grassland					

Plant Community	Total Ground Cover (%)	Actual Sample Size	Computed Adequate Sample Size	Computed Z-Value	Confidence Level Achieved
Agricultural Land					
Bottomland Sagebrush Grassland					
Big Sagebrush Shrubland					
Prairie Dog Modified Grassland					
Juniper Woodland					
Reclaimed					
Rough Breaks Mixed Shrubland					
Riparian Woodland					
Scoria Grassland					
Upland Grassland					

- Text briefly discussing numbers in relation to the approved methods

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V. Present sample data

- Optional tabular presentation.

Vegetation Parameter	Vegetation Community									
	AG	BLS	BSS	PDMG	JW	R	RBMS	RW	SG	UG
Absolute Vegetation Cover (%)										
Absolute Total Ground Cover (%)										

- Text which describes the major vegetation and topographic characteristics of each community; integrate soil type(s) as useful.
- Tabulate and discuss relative cover values by life form.
- Present and discuss photographs.

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Optional Relative Vegetation Cover by Lifeform Table.

Life Form	AG	BLS	BSS	PDMG	JW	R	RBMS	RW	SG	UG
	Relative %	Relative %	Relative %	Relative %	Relative %	Relative %	Relative %	Relative %	Relative %	Relative %
Native Annual Grasses										
Introduced Annual Grasses										
Native Cool Season Perennial Grasses										
Native Warm Season Perennial Grasses										
Introduced Perennial Grasses										
Native Annual Forbs										
Introduced Annual Forbs										
Native Perennial Forbs										
Introduced Perennial Forbs										
Half and Sub-Shrubs										
Full Shrubs										
Native Trees										
Introduced Trees										
Succulents										

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Absolute Cover Summary by Species Table

Species (list of species organized in the life forms below)	AG Absolute %	BLS Absolute %	BSS Absolute %	PDMG Absolute %	JW Absolute %	R Absolute %	RBMS Absolute %	RW Absolute %	SG Absolute %	UG Absolute %
Annual Grasses										
Vulpia octoflora										
Bromus tectorum										
Bromus japonicus										
Total Annual Grasses										
etc										
Introduced Perennial Grasses										
Total Introduced Perennial Grasses										
Native Annual Forbs										
Total Native Annual Forbs										
Introduced Annual Forbs										
Total Introduced Annual Forbs										
Native Perennial Forbs										
Total Native Perennial Forbs										
Introduced Perennial Forbs										
Total Introduced Perennial Forbs										
Half and Sub-Shrubs										
Total Half and Sub-Shrubs										
Full Shrubs										
Total Full Shrubs										
Native Trees										
Total Native Trees										
Introduced Trees										
Total Introduced Trees										
Succulents										
Total Succulents										
Total Vegetative Cover										
Litter										
Rock										
Cryptograms										
Total Ground Cover										
Bare Ground										

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VI. Present species lists by vegetation community.

- Text briefly discussing lists.
- Text noting the presence or absence of federally listed threatened and endangered species and state listed noxious weeds.

VII. Present Extended Reference Area

- Text briefly describing reference units in baseline map.
- Text discussing and justifying representative nature of the EXREFA.

VIII. References

- Includes citations for plant identification, etc.

IX. Photographs

- Each caption is complete and descriptive.

X. Raw Cover Data

- Includes tables for raw cover.

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Attachment to Sampling Plan date June 20, 2013

Additional Agreements.

Juniper dominated one portion and Ponderosa Pine dominated the other portion of the Juniper Woodland vegetation community. Sample adequacy was not met in this community when combined. When split apart the Ponderosa Pine community meets adequacy. The Juniper community still does not meet adequacy. Fifteen transects total were sampled for 50 acres. . The Juniper dominated area is 18.58 acres and 8 samples were collected. The Ponderosa Pine dominated area (PPs in Section Section 10, T57N, R84W) is 32.45 acres and 7 samples were collected. **No more samples were required**

2. Sample adequacy was not met for any of the vegetation communities for shrub density. Review of the data indicated that the target shrub would unlikely change with more sampling on any of the communities except for the Upland Grassland. The shrub density was extremely low in this community and probably would not increase very much if at all with addtiional sampling. **No additional sampling will be required.**

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