TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.
HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

March 1, 2018

Mr. Brock Bowles
Environmental Protection Specialist
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

RE: New Horizon Mine (Permit No. C-1981-008)
Phase III Bond Release Application 19 (SL-19)
Adequacy Response

Dear Mr. Bowles:

Tri-State Generation and Transmission Association, Inc. (Tri-State) is the parent company to Elk Ridge Mining and Reclamation, LLC New Horizon Mine. The New Horizon Mine operates under Division of Reclamation, Mining and Safety (DRMS) Permit No. C-1981-008.

Tri-State received your adequacy review for SL-19 dated February 28, 2018. Tri-State on behalf of the New Horizon Mine has the following responses to your comments:

1. *The following comments are referring to Appendix B of the application:*
   a. *The ground cover data presented in section 4.1 (both text and charts 3 & 4) does not correspond with the data presented in Table 2 (page 13) and the data sheets in Tables A2, A3 and A4. Please update section 4.1.*

      Response: Section 4.1 has been corrected as requested.

   b. *In section 4.2, the paragraph discussing the 2014 production results has the 2015 data in it. Please update this paragraph with the correct data.*

      Response: The paragraph requested to be updated in Section 4.2 has been updated accordingly.

2. *The following comments are referring to Appendix C of the application:*
   a. *In section 3.2.1, Table 2 and Chart 4, the desirable perennial cover for the bond release block is 34.47%. The data sheet in Table A3 shows it to be 33.87%. Please correct the text, table and chart.*

      Response: Section 3.2.1, Table 2, and Chart 4 have been updated as requested.

   b. *In Table A6, the data shown in the 'Average' row does not add up to the value in the 'TOTAL' column. Please correct the table. Also, update Table 3 on page 15, the discussion in Section 4.2 and Chart 5 which use the data from Table A6 to calculate production success.*

Response: An error in a formula was corrected in Table A6. Therefore, Section 4.2, Table 3, and Chart 5 have been updated to correct this error.

Revised pages with the noted changes have been included for your review. If you have any further questions, please contact Tony Tennyson at (970) 824-1232 or ttennyson@tristategt.org.

Sincerely,

Daniel J. Casiraro
Senior Manager
Environmental Services

DJC:TT:der

Enclosures

cc: Frank Ferris (via email)
Chris Gilbreath (via email)
Jason Storey (via email)
Tony Tennyson (via email)
File: G474-11.3(21)b-4

New Horizon Mine
Permit No. C-1981-008

2014-2015 Phase III Revegetation Evaluation Report

Field Survey - IME – 2014 and Cedar Creek – 2015

Report – Cedar Creek - August, 2015

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Fort Collins, Colorado 80526
(970) 223-0775
www.cedarcreekassociatesinc.com

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List of Tables and Charts

List of Maps

New Horizon Mine
Permit No. C-1981-008

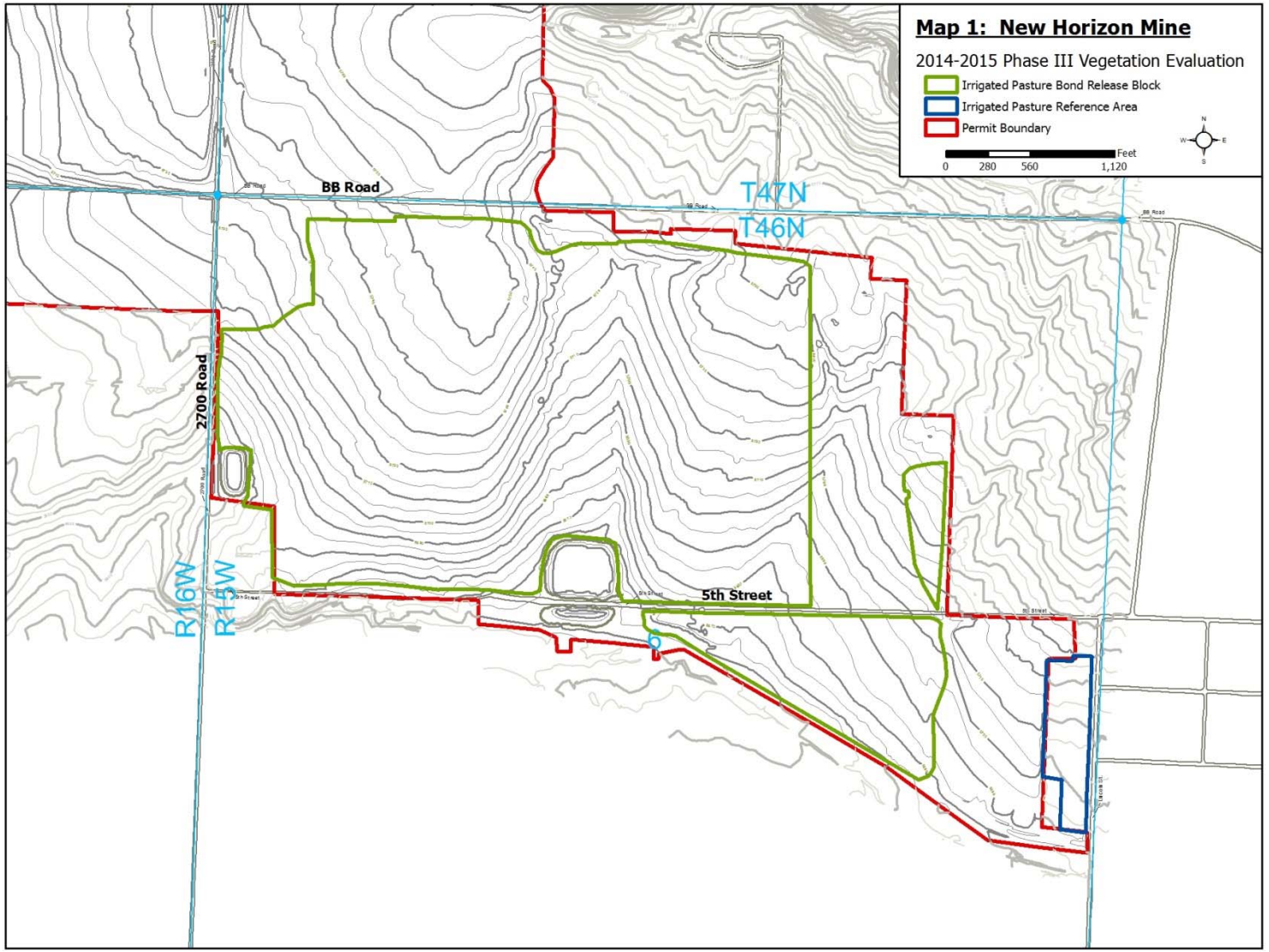
2014-2015 PHASE III REVEGETATION EVALUATION REPORT

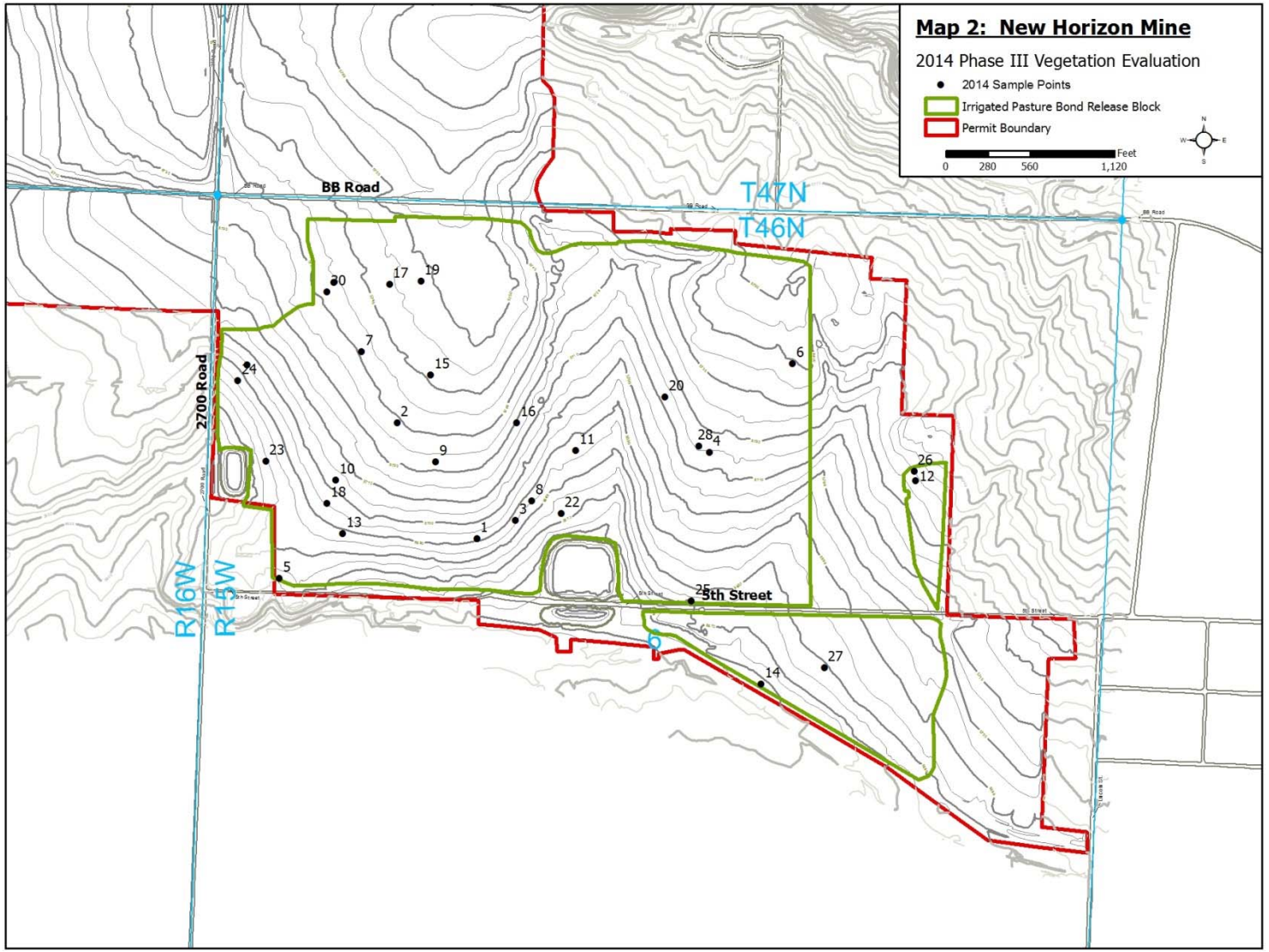
PHASE II BOND RELEASE BLOCK:	REFERENCE AREA:
IRRIGATED PASTURE REVEGETATION	IRRIGATED PASTURE

1.0 INTRODUCTION

IME was contracted in 2014 and Cedar Creek Associates, Inc. (Cedar Creek) in 2015 by New Horizon Mine (New Horizon) to evaluate revegetated units for Phase III bond release. Data collection was performed in the interest of ascertaining progress toward revegetation success in accordance with Permit Section 2.05.4(2)(e). The bond release block evaluated in 2014-2015 consisted of 225.8 acres of Irrigated Pasture revegetation (Map 1). Overall, the entire bond release application is 280.2 acres. However, this report only addresses the 225.8 acres of Irrigated Pasture. In addition, the Irrigated Pasture Reference Area was evaluated to provide cover and production values to facilitate a comparison of success for the reclaimed units. The sample points for Phase III bond release and reference areas evaluated in 2014-2015 are provided on Maps 2 through 5. Grazing and other land management activities were precluded from the Phase III Bond Release Area and reference area until vegetation sampling was completed in 2014 and 2015. Irrigation waters were generally applied in equal amounts on the reclamation and reference area.

Sampling on Irrigated Pasture Phase III Bond Release Block and Reference Area occurred July, 2014 by IME and June 1-4, 2015 by Cedar Creek. Field efforts in 2014 were conducted by or under the direct supervision of IME's principal ecologist, Mr. Kent Crofts. Field efforts in 2015 were conducted by or under the direct supervision of Cedar Creek's Reclamation Ecologist, Mr. Jesse Dillon. Cedar Creek has prepared this report. New Horizon Mine has determined acreages presented in this document. Raw data tables are presented in Appendix A.


Map 1: New Horizon Mine
2014-2015 Phase III Vegetation Evaluation
Irrigated Pasture Bond Release Block
Irrigated Pasture Reference Area
Permit Boundary
Feet
0 280 560 1,120
BB Road
T47N
T46N
2700 Road
R16W
R15W
5th Street


Map 2: New Horizon Mine
2014 Phase III Vegetation Evaluation
2014 Sample Points
Irrigated Pasture Bond Release Block
Permit Boundary
Feet
0 280 560 1,120
BB Road
T47N
T46N
2700 Road
5th Street
R16W
R15W
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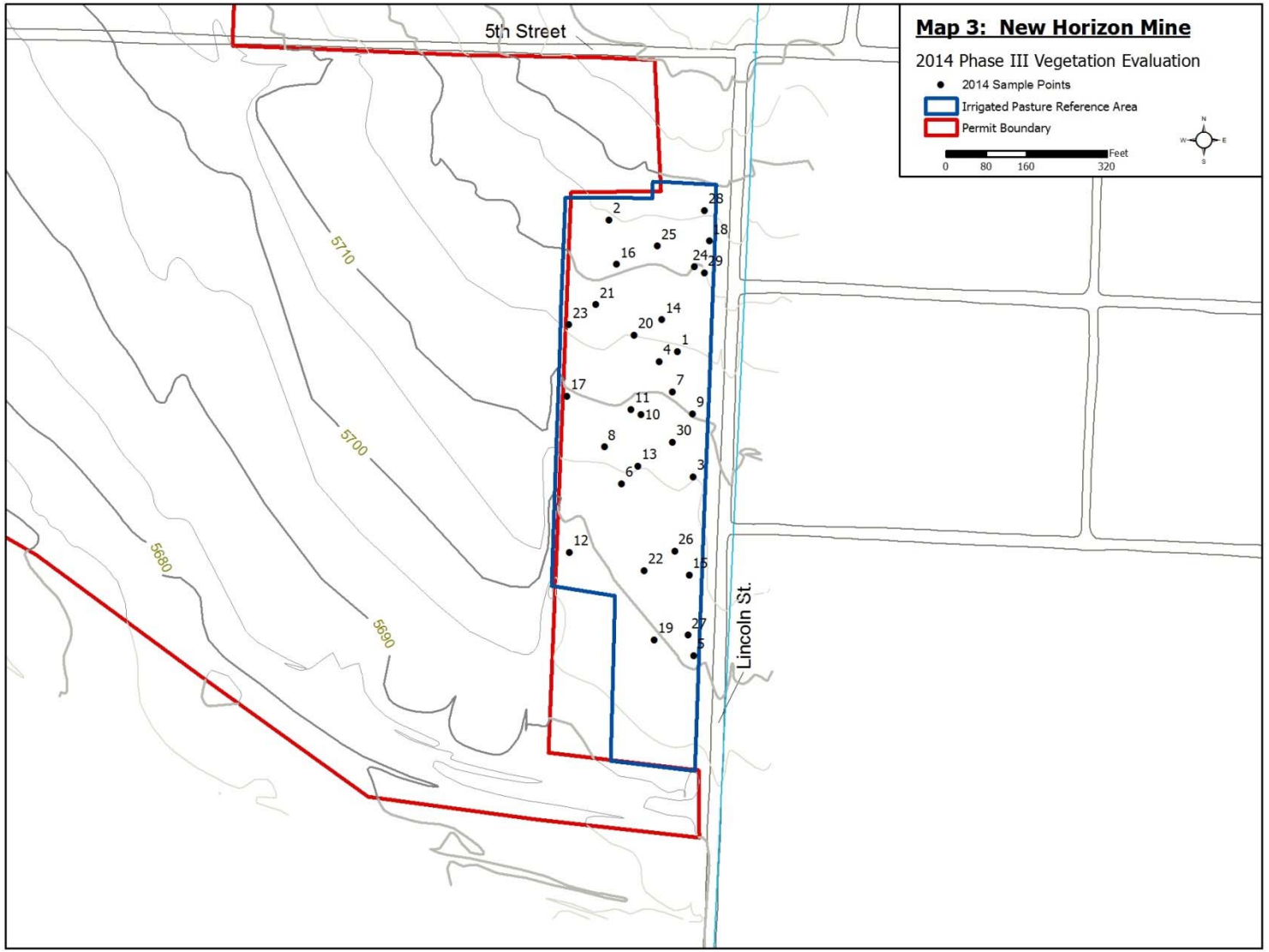
Map 3: New Horizon Mine
2014 Phase III Vegetation Evaluation
2014 Sample Points
Irrigated Pasture Reference Area
Permit Boundary
Feet
0 80 160 320
5th Street
Lincoln St.
5710
5700
5690
5680
2
28
25
18
16
24
29
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14
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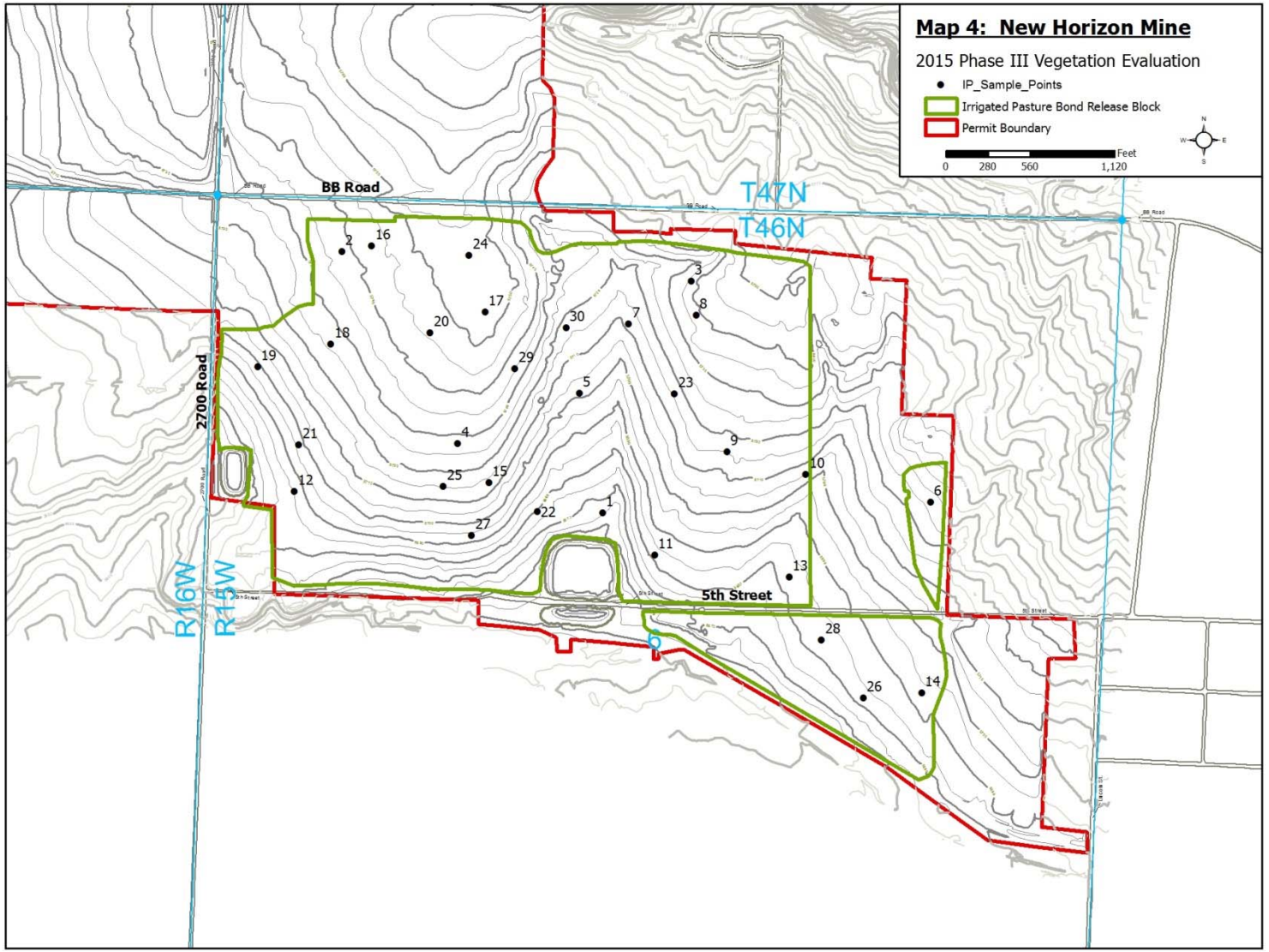
Map 4: New Horizon Mine
2015 Phase III Vegetation Evaluation
IP_Sample_Points
Irrigated Pasture Bond Release Block
Permit Boundary
Feet
0 280 560 1,120
BB Road
T47N
T46N
2700 Road
5th Street
R16W
R15W
1
2
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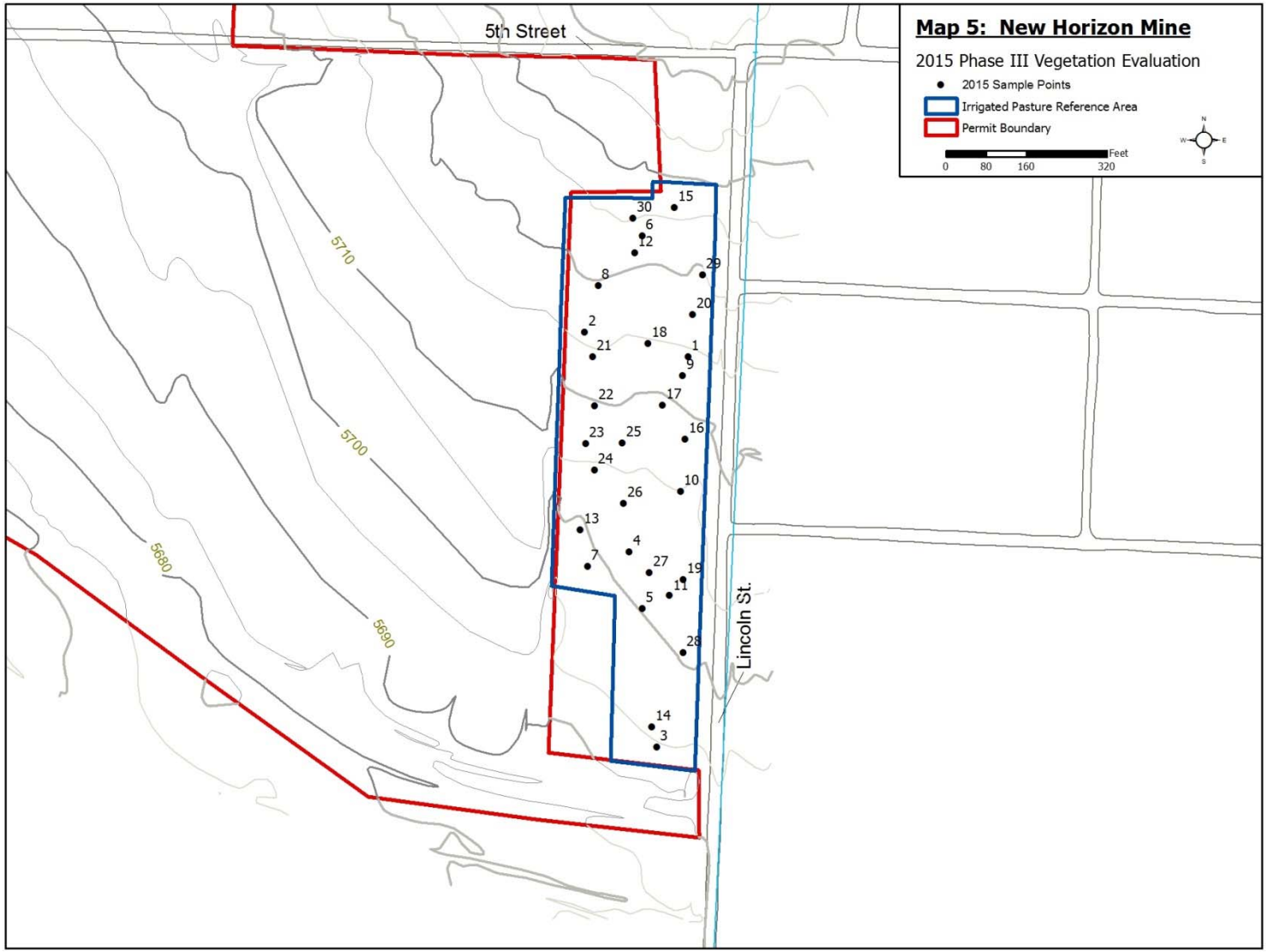
Map 5: New Horizon Mine
2015 Phase III Vegetation Evaluation
2015 Sample Points
Irrigated Pasture Reference Area
Permit Boundary
Feet
0 80 160 320
5th Street
Lincoln St.
5710
5700
5690
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2.0 METHODOLOGY FOR VEGETATION SAMPLING / COMPARISON METHODS

2.1 Sample Site Selection / Location

The sample layout protocol for revegetation evaluations in 2014 and 2015 followed procedures described in permit section 2.05.4(2)(e). A total of 15 cover or 30 production sample sites for each Bond Release Block or Reference Area were randomly determined using computer software. The generated coordinates were then loaded into the GPS unit to facilitate sample site location in the field. At each sample site, the transect orientation was determined by a random number generator based on the degrees of the compass (1 to 360 degrees). Once the transect orientation was determined, a 50-meter long tape was then laid out across the site. All transects were kept within the designated sample unit boundaries. When a transect alignment would require crossing a sample unit boundary, the transect line was backed up until it was completely within the sample unit boundary.

2.2 Determination of Ground Cover

Ground cover was evaluated in accordance with Rule 4.15.11 (1) (a) (i) by sampling along a 50-meter transect tape on the Bond Release Block and Irrigated Pasture Reference Area. A 50-meter transect is the standard length, however, a 10-meter transect may be used when evaluating small areas to limit overlapping transects. Along the transect, a total of ten randomly selected intervals were used as the setup locations for sampling plant cover. In 2014, an inclined metal ten-point frame, one meter in height, was positioned perpendicular to the tape at each designated setup location. In 2015, a laser bar was used in lieu of the metal ten-point frame. Random even numbered setup locations were sampled on the right-hand side of the tape and odd numbered setup locations were sampled on the left-hand side of the tape. A sharpened metal rod was dropped, or laser pointer used, at ten-centimeter intervals along the ten-point frame, one meter in width. Each time the rod was dropped or laser pointed, the plant species encountered by the rod or laser was recorded. In this manner, a total of 100 intercepts per transect were recorded resulting in 1 percent cover per intercept. If no plant cover was encountered, then the observation was recorded as to the presence of plant litter, rock, bare ground, lichens or cryptogams. Plant material produced in each respective growing season which was still attached to the plant was considered as living plant material whereas all plant material produced in prior years, which was dead or which had fallen to the ground was considered to be litter.

2.3 Determination of Current Annual Production

In 2014 and 2015, along each randomly located transect, randomly located one-quarter square meter quadrat (or larger) were clipped and bagged by lifeform. For each area evaluated, a minimum of 30 forage production transects were collected. From within each quadrat, all above ground current annual vegetation within the vertical boundaries of the frame were clipped and bagged separately by life form as follows:

Desirable Perennial Grass	*Desirable Perennial Forb*
Annual Grass	*Annual Forb*
Sub-shrubs	*Noxious Weeds (if found)*

All production samples were returned to the lab for drying and weighing. In 2014, air dry weights were recorded and are presented in this report. In 2015, drying was conducted in an oven at 105° C until a stable weight was achieved (24 hours). Samples were then weighed to the nearest 0.1 gram.

2.4 Sample Adequacy Determination

Sampling within each unit (Reference Area or Phase III Bond Release Block) was conducted to a minimum of 15 cover or 30 production samples. From these preliminary efforts, sample means and standard deviations for total non-overlapping vegetation ground cover were calculated. The Cochran formula (below) for determining sample adequacy was used to calculate $\mathbf{n_{min}}$, whereby the population is estimated to within 10% of the true mean (μ) with 90% confidence.

When the inequality ($\mathbf{n_{min}} \leq \mathbf{n}$) is true, sampling is deemed adequate; and $\mathbf{n_{min}}$ is determined as follows:

$$\mathbf{n_{min} = (t^2 s^2) / (0.1 \bar{X})^2}$$

where: n = the number of actual samples collected (initial size = 15 or 30)

t = the value from the one-tailed t distribution for 90% confidence with n-1 degrees of freedom;

s^2 = the variance of the estimate as calculated from the initial samples;

$\bar{X}$ = the mean of the estimate as calculated from the initial samples.

If the initial samples do not provide a suitable estimate of the mean (i.e., the inequality is false), a reverse null success evaluation which does not require adequacy would be employed (Rule 4.15.11 (2)(c)). Sample adequacy results are presented on Table 1.

Table 1 Sample Adequacy Table

		Ground Cover		Production	
		Phase III Bond Release Block	Reference Areas	Phase III Bond Release Block	Reference Areas
2014	**Mean =**	91.9	75.1	101.6	74.7
	Variance =	13.6	16.2	1945.3	1356.6
	n =	15	15	30	30
	n_{min} =	0.28	0.49	32.4	41.8
		Ground Cover		**Production**	
		Phase III Bond Release Block	Reference Areas	Phase III Bond Release Block	Reference Areas
2015	**Mean =**	90.5	90.5	114.0	107.2
	Variance =	37.5	31.5	757.1	1188.9
	n =	30	30	30	30
	n_{min} =	0.8	0.7	10.0	17.8

2.5 Success Evaluation

Success evaluations involve a direct comparison and, where necessary, statistical testing of the ground cover, production, and forage quality parameters. In the case of ground cover and production, comparisons are made against reference area data of the same year.

3.0 RESULTS

3.1 2014 Vegetation Evaluation Results

3.1.1 Irrigated Pasture - Phase III Bond Release Block

A total of 17 plant species were encountered within the Irrigated Pasture Phase III Bond Release Block evaluated in 2014 (Table 2). Ground cover in the Irrigated Pasture Phase III Bond Release Block (Chart 1 and Table 2) consisted of 91.93% live vegetation, 5.13% rock, 2.53% litter, and bare ground exposure of 0.40%. Desirable perennial cover across the unit averaged 88.60%, with annual and biennial cover averaging 0.40% absolute cover. Noxious weed cover was 2.93%. Dominant taxa were meadow brome (*Bromus biebersteinii*) and alfalfa (*Medicago sativa*) with 42.27% and 19.20% average cover, respectively. Current annual herbaceous production across the Phase III area averaged 3,619.8 pounds per acre based on air-dry samples (Table 3). Desirable perennial vegetation contributed 3,619.8 pounds per acre in 2014 (Table 3 and Chart 2). Undesirable forage was not clipped in 2014.

3.1.2 Irrigated Pasture - Reference Area

A total of 22 plant species were encountered within the Irrigated Pasture Reference Area evaluated in 2014 (Table 2). Ground cover in the Irrigated Pasture Reference Area (Chart 1 and Table 2) consisted of 75.07% live vegetation, 0.00% rock, 22.73% litter, and bare ground exposure of 2.20%. Desirable perennial cover across the unit averaged 71.00%, with annual and biennial cover averaging 0.67% absolute cover. Noxious weed cover was 3.40%. Dominant taxa were tall fescue (*Festuca arundinacea*) and Alsike clover (*Trifolium hybridum*) with 31.67% and 12.67% average cover, respectively. Current annual herbaceous production across the Reference Area averaged 2,661.2 pounds per acre based on air-dry samples (Table 3). Desirable perennial vegetation contributed 2,661.2 pounds per acre in 2014 (Table 3 and Chart 2). Undesirable forage was not clipped in 2014.

3.2 2015 Vegetation Evaluation Results

3.2.1 Irrigated Pasture - Phase III Bond Release Block

A total of 16 plant species were encountered within the Irrigated Pasture Phase III Bond Release Block evaluated in 2015 (Table 2). Ground cover in the Irrigated Pasture Phase III Bond Release Block (Chart 1 and Table 2) consisted of 90.47% live vegetation, 0.03% rock, 7.10% litter, and bare ground exposure of 2.40%. Desirable perennial cover across the unit averaged 89.47%, with annual and biennial cover averaging 0.17% absolute cover. Noxious weed cover was 0.67%. Dominant taxa were meadow brome and orchardgrass (*Dactylis glomerata*) with 42.37% and 19.40% average cover, respectively. Current annual herbaceous production across the Phase III area averaged 2,057.4 pounds per acre based on oven-dry samples (Table 3). Desirable perennial vegetation contributed 2,030.4 pounds per acre in 2015 (Table 3 and Chart 2).

3.2.2 Irrigated Pasture - Reference Area

A total of 19 plant species were encountered within the Irrigated Pasture Reference Area evaluated in 2015 (Table 2). Ground cover in the Irrigated Pasture Reference Area (Chart 1 and Table 2) consisted of 90.53% live vegetation, 0.00% rock, 6.83% litter, and bare ground exposure of 2.63%. Desirable perennial cover across the unit averaged 89.50%, with annual and biennial cover averaging 0.73% absolute cover. Noxious weeds cover was 0.30% absolute. Dominant taxon was tall fescue with 41.93% average cover. Current annual herbaceous production across the Reference Area averaged 1,992.2 pounds per acre based on air-dry samples (Table 3). Desirable perennial vegetation contributed 1,909.4 pounds per acre in 2015 (Table 3 and Chart 2).

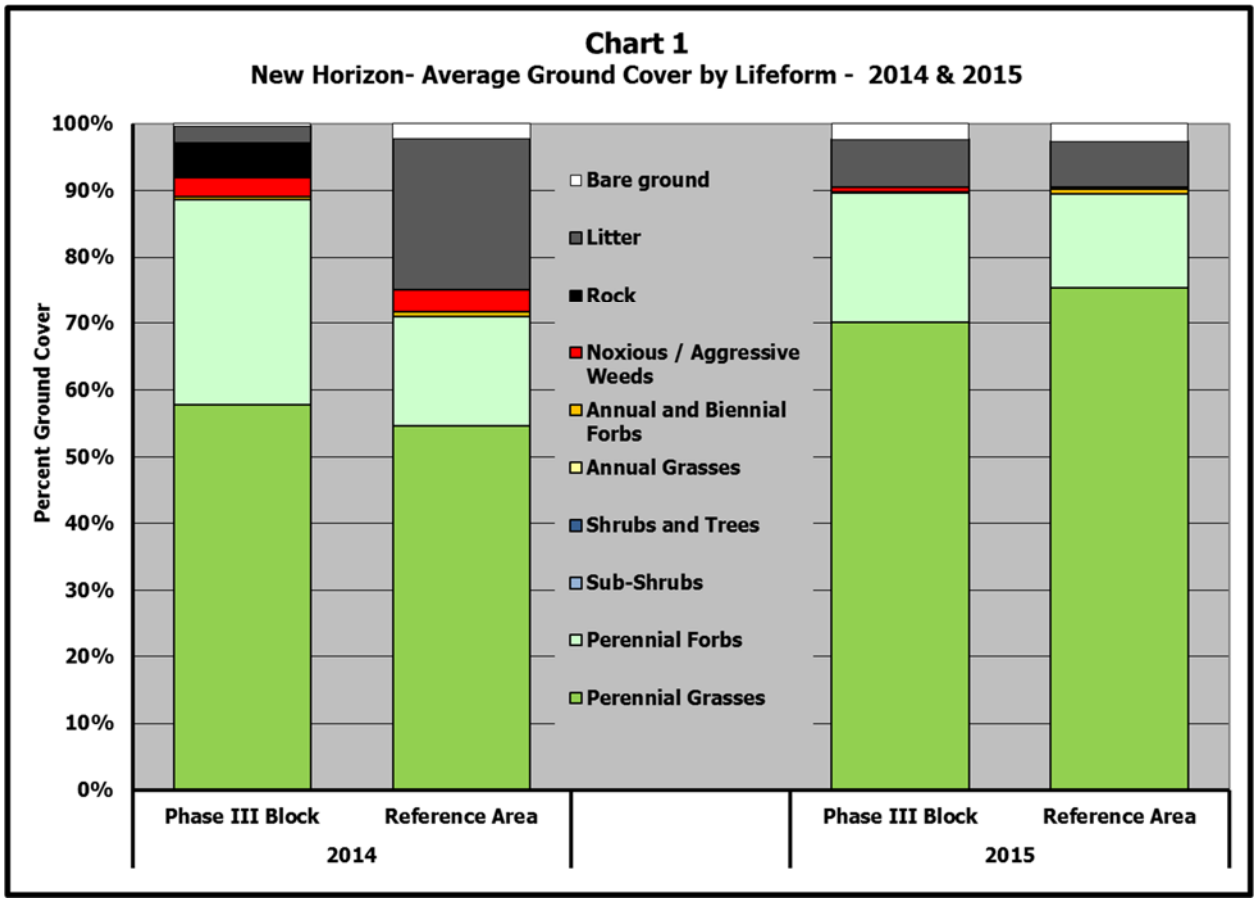


Table 2 New Horizon - Vegetation Cover - 2014 & 2015

Average Ground Cover Summary

Percent Ground Cover Based on Point-Intercept Sampling

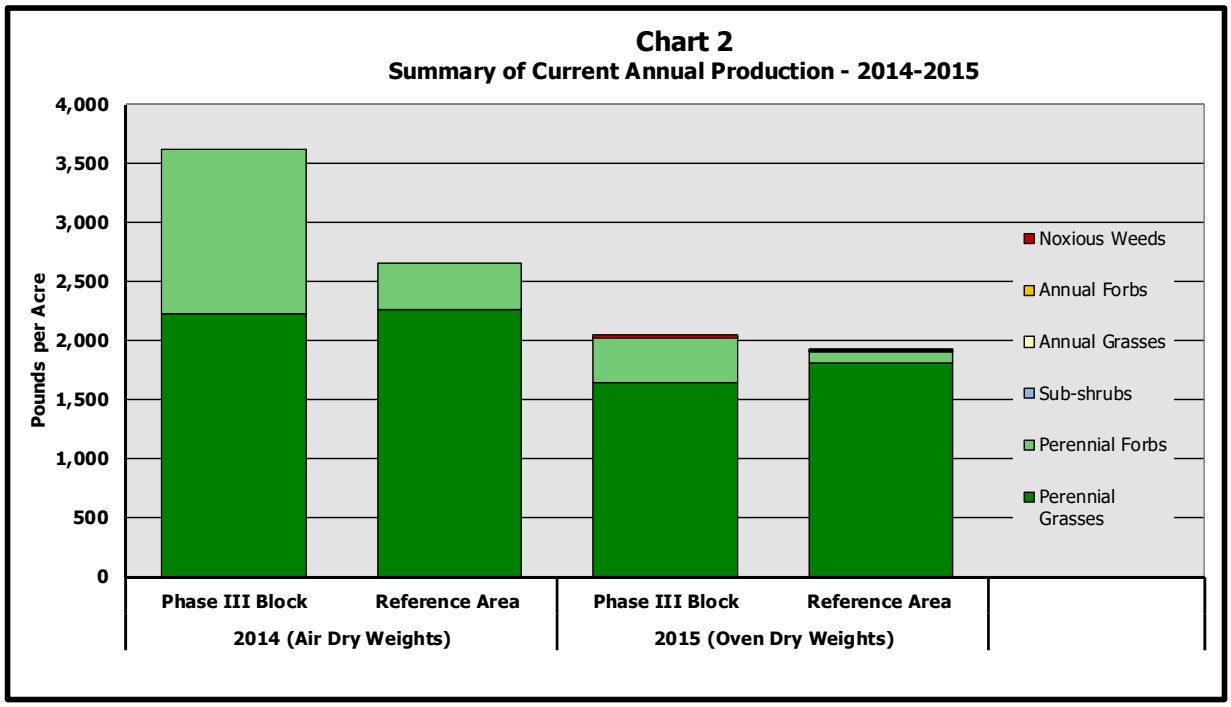
				Area -->	Phase III	Reference Area	Phase III	Reference Area
				Year -->	2014	2014	2015	2015
Grasses and Grass-likes								
Nx	P	*Agropyron repens*	Quackgrass		1.47	2.93	-	-
I	P	*Alopecurus pratensis*	Meadow Foxtail		-	0.20	-	-
I	P	*Bromus biebersteinii*	Meadow Brome		42.27	1.00	42.37	1.27
I	P	*Bromus inermis*	Smooth Brome		-	0.47	-	-
Nx	A	*Bromus tectorum*	Cheatgrass		-	0.13	-	0.03
N	P	*Carex microptera*	Small-wing Sedge		-	5.93	-	4.33
I	P	*Dactylis glomerata*	Orchardgrass		5.67	1.13	19.40	9.43
I	P	*Elymus junceus*	Russian Wildrye		0.07	-	-	-
I	P	*Festuca arundinacea*	Tall Fescue		4.33	31.67	3.83	41.93
N	P	*Hordeum jubatum*	Foxtail Barley		0.13	-	-	-
N	P	*Juncus balticus*	Baltic Rush		-	5.93	-	4.37
I	P	*Phleum pratense*	Timothy		0.07	0.07	-	1.10
I	P	*Poa compressa*	Canada Bluegrass		-	-	4.30	9.97
N	P	*Poa palustris*	Fowl Bluegrass		-	0.13	-	-
I	P	*Poa pratensis*	Kentucky Bluegrass		5.20	8.07	0.17	2.97
Forbs								
NX	P	*Cardaria draba*	Whitetop		-	-	0.20	-
Nx	P	*Centaurea repens*	Russian Knapweed		0.07	-	-	-
Nx	P	*Convolvulus arvensis*	Bindweed		1.40	0.33	0.67	0.27
N	A	*Descurainia pinnata*	Pinnate Tansymustard		-	-	0.03	-
Nx	B	*Erodium cicutarium*	Redstem Filaree		0.40	0.27	-	0.13
N	B	*Grindelia squarrosa*	Curlycup Gumweed		-	-	0.10	0.07
I	P	*Lotus corniculatus*	Bird's-foot Trefoil		0.60	-	0.77	0.33
I	A	*Medicago lupulina*	Black Medic		-	0.40	-	0.53
I	P	*Medicago sativa*	Alfalfa		19.20	0.80	10.93	2.53
I	P	*Plantago lanceolata*	Buckhorn Plantain		6.53	1.40	-	-
I	P	*Plantago major*	Common Plantain		-	0.13	4.73	0.70
I	P	*Rumex crispus*	Curly Dock		-	0.27	0.03	0.10
I	P	*Taraxacum officinale*	Dandelion		3.73	1.07	2.70	1.00
I	P	*Trifolium fragiferum*	Strawberry Clover		0.53	0.07	-	-
I	P	*Trifolium hybridum*	Alsike Clover		0.27	12.67	-	-
I	P	*Trifolium pratense*	Red Clover		-	-	0.03	-
I	P	*Trifolium repens*	White Clover		-	-	0.20	9.47
Sub-Shrubs								
		None			-	-	-	-
Shrubs & Trees								
		None			-	-	-	-
				Total Plant Cover	**91.93**	**75.07**	**90.47**	**90.53**
				Rock	5.13	-	0.03	-
				Litter	2.53	22.73	7.10	6.83
				Bare ground	0.40	2.20	2.40	2.63
				Desirable Perennial Cover (excluding noxious weeds)	**88.60**	**71.00**	**89.47**	**89.50**
Summary by Lifeform:								
				Perennial Grasses	**57.73**	**54.60**	**70.07**	**75.37**
				Annual Grasses	-	-	-	-
				Perennial Forbs	**30.86**	**16.40**	**19.40**	**14.13**
				Annual and Biennial Forbs	0.40	0.67	0.17	0.73
				Noxious / Aggressive Weeds	2.93	3.40	0.67	0.30
				Sub-Shrubs	**-**	**-**	**-**	**-**
				Shrubs and Trees	**-**	**-**	**-**	**-**
Sample Adequacy Calculations:								
				Mean =	**91.93**	**75.07**	**90.47**	**90.53**
				Variance =	**13.64**	**16.21**	**37.50**	**31.50**
				n =	**15**	**15**	**30**	**30**
				n_{min} =	**0.28**	**0.49**	**0.79**	**0.66**

Table 3 New Horizon - Vegetation Production - 2014 - 2015

Production Summary

Pounds (lbs) per Acre

	Area	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual Forbs*	*Noxious Weeds*	TOTAL	
								lbs / ac	Desirable lbs / ac
2014	Phase III Block	2,230.0	1,389.8	-	-	-	-	**3,619.8**	**3,619.8**
	Reference Area	2,262.4	398.9	-	-	-	-	**2,661.2**	**2,661.2**
2015	Phase III Block	1,650.1	380.3	-	0.2	3.1	23.7	**2,057.4**	**2,030.4**
	Reference Area	1,808.8	100.6	-	2.6	5.8	4.5	**1,922.2**	**1,909.4**



4.0 SUCCESS COMPARISON

4.1 Ground Cover

The demonstration of adequacy and a minimum of 15 transects in each unit (Table 1 and Table 2) allow for a direct comparison for perennial cover per Rule 4.15.11 (2)(a). Chart 3 displays the results from ground cover sampling in 2014, and reveals that the Irrigated Pasture Phase III Bond Release Block exceeds the reference area comparison with 88.60% perennial cover versus the 63.90% perennial cover standard (90% of 71.00%).

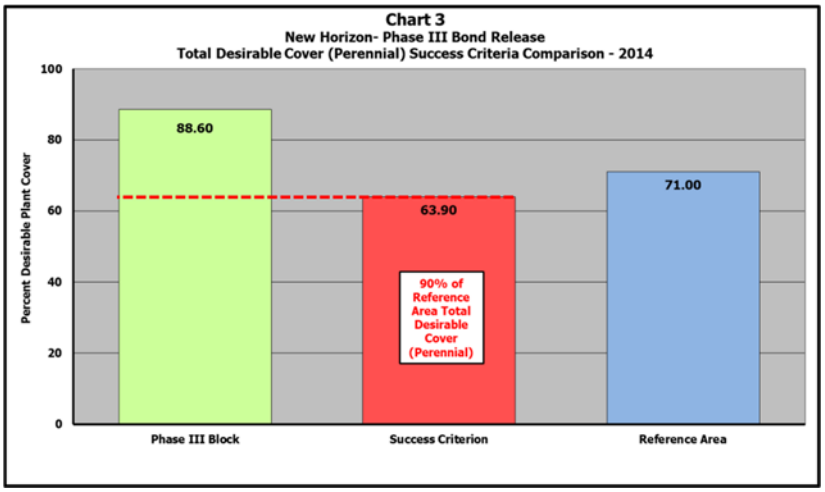
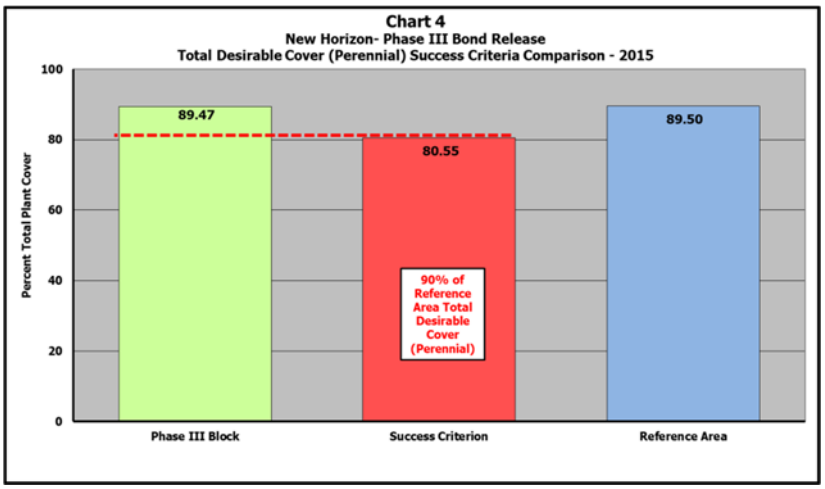


Chart 4 displays the results from ground cover sampling in 2015, and reveals that the Irrigated Pasture Phase III Bond Release Block exceeds the reference area comparison with 89.47% perennial cover versus the 80.55% perennial cover standard (90% of 89.50%).



4.2 Production

For Irrigated Pasture bond release production comparisons, permit section 2.05.4(2)(e) specifies that a soil type correction factor must be applied to mean production for the Irrigated Pasture reference area to allow for variation in productivity of different soil types. For the Irrigated Pasture Phase III Bond Release Block, the Soil Adjustment Factor was calculated based on the acres of each soil type in the reclaimed area tract, and the soil productivity factor associated with the soil types (Table 4).

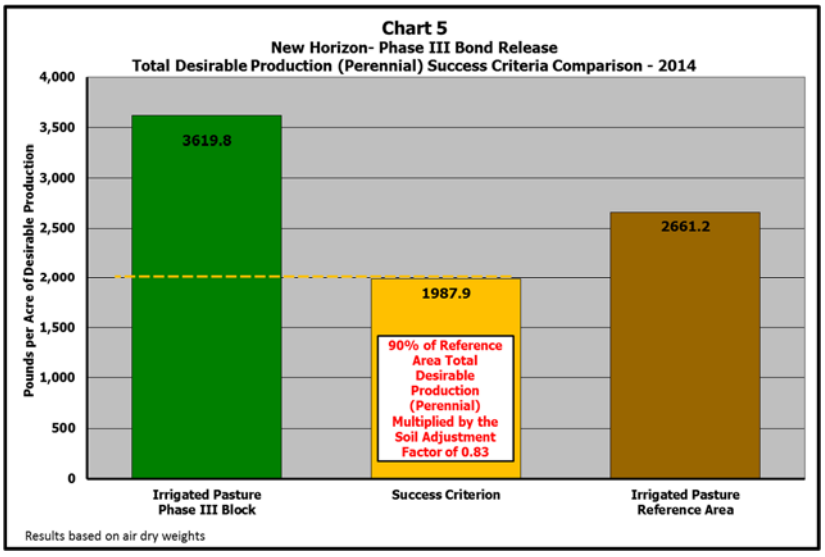
Table 4 Soil Adjustment Factor

Soil	Acreage	Relative Acreage	Assigned Production Factor	Weighted Index
10	36.4	16%	1.0	0.16
77	100.2	44%	0.8	0.36
78	59.5	26%	0.7	0.18
81	29.7	13%	1.0	0.13
			Soil Adjustment Factor =	**0.83**

To calculate the Soil Adjustment Factor, the acreages were tabulated by overlaying the Irrigated Pasture Phase III reclamation parcels on the NRCS Soil Survey to represent pre-mining soils. Assigned Production Factors for each soil were obtained from Jim Boyd's October 2, 2007 letter found in Attachment 2.05.4(2)(e) – 11 of the permit. Jim Boyd, the local NRCS representative, reviewed the capability of all soils in the reclaimed area and assigned a relative factor to each of these soils. The adjustment procedure elevates the production success standard in situations where pre-mining soils were potentially more productive than reference area soils, and lowers the standard in situations where pre-mine soils were on average potentially less productive than reference area soils.

In 2014, a minimum of 30 quadrats were sampled in each unit but sample adequacy was not achieved (Sample Adequacy Table presented above). Per Rule 4.15.8, a Reverse Null Hypothesis t-test must be used to demonstrate success. Statistical testing results are found on Table 5. Chart 5 displays the results from production sampling in 2014, and reveals that the Irrigated Pasture Phase III Bond Release Block exceeds the reference area comparison with 3,619.8 pounds per acre of desirable perennial production versus the 1,987.9 pounds per acre desirable perennial production standard (90% of 2,661.2 times the Soil Adjustment Factor of 0.83).

Table 5 - New Horizon Statistical Testing 2014 Production Success Evalutation (Reverse Null Hypothesis t-test)			
	Phase III Bond Release Block	**Reference Area**	
n	30	30	
Mean	3619.82	2661.23	
Standard Deviation	1571.40	1312.24	
IP Reference Area Total Desirable Production, Adjusted for Soil Type	2208.82		**Pass** $t_c > t_t$
IP Reference Area Q (90% of Reference Area Mean, Adjusted for Soil Type)	1987.94		
Standard Error of the Mean	286.90		
Degrees of Freedom	29		
t_c	5.69		
t_t	0.85		
Hypotheses	H_0: Mean of P3 ≤ (0.9*Mean of RA) H_A: Mean of P3 > (0.9*Mean of RA)		
Decision Rule	If $t_c > t_t$, then H_0 is rejected and reclamation is deemed successful.		
Results based on air-dryed weights			



The demonstration of adequacy and a minimum of 30 quadrats in each unit (Sample Adequacy Table presented above) allow for a direct comparison for desirable perennial production per Rule 4.15.11 (2)(a). Chart 6 displays the results from production sampling in 2015, and reveals that the Irrigated Pasture Phase III Bond Release Block exceeds the reference area comparison with 2,030.4 pounds per acre of desirable perennial production versus the 1,426.3 pounds per acre desirable perennial production standard (90% of 1,909.4 times the Soil Adjustment Factor of 0.83).

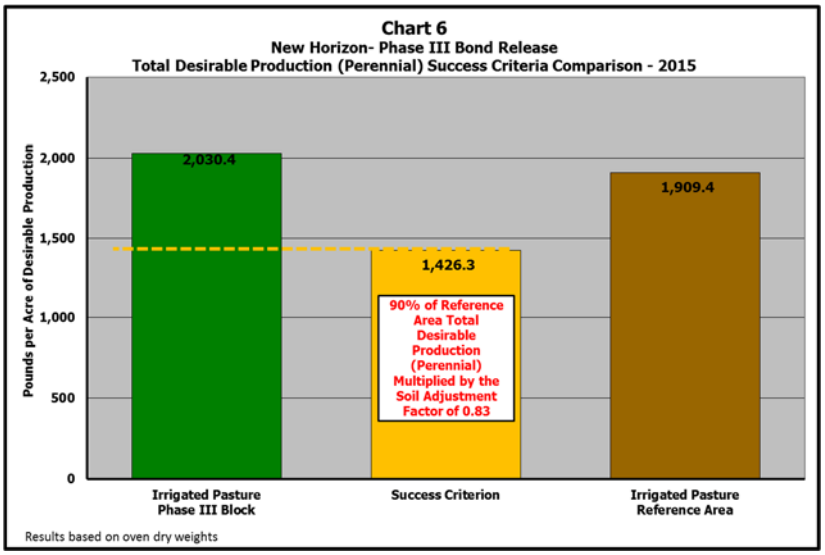


Chart 6
New Horizon- Phase III Bond Release
Total Desirable Production (Perennial) Success Criteria Comparison - 2015
Pounds per Acre of Desirable Production
2,500
2,000
1,500
1,000
500
0
2,030.4
1,426.3
1,909.4
90% of Reference Area Total Desirable Production (Perennial) Multiplied by the Soil Adjustment Factor of 0.83
Irrigated Pasture Phase III Block
Success Criterion
Irrigated Pasture Reference Area
Results based on oven dry weights

4.3 Forage Quality

The forage quality standard states that at least 75% of the relative forage will be comprised of seeded species or species of comparable quality as livestock forage. The results of forage quality testing for 2014 and 2015 are presented on Table 6. The Irrigated Pasture Phase III Bond Release Block exceeds the standard for forage quality for both 2014 and 2015.

Table 6 Forage Quality - 2014 & 2015

		2014 Results (%)	Relative Cover	Test Result	2015 Results (%)	Relative Cover	Test Result
Desirable Cover	Perennial Grasses	57.7%	96.4%	**Pass >75%**	70.1%	99.1%	**Pass >75%**
	Perennial Forbs	30.9%			19.4%		
Undesirable Cover	Sub-shrubs	-	0.4%		-	0.2%	
	Annual Grasses	-			-		
	Annual Forbs	0.4%			0.2%		
Noxious Weeds	Noxious Weeds	2.9%	3.2%		0.7%	0.7%	
Total		**91.9%**	**100.0%**		**90.3%**	**100.0%**	

5.0 CONCLUSION

It has been at least 10 years since the last seeding effort on the Irrigated Pasture Phase III Bond Release Block. Revegetation evaluation in 2014 and 2015 revealed that the Irrigated Pasture Phase III Bond Release Block exceeds all applicable performance standards from the New Horizon permit.

6.0 LITERATURE CITED

Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) database for San Miguel Area, Colorado, Parts of Delores, Montrose and San Miguel Counties. Published December 30, 2013.

New Horizon 2 Mine. Permit Number C-1987-008. Section 2.05.4.

Weber, W.A. and Wittman, R.C., 1996. Colorado Flora: Western Slope - Revised Edition. University Press of Colorado. 496 p

Appendix A

Tables

Appendix A List of Tables

Table A1 New Horizon - Vegetation Cover - 2014

Irrigated Pasture - Phase III Bond Release Block

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.——>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																					
Nx	P	*Agropyron repens*	Quackgrass	1		2		9			1			5		2	2		**1.47**	**1.60**	**35**
I	P	*Bromus biebersteinii*	Meadow Brome	34	40	26	55	3	55	52	25	61	28	40	66	34	40	75	**42.27**	**45.98**	**75**
I	P	*Dactylis glomerata*	Orchardgrass	8	7	12		4	2		3	3	13	14	5	9	5		**5.67**	**6.16**	**60**
I	P	*Elymus junceus*	Russian Wildrye			1													**0.07**	**0.07**	**5**
I	P	*Festuca arundinacea*	Tall Fescue	10		11					37			4			3		**4.33**	**4.71**	**25**
N	P	*Hordeum jubatum*	Foxtail Barley					2											**0.13**	**0.15**	**5**
I	P	*Phleum pratense*	Timothy	1															**0.07**	**0.07**	**5**
I	P	*Poa pratensis*	Kentucky Bluegrass	4	4	1	1	33		2	6	1	6	9		7	4		**5.20**	**5.66**	**60**
Forbs																					
Nx	P	*Acoptilon repens*	Russian Knapweed					1											**0.07**	**0.07**	**5**
Nx	P	*Convolvulus arvensis*	Bindweed	2	1	5	1	5	3		1		1	1				1	**1.40**	**1.52**	**50**
I	B	*Erodium ciconium*	Common Stork's Bill						6										**0.40**	**0.44**	**5**
I	P	*Lotus corniculatus*	Bird's-foot Trefoil				1		5						3				**0.60**	**0.65**	**15**
I	P	*Medicago sativa*	Alfalfa	10	37	12	32	8	19	35	11	30	35		20	9	13	17	**19.20**	**20.88**	**70**
I	P	*Plantago lanceolata*	Buckhorn Plantain	16		14		27	2		2			9		13	14	1	**6.53**	**7.11**	**45**
I	P	*Taraxacum officinale*	Dandelion	3	6		3	4				1	4	15		13	7		**3.73**	**4.06**	**45**
I	P	*Trifolium fragiferum*	Strawberry Clover								4		3	1					**0.53**	**0.58**	**15**
I	P	*Trifolium hybridum*	Alsike Clover								1					2	1		**0.27**	**0.29**	**15**
Sub-Shrubs																					
		None																	**0.00**	**0.00**	**0**
Shrubs & Trees																					
		None																	**0.00**	**0.00**	**0**
																				Mean	
			Total Plant Cover	**89**	**95**	**84**	**93**	**96**	**92**	**89**	**91**	**96**	**90**	**98**	**94**	**89**	**89**	**94**		**91.93**	
			Rock	7	4	2	6	2	3	8	7	3	9	1	6	8	7	4		**5.13**	
			Litter	4	1	9	1	2	5	3	2	1	1	1	0	3	3	2		**2.53**	
			Bare ground	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0		**0.40**	
			Desirable Perennial Cover	**86**	**94**	**77**	**92**	**81**	**83**	**89**	**89**	**96**	**89**	**92**	**94**	**87**	**87**	**93**		**88.60**	

Sample Adequacy Calculations	**Plant Cover Mean = 91.93**	**t= 1.31**	**n = 30**
	Variance = 13.64		**n_{min} = 0.28**

Table A2 New Horizon - Vegetation Cover - 2014

Irrigated Pasture Reference Area

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.——>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																					
Nx	P	*Agropyron repens*	Quackgrass		8						21						15		**2.93**	**3.91**	**15**
I	P	*Alopecurus pratensis*	Meadow Foxtail			2										1			**0.20**	**0.27**	**10**
I	P	*Bromus biebersteinii*	Meadow Brome								15								**1.00**	**1.33**	**5**
I	P	*Bromus inermis*	Smooth Brome		1						1							7	**0.47**	**0.62**	**5**
Nx	A	*Bromus tectorum*	Cheatgrass																**0.13**	**0.18**	**10**
N	P	*Carex microptera*	Small-wing Sedge	1		24	11	1	1	7	3		10	5	9	14	3		**5.93**	**7.90**	**60**
I	P	*Dactylis glomerata*	Orchardgrass	1	15			1											**1.13**	**1.51**	**15**
I	P	*Festuca arundinacea*	Tall Fescue	54	34	4	37	53	29	32	22	36	19	20	57	16	26	36	**31.67**	**42.18**	**75**
N	P	*Juncus balticus*	Baltic Rush			9	3		13	13		3	14	18	2	13	1		**5.93**	**7.90**	**50**
I	P	*Phleum pratense*	Timothy													1			**0.07**	**0.09**	**5**
N	P	*Poa palustris*	Fowl Bluegrass						1					1					**0.13**	**0.18**	**10**
I	P	*Poa pratensis*	Kentucky Bluegrass	1	2	2	4	3	5	7	1	25	2	9	11	6	27	16	**8.07**	**10.75**	**75**
Forbs																					
Nx	P	*Convolvulus arvensis*	Bindweed		4						1								**0.33**	**0.44**	**10**
I	B	*Erodium ciconium*	Common Stork's Bill								4								**0.27**	**0.36**	**5**
I	A	*Medicago lupulina*	Black Medic				1	3		1								1	**0.40**	**0.53**	**20**
I	P	*Medicago sativa*	Alfalfa		8			1										3	**0.80**	**1.07**	**15**
I	P	*Plantago lanceolata*	Buckhorn Plantain		3			6	1		11								**1.40**	**1.87**	**20**
I	P	*Plantago major*	Common Plantain													1		1	**0.13**	**0.18**	**10**
I	P	*Rumex crispus*	Curly Dock		1				2					1					**0.27**	**0.36**	**15**
I	P	*Taraxacum officinale*	Dandelion	1			3	5	1	2		1	1				1	1	**1.07**	**1.42**	**45**
I	P	*Trifolium fragiferum*	Strawberry Clover													1			**0.07**	**0.09**	**5**
I	P	*Trifolium hybridum*	Alsike Clover	20		28	22	3	20	10		5	27	14		24	6	11	**12.67**	**16.87**	**60**
Sub-Shrubs																					
		None																	**0.00**	**0.00**	**0**
Shrubs & Trees																					
		None																	**0.00**	**0.00**	**0**
																			Mean		
			Total Plant Cover	**78**	**76**	**69**	**81**	**76**	**73**	**72**	**79**	**70**	**73**	**68**	**79**	**77**	**79**	**76**	**75.07**		
			Rock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0.00**		
			Litter	22	11	27	19	16	27	28	17	30	27	32	21	23	21	20	**22.73**		
			Bare ground	0	13	4	0	8	0	0	4	0	0	0	0	0	0	4	**2.20**		
			Desirable Perennial Cover	**78**	**63**	**69**	**80**	**73**	**73**	**71**	**52**	**70**	**73**	**68**	**79**	**77**	**64**	**75**	**71.00**		

Sample Adequacy Calculations	**Plant Cover Mean = 75.07**	**t= 1.31**	**n = 30**
	Variance = 16.21		**n_{min} = 0.49**

Table A3 New Horizon - Vegetation Cover - 2015

Irrigated Pasture - Phase III Bond Release Block

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.——>	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	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																																				
I	P	*Bromus biebersteinii*	Meadow Brome	27	36	39	25	60	39	26	51	57	34	54	15	60	68	16	49	66	50		73	13	27	55	49	33	20	57	59	31	82	**42.37**	**46.83**	**145**
I	P	*Dactylis glomerata*	Orchardgrass		22	26	22	2	40	46	9		5	16	63			17	8	23	25	69	11	78	1	1	13	23	30	6	17	9		**19.40**	**21.44**	**125**
I	P	*Festuca arundinacea*	Tall Fescue					10		3		5					8				1	11			2				20			55		**3.83**	**4.24**	**45**
I	P	*Poa compressa*	Canada Bluegrass	40	1	2	1					5	15	5	2			17			1			1	9	8		2	1	13	3		3	**4.30**	**4.75**	**90**
I	P	*Poa pratensis*	Kentucky Bluegrass													1									4									**0.17**	**0.18**	**10**
Forbs																																				
I	Nx	*Cardaria draba*	Whitetop													5										1								**0.20**	**0.22**	**10**
I	Nx	*Convolvulus arvensis*	Bindweed					1			1		2	2	1	2										1		2	1	4	3			**0.67**	**0.74**	**55**
N	A	*Descurainia pinnata*	Pinnate Tansymustard								1																							**0.03**	**0.04**	**5**
N	B	*Grindelia squarrosa*	Curlycup Gumweed																						3									**0.10**	**0.11**	**5**
I	P	*Lotus corniculatus*	Bird's-foot Trefoil			1			2			16	2													1					1			**0.77**	**0.85**	**30**
I	P	*Medicago sativa*	Alfalfa	7	30	17	7	12	6	11	23	2	10	16	6	14	10		26	5	14	14	6	3	1	13	31	19	10	4	5		6	**10.93**	**12.09**	**140**
I	P	*Plantago major*	Common Plantain	15			22	1	8		2		7	1	5			29					1		33	2		1	4	3	7		1	**4.73**	**5.23**	**85**
I	P	*Rumex crispus*	Curly Dock												1																			**0.03**	**0.04**	**5**
I	P	*Taraxacum officinale*	Dandelion			4	10	8	4	1	4			1		1		14	1			1	2					4	11	8	4	2	1	**2.70**	**2.98**	**90**
I	P	*Trifolium pratense*	Red Clover																											1				**0.03**	**0.04**	**5**
I	P	*Trifolium repens*	White Clover																														6	**0.20**	**0.22**	**5**
Sub-Shrubs																																				
		None																																**0.00**	**0.00**	**0**
Shrubs & Trees																																				
		None																																**0.00**	**0.00**	**0**
																																		Mean		
			Total Plant Cover	**89**	**89**	**89**	**87**	**94**	**99**	**87**	**91**	**85**	**75**	**95**	**93**	**83**	**86**	**93**	**84**	**94**	**91**	**95**	**93**	**95**	**80**	**82**	**93**	**84**	**97**	**96**	**99**	**97**	**99**	**90.47**		
			Rock	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0.03**		
			Litter	6	10	7	11	5	1	10	3	11	22	1	7	16	11	6	11	2	7	5	5	5	7	12	5	16	3	4	0	3	1	**7.10**		
			Bare ground	5	0	4	2	1	0	3	6	4	3	4	0	1	3	1	5	4	2	0	2	0	13	6	2	0	0	0	1	0	0	**2.40**		
			Desirable Perennial Cover	**89**	**89**	**89**	**87**	**93**	**99**	**87**	**89**	**85**	**73**	**93**	**92**	**76**	**86**	**93**	**84**	**94**	**91**	**95**	**93**	**95**	**77**	**80**	**93**	**82**	**96**	**92**	**96**	**97**	**99**	**89.47**		

Sample Adequacy Calculations	**Plant Cover Mean = 90.47**	**t= 1.31**	**n = 30**
	Variance = 37.50	**n_{min} = 0.79**	

Table A4 New Horizon - Vegetation Cover - 2015

Irrigated Pasture Reference Area

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.—>	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	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																																			
I	P	*Bromus biebersteinii*	Meadow Brome		2					1				1			6				3							5					20	**1.27**	**1.40**	**35**
Nx	A	*Bromus tectorum*	Cheatgrass					1																										**0.03**	**0.04**	**5**
N	P	*Carex microptera*	Small-wing Sedge	10			1		3	5		7		3	8	11						5					5	35	35	1			1	**4.33**	**4.79**	**70**
I	P	*Dactylis glomerata*	Orchardgrass	26	39			2			35				27			5			15		30	40	8			11			6	28	11	**9.43**	**10.42**	**70**
I	P	*Festuca arundinacea*	Tall Fescue	41	30	59	40	61	67	48	31	68	5	41	50	50	60	55	38	12	31	52	30	15	8	79	61		31	56	59	35	45	**41.93**	**46.32**	**145**
N	P	*Juncus balticus*	Baltic Rush							2			36			10			18	48									17					**4.37**	**4.82**	**30**
I	P	*Phleum pratense*	Timothy										30															3						**1.10**	**1.22**	**10**
I	P	*Poa compressa*	Canada Bluegrass	2	1		34	13	5	9	8	3		37	2	14	9	10	26	15		20		14	19	7	3		1	26	15		6	**9.97**	**11.01**	**120**
I	P	*Poa pratensis*	Kentucky Bluegrass															9			30		23			3	5	13	6					**2.97**	**3.28**	**35**
Forbs																																			
Nx	P	*Convolvulus arvensis*	Bindweed					1							2									4									3	**0.27**	**0.29**	**15**
I	B	*Erodium ciconium*	Common Stork's Bill					2							2																			**0.13**	**0.15**	**10**
N	B	*Grindelia squarrosa*	Curlycup Gumweed					1																1										**0.07**	**0.07**	**10**
I	P	*Lotus corniculatus*	Bird's-foot Trefoil																													10		**0.33**	**0.37**	**5**
I	A	*Medicago lupulina*	Black Medic			1	1										9			1							1				3		**0.53**	**0.59**	**30**
I	P	*Medicago sativa*	Alfalfa		7	2	4	2	1	3				8								5	3	13							9	12	7	**2.53**	**2.80**	**65**
I	P	*Plantago major*	Common Plantain		1			3			7						2	1		1				3								2	1	**0.70**	**0.77**	**45**
I	P	*Rumex crispus*	Curly Dock																1							2								**0.10**	**0.11**	**10**
I	P	*Taraxacum officinale*	Dandelion	1		2					3	1		1		2	5			4	1	1	1	2			2		3	1				**1.00**	**1.10**	**75**
I	P	*Trifolium repens*	White Clover	16		25	16			25	1	19	25	1		1			17	16	11	10			54		14	29	2			2		**9.47**	**10.46**	**90**
Sub-Shrubs																																			
		None																																**0.00**	**0.00**	**0**
Shrubs & Trees																																			
		None																																**0.00**	**0.00**	**0**
																																		Mean		
			Total Plant Cover	**96**	**80**	**89**	**96**	**86**	**76**	**93**	**85**	**98**	**96**	**92**	**89**	**88**	**91**	**80**	**100**	**97**	**91**	**93**	**87**	**92**	**89**	**91**	**91**	**96**	**95**	**84**	**92**	**89**	**94**	**90.53**		
			Rock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0.00**		
			Litter	1	9	10	3	13	10	7	6	1	4	8	7	11	6	13	0	3	5	7	12	6	11	8	9	4	2	14	7	4	4	**6.83**		
			Bare ground	3	11	1	1	1	14	0	9	1	0	0	4	1	3	7	0	0	4	0	1	2	0	1	0	0	3	2	1	7	2	**2.63**		
			Desirable Perennial Cover	**96**	**80**	**88**	**95**	**81**	**76**	**93**	**85**	**98**	**96**	**92**	**87**	**88**	**82**	**80**	**100**	**96**	**91**	**93**	**87**	**87**	**89**	**91**	**90**	**96**	**95**	**84**	**89**	**89**	**91**	**89.50**		

Sample Adequacy Calculations	**Plant Cover Mean = 90.53**	**t= 1.31**	**n = 30**
	Variance = 31.50	**n_{min} = 0.66**	

Table A5 New Horizon - Vegetation Production - 2014

Irrigated Pasture - Phase III Block

Air Dry Weight (grams per 1/4 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL		TOTAL DESIRABLE	
							g/0.25m^2	lbs / ac	g/0.25m^2	lbs / ac
1	36.8	9.8					**46.6**	**1,659.2**	**46.6**	**1,659.2**
2	47.1	38.3					**85.4**	**3,042.6**	**85.4**	**3,042.6**
3	44.3	4.1					**48.4**	**1,725.5**	**48.4**	**1,725.5**
4	62.6	52.1					**114.7**	**4,086.5**	**114.7**	**4,086.5**
5	26.8	14.3					**41.1**	**1,464.3**	**41.1**	**1,464.3**
6	50.5	19.5					**70.1**	**2,496.1**	**70.1**	**2,496.1**
7	61.3	48.9					**110.1**	**3,923.7**	**110.1**	**3,923.7**
8	47.0	24.5					**71.5**	**2,546.3**	**71.5**	**2,546.3**
9	164.6	45.2					**209.8**	**7,473.7**	**209.8**	**7,473.7**
10	81.7	40.7					**122.4**	**4,360.9**	**122.4**	**4,360.9**
11	47.6	19.1					**66.7**	**2,375.3**	**66.7**	**2,375.3**
12	51.0	40.9					**92.0**	**3,276.4**	**92.0**	**3,276.4**
13	38.6	40.8					**79.4**	**2,828.9**	**79.4**	**2,828.9**
14	48.8	28.9					**77.7**	**2,767.2**	**77.7**	**2,767.2**
15	54.2	72.5					**126.7**	**4,515.1**	**126.7**	**4,515.1**
16	81.5	16.3					**97.8**	**3,483.3**	**97.8**	**3,483.3**
17	89.3	34.6					**123.8**	**4,412.2**	**123.8**	**4,412.2**
18	44.2	38.9					**83.1**	**2,959.6**	**83.1**	**2,959.6**
19	81.6	59.5					**141.1**	**5,027.1**	**141.1**	**5,027.1**
20	40.2	58.3					**98.5**	**3,509.4**	**98.5**	**3,509.4**
21	133.2	73.6					**206.8**	**7,368.9**	**206.8**	**7,368.9**
22	31.7	27.2					**58.8**	**2,096.4**	**58.8**	**2,096.4**
23	77.0	65.1					**142.1**	**5,063.8**	**142.1**	**5,063.8**
24	94.1	58.7					**152.8**	**5,442.9**	**152.8**	**5,442.9**
25	22.9	11.5					**34.5**	**1,227.7**	**34.5**	**1,227.7**
26	48.4	76.9					**125.3**	**4,464.2**	**125.3**	**4,464.2**
27	30.3	63.6					**93.9**	**3,345.5**	**93.9**	**3,345.5**
28	42.8	14.6					**57.4**	**2,045.0**	**57.4**	**2,045.0**
29	92.2	27.3					**119.5**	**4,256.5**	**119.5**	**4,256.5**
30	105.5	44.7					**150.2**	**5,350.3**	**150.2**	**5,350.3**
Average	**62.6**	**39.0**	**0.0**	**0.0**	**0.0**	**0.0**	**101.6**	**3619.8**	**101.6**	**3619.8**

Sampling Adequacy: **t = 1.311** **var. = 1945.329**

n= 30 **Mean = 101.60** **n_{min} = 32.411**

Table A6 New Horizon - Vegetation Production - 2014

Irrigated Pasture - Reference Area

Air Dry Weight (grams per 1/4 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL		TOTAL DESIRABLE	
							g/0.25m^2	lbs / ac	g/0.25m^2	lbs / ac
1	59.1	20.8					**79.9**	**2,845.6**	**79.9**	**2,845.6**
2	31.6	6.8					**38.4**	**1,367.0**	**38.4**	**1,367.0**
3	49.2	11.6					**60.8**	**2,165.1**	**60.8**	**2,165.1**
4	133.9	5.8					**139.7**	**4,976.2**	**139.7**	**4,976.2**
5	47.7	15.2					**62.9**	**2,239.9**	**62.9**	**2,239.9**
6	77.3	13.3					**90.6**	**3,227.9**	**90.6**	**3,227.9**
7	154.6	6.4					**161.1**	**5,738.2**	**161.1**	**5,738.2**
8	55.1						**55.1**	**1,963.1**	**55.1**	**1,963.1**
9	120.4	10.9					**131.3**	**4,676.9**	**131.3**	**4,676.9**
10	110.7	20.5					**131.2**	**4,675.5**	**131.2**	**4,675.5**
11	77.5	10.7					**88.2**	**3,143.5**	**88.2**	**3,143.5**
12	88.2						**88.2**	**3,143.5**	**88.2**	**3,143.5**
13	82.7	9.6					**92.3**	**3,287.4**	**92.3**	**3,287.4**
14	64.2	3.3					**67.5**	**2,403.8**	**67.5**	**2,403.8**
15	53.8	7.2					**61.0**	**2,172.2**	**61.0**	**2,172.2**
16	13.7	2.8					**16.4**	**585.7**	**16.4**	**585.7**
17	42.2	17.5					**59.7**	**2,127.0**	**59.7**	**2,127.0**
18	40.5	20.8					**61.3**	**2,185.1**	**61.3**	**2,185.1**
19	22.7	11.7					**34.4**	**1,224.5**	**34.4**	**1,224.5**
20	23.6	31.1					**54.6**	**1,946.7**	**54.6**	**1,946.7**
21	21.2	29.5					**50.6**	**1,804.2**	**50.6**	**1,804.2**
22	60.4	6.5					**66.9**	**2,382.4**	**66.9**	**2,382.4**
23	8.2	3.2					**11.5**	**408.3**	**11.5**	**408.3**
24	53.1	7.0					**60.2**	**2,143.4**	**60.2**	**2,143.4**
25	47.4	8.0					**55.4**	**1,972.7**	**55.4**	**1,972.7**
26	33.0	2.6					**35.5**	**1,266.2**	**35.5**	**1,266.2**
27	26.3	23.5					**49.9**	**1,776.4**	**49.9**	**1,776.4**
28	86.1	9.2					**95.3**	**3,396.4**	**95.3**	**3,396.4**
29	104.3	6.4					**110.7**	**3,944.0**	**110.7**	**3,944.0**
30	116.5	13.9					**130.5**	**4,648.0**	**130.5**	**4,648.0**
Average	**63.5**	**11.2**	**0.0**	**0.0**	**0.0**	**0.0**	**74.7**	**2661.2**	**74.7**	**2661.2**

Sampling Adequacy: **t = 1.311** **var. = 1356.582**
n= 30 **Mean = 74.70** **n_{min} = 41.817**

Table A7 New Horizon - Vegetation Production - 2015

Irrigated Pasture - Phase III Block

Oven Dry Weight (grams per 1/2 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL		TOTAL DESIRABLE	
							g/0.5m^2	lbs / ac	g/0.5m^2	lbs / ac
1	80.0	6.3				0.4	**86.7**	**1,544.5**	**86.3**	**1,537.3**
2	97.7	34.5					**132.2**	**2,355.0**	**132.2**	**2,355.0**
3	132.7	19.6					**152.3**	**2,713.1**	**152.3**	**2,713.1**
4	112.6	29.0					**141.6**	**2,522.5**	**141.6**	**2,522.5**
5	48.3	30.6					**78.9**	**1,405.5**	**78.9**	**1,405.5**
6	123.8	16.6			4.0	2.3	**146.7**	**2,613.3**	**140.4**	**2,501.1**
7	106.4	4.2				2.1	**112.7**	**2,007.6**	**110.6**	**1,970.2**
8	79.8	29.1					**108.9**	**1,939.9**	**108.9**	**1,939.9**
9	60.2	35.8				3.0	**99.0**	**1,763.6**	**96.0**	**1,710.1**
10	56.3	25.7				4.8	**86.8**	**1,546.3**	**82.0**	**1,460.7**
11	39.7	42.5				1.2	**83.4**	**1,485.7**	**82.2**	**1,464.3**
12	127.8	8.3				3.5	**139.6**	**2,486.8**	**136.1**	**2,424.5**
13	65.4	29.3				4.4	**99.1**	**1,765.4**	**94.7**	**1,687.0**
14	95.1	3.2				1.5	**99.8**	**1,777.8**	**98.3**	**1,751.1**
15	5.0	56.3					**61.3**	**1,092.0**	**61.3**	**1,092.0**
16	77.5	34.6				1.0	**113.1**	**2,014.8**	**112.1**	**1,996.9**
17	136.1	9.5					**145.6**	**2,593.7**	**145.6**	**2,593.7**
18	129.5	0.9					**130.4**	**2,322.9**	**130.4**	**2,322.9**
19	118.0	24.5					**142.5**	**2,538.5**	**142.5**	**2,538.5**
20	103.1	5.5					**108.6**	**1,934.6**	**108.6**	**1,934.6**
21	132.0	1.5					**133.5**	**2,378.2**	**133.5**	**2,378.2**
22	9.2	73.4				4.0	**86.6**	**1,542.7**	**82.6**	**1,471.4**
23	105.9	5.1				3.3	**114.3**	**2,036.1**	**111.0**	**1,977.4**
24	83.7	61.4					**145.1**	**2,584.8**	**145.1**	**2,584.8**
25	80.5	21.4				1.2	**103.1**	**1,836.6**	**101.9**	**1,815.2**
26	108.6	10.3					**118.9**	**2,118.1**	**118.9**	**2,118.1**
27	141.6					7.2	**148.8**	**2,650.7**	**141.6**	**2,522.5**
28	48.1	8.8					**56.9**	**1,013.6**	**56.9**	**1,013.6**
29	144.2	3.8		0.4			**148.4**	**2,643.6**	**148.0**	**2,636.5**
30	130.1	8.7			1.2		**140.0**	**2,494.0**	**138.8**	**2,472.6**
Average	**92.6**	**21.3**	**0.0**	**0.0**	**0.2**	**1.3**	**115.5**	**2057.4**	**114.0**	**2030.4**

Sampling Adequacy: **t = 1.311** **var. = 757.111**

n= 30 **Mean = 113.98** **n_{min} = 10.024**

Table A8 New Horizon - Vegetation Production - 2015

Irrigated Pasture - Reference Area

Oven Dry Weight (grams per 1/2 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL		TOTAL DESIRABLE	
							g/0.5m^2	lbs / ac	g/0.5m^2	lbs / ac
1	91.8	6.7					**98.5**	**1,754.7**	**98.5**	**1,754.7**
2	85.1	23.6					**108.7**	**1,936.4**	**108.7**	**1,936.4**
3	104.7	1.5					**106.2**	**1,891.8**	**106.2**	**1,891.8**
4	91.9	3.0					**94.9**	**1,690.5**	**94.9**	**1,690.5**
5	80.1	4.4					**84.5**	**1,505.3**	**84.5**	**1,505.3**
6	93.5				1.8	2.0	**97.3**	**1,733.3**	**93.5**	**1,665.6**
7	102.0	2.0					**104.0**	**1,852.7**	**104.0**	**1,852.7**
8	63.0	4.7			0.6	3.3	**71.6**	**1,275.5**	**67.7**	**1,206.0**
9	161.0	2.4					**163.4**	**2,910.8**	**163.4**	**2,910.8**
10	126.2	3.6					**129.8**	**2,312.3**	**129.8**	**2,312.3**
11	49.9	2.6					**52.5**	**935.2**	**52.5**	**935.2**
12	114.6	2.7					**117.3**	**2,089.6**	**117.3**	**2,089.6**
13	150.1	5.6					**155.7**	**2,773.6**	**155.7**	**2,773.6**
14	51.7	4.8					**56.5**	**1,006.5**	**56.5**	**1,006.5**
15	48.2						**48.2**	**858.6**	**48.2**	**858.6**
16	109.6	9.2					**118.8**	**2,116.3**	**118.8**	**2,116.3**
17	139.4	3.9					**143.3**	**2,552.7**	**143.3**	**2,552.7**
18	131.0	3.3					**134.3**	**2,392.4**	**134.3**	**2,392.4**
19	103.0	3.8					**106.8**	**1,902.5**	**106.8**	**1,902.5**
20	186.0	2.9					**188.9**	**3,365.1**	**188.9**	**3,365.1**
21	75.2	16.1					**91.3**	**1,626.4**	**91.3**	**1,626.4**
22	73.8	17.6		4.4	0.5		**96.3**	**1,715.5**	**91.4**	**1,628.2**
23	102.1	26.1			6.9		**135.1**	**2,406.7**	**128.2**	**2,283.8**
24	154.7	5.9					**160.6**	**2,860.9**	**160.6**	**2,860.9**
25	122.6	4.4					**127.0**	**2,262.4**	**127.0**	**2,262.4**
26	117.8	3.8					**121.6**	**2,166.2**	**121.6**	**2,166.2**
27	85.2						**85.2**	**1,517.8**	**85.2**	**1,517.8**
28	76.7	3.0					**79.7**	**1,419.8**	**79.7**	**1,419.8**
29	96.8	0.1					**96.9**	**1,726.2**	**96.9**	**1,726.2**
30	58.4	1.7				2.2	**62.3**	**1,109.8**	**60.1**	**1,070.6**
Average	**101.5**	**5.6**	**0.0**	**0.1**	**0.3**	**0.3**	**107.9**	**1922.2**	**107.2**	**1909.4**

Sampling Adequacy: **t = 1.311** **var. = 1188.866**
n= 30 **Mean = 107.18** **n_{min} = 17.798**

New Horizon Mine
Permit No. C-1981-008

2015-2016 Phase III Revegetation Evaluation Report

July , 2016

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New Horizon Mine
Permit No. C-1981-008

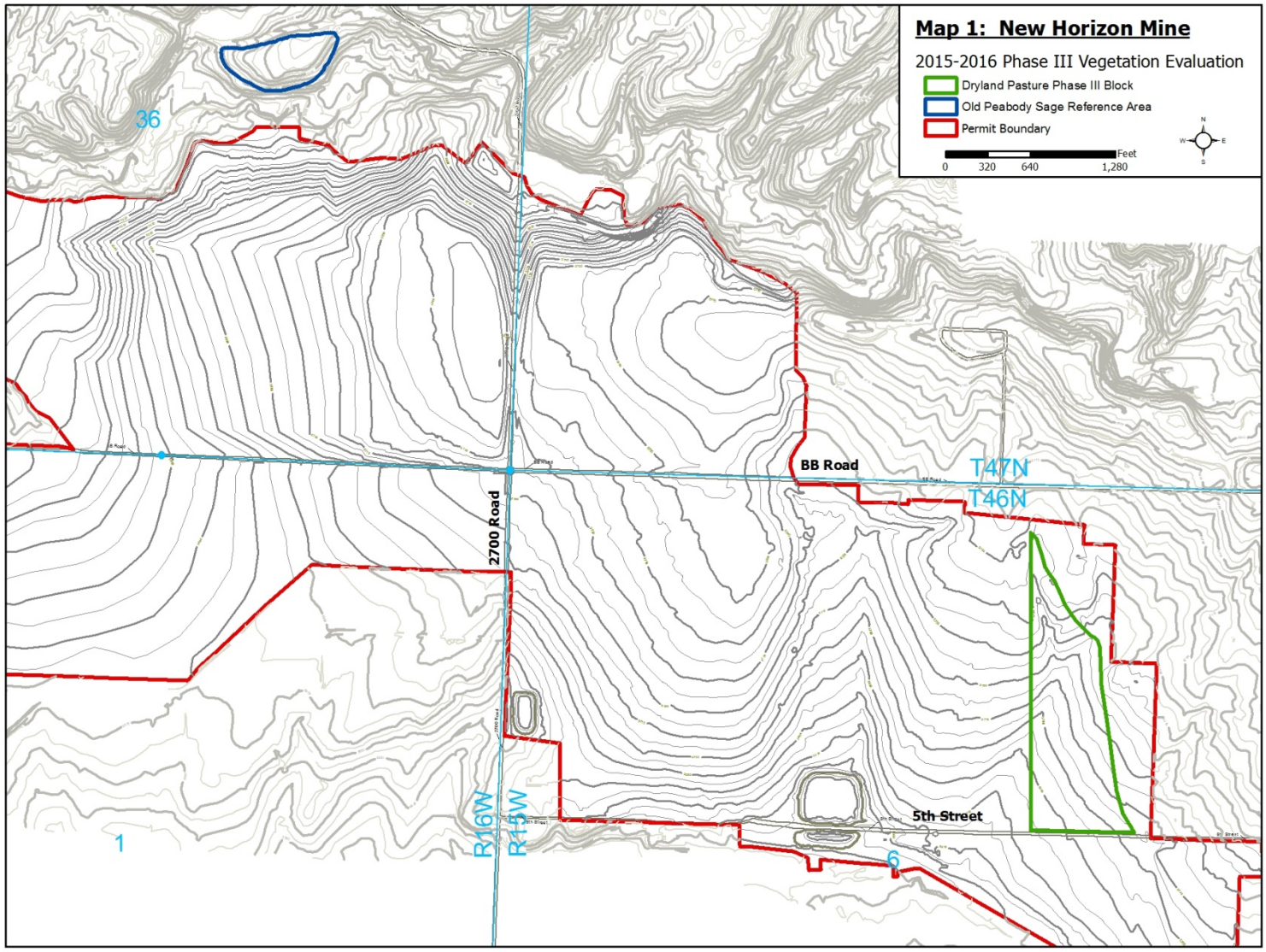
2015-2016 PHASE III REVEGETATION EVALUATION REPORT

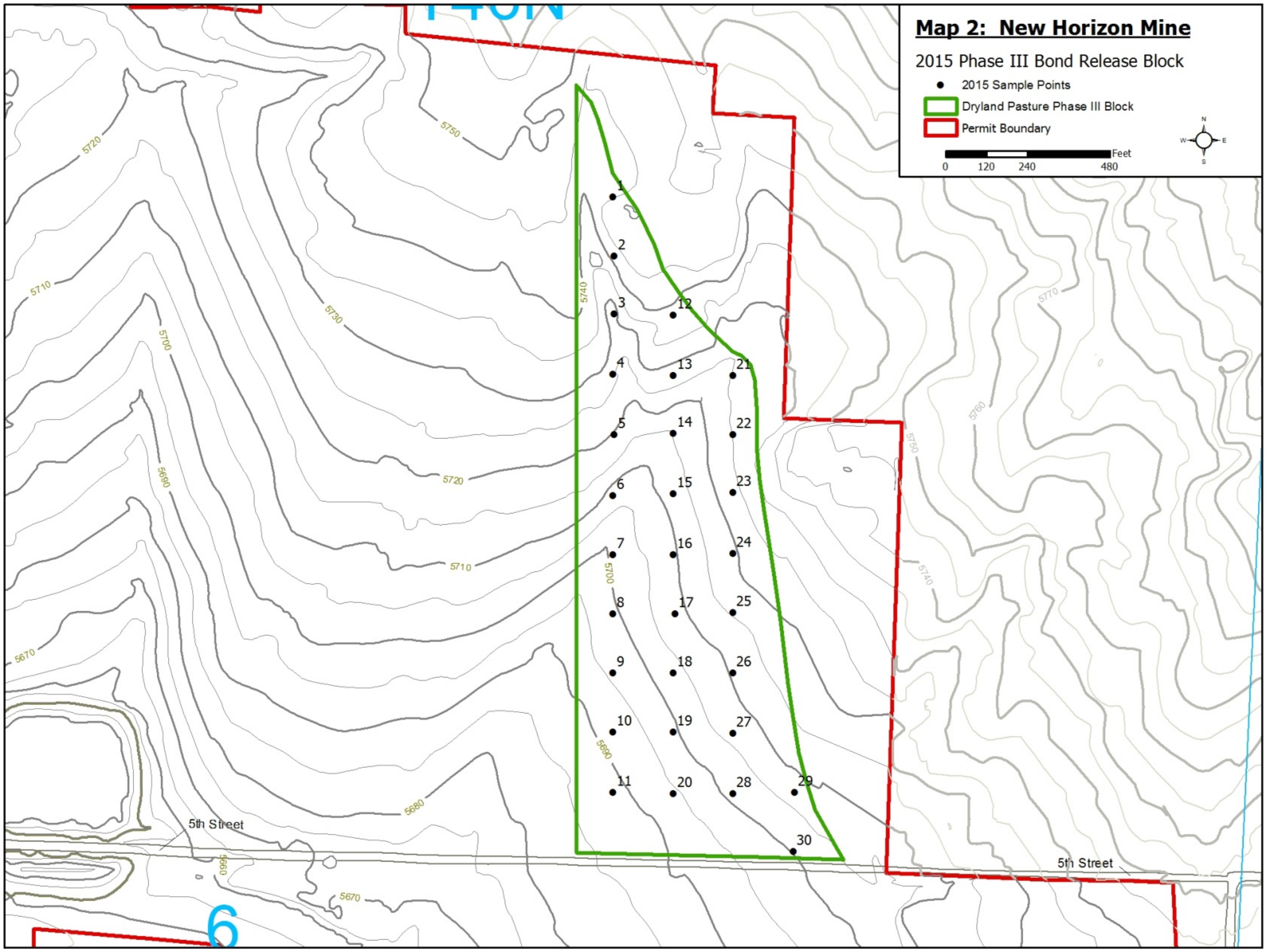
PHASE III BOND RELEASE BLOCK:	REFERENCE AREA:
DRYLAND PASTURE REVEGETATION	OLD PEABODY SAGE

1.0 INTRODUCTION

Cedar Creek Associates, Inc. (Cedar Creek) was contracted by New Horizon Mine (New Horizon) to evaluate revegetated units for Phase III bond release. Data collection was performed in the interest of ascertaining progress toward revegetation success in accordance with Permit Section 2.05.4(2)(e). The bond release block evaluated in 2015-2016 consisted of 23.8 acres of Dryland Pasture revegetation (Map 1). In addition, the Old Peabody Sage Reference Area was evaluated to provide cover and production values to facilitate a comparison of success for the reclaimed units. Overall, the entire bond release application is 278.5 acres. However, this report only addresses the 23.8 acres of Dryland Pasture. The sample points for Phase III bond release and reference areas evaluated in 2015-2016 are provided on Maps 2 through 5. Grazing and other land management activities were precluded from the Phase III Bond Release Area and reference area until vegetation sampling was completed in 2015 and 2016.

Sampling on Dryland Pasture Phase III Bond Release Block and Reference Area occurred June 1-5, 2015 and June 4-6, 2016 by or under the direct supervision of Cedar Creek's Reclamation Ecologist, Mr. Jesse Dillon. Raw data tables are presented in Appendix A.


Map 1: New Horizon Mine
2015-2016 Phase III Vegetation Evaluation
Dryland Pasture Phase III Block
Old Peabody Sage Reference Area
Permit Boundary
0 320 640 1,280
Feet
36
BB Road
T47N
T46N
2700 Road
R16W
R15W
5th Street
1
6


Map 2: New Horizon Mine
2015 Phase III Bond Release Block
2015 Sample Points
Dryland Pasture Phase III Block
Permit Boundary
Feet
0 120 240 480
5th Street
5th Street
1
2
3
4
5
6
7
8
9
10
11
12
13
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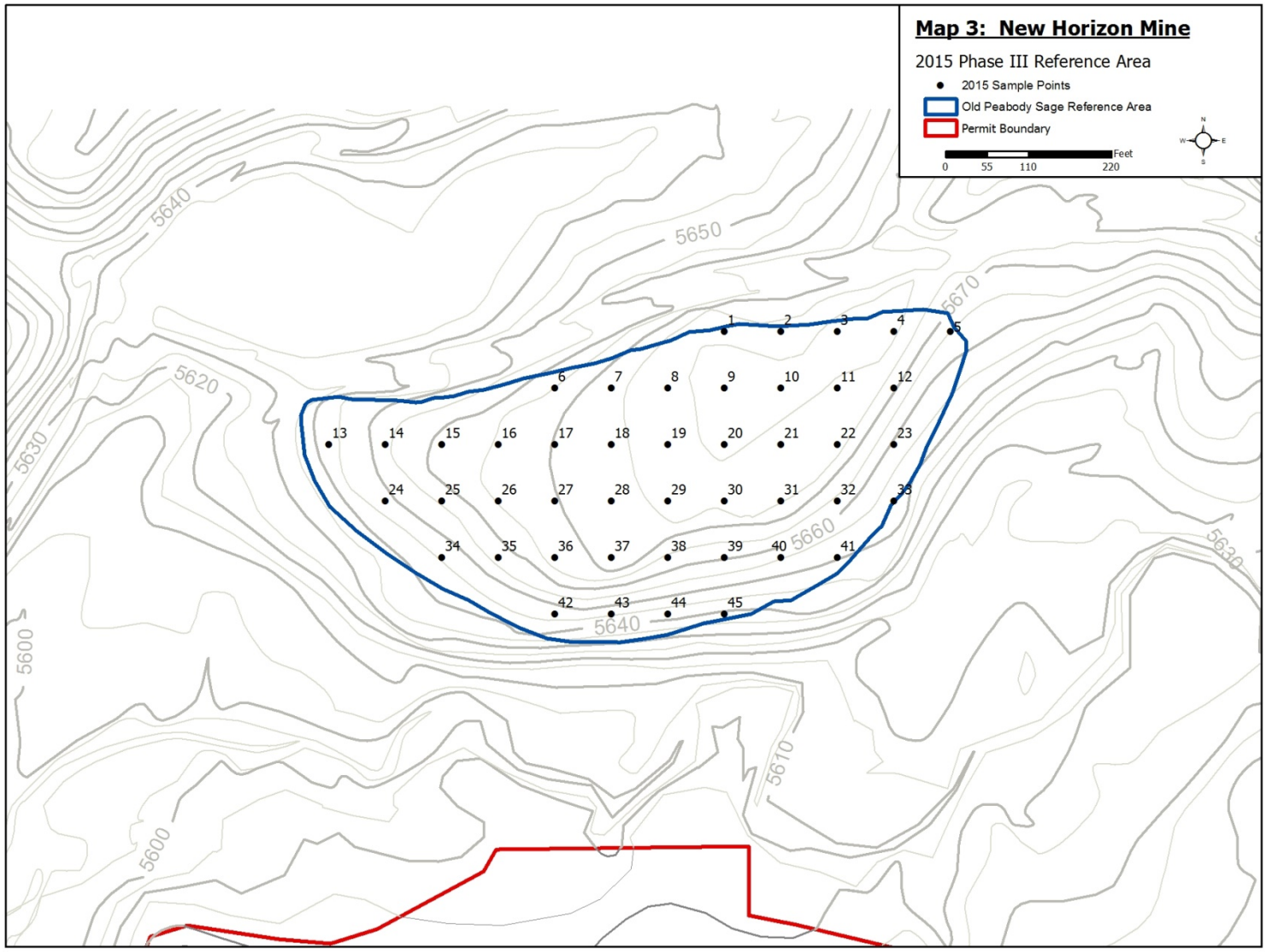
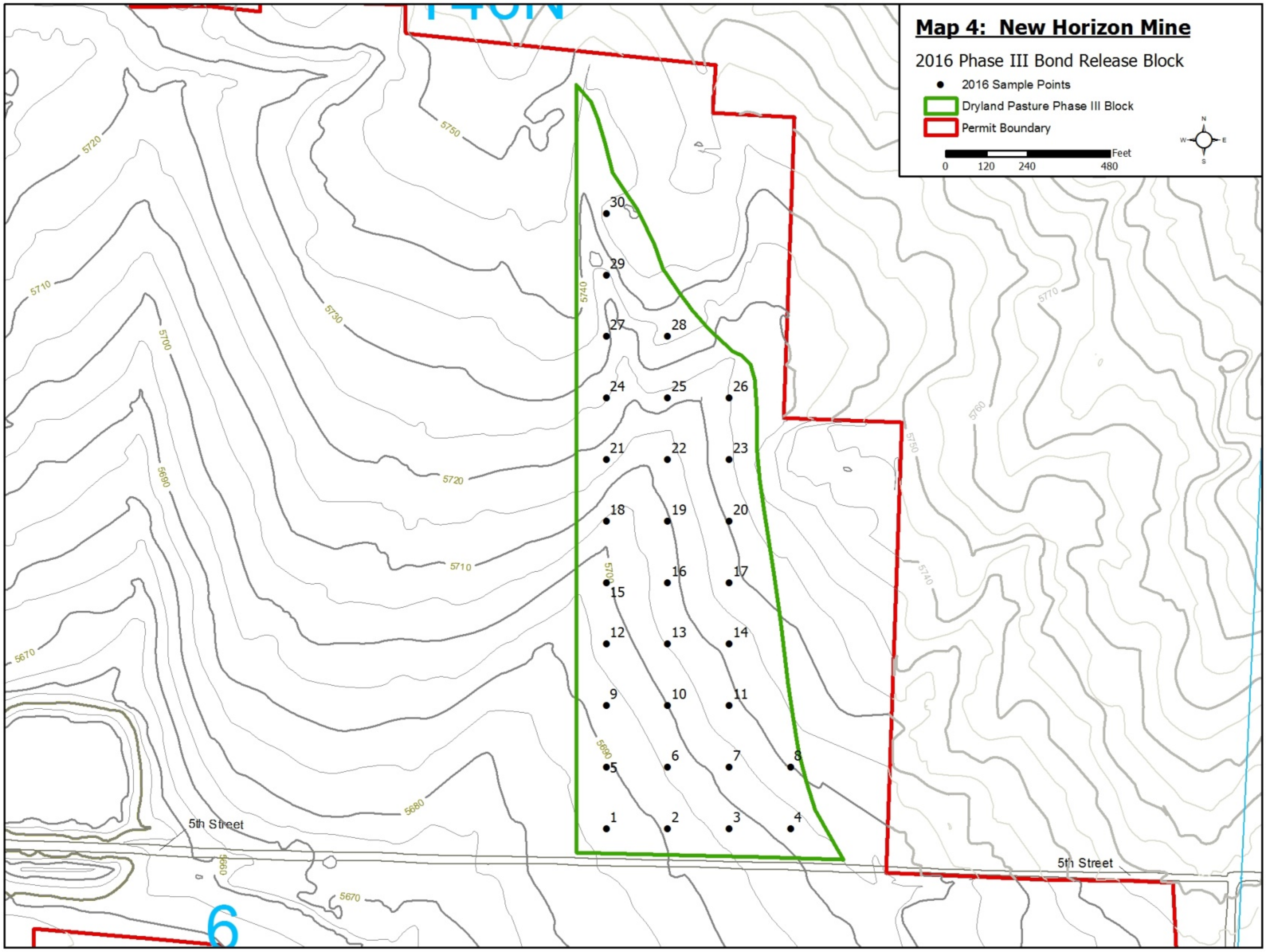
30


Map 3: New Horizon Mine
2015 Phase III Reference Area
2015 Sample Points
Old Peabody Sage Reference Area
Permit Boundary
Feet
0 55 110 220
N
W E
S
5640
5650
5670
5620
5630
5660
5600
5610
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 41
42 43 44 45



Map 4: New Horizon Mine
2016 Phase III Bond Release Block
2016 Sample Points
Dryland Pasture Phase III Block
Permit Boundary
Feet
0 120 240 480
N
W
E
S
5th Street
5th Street
5750
5740
5730
5720
5710
5700
5690
5680
5670
5660
5770
5760
6
1
2
3
4
5
6
7
8
9
10
11
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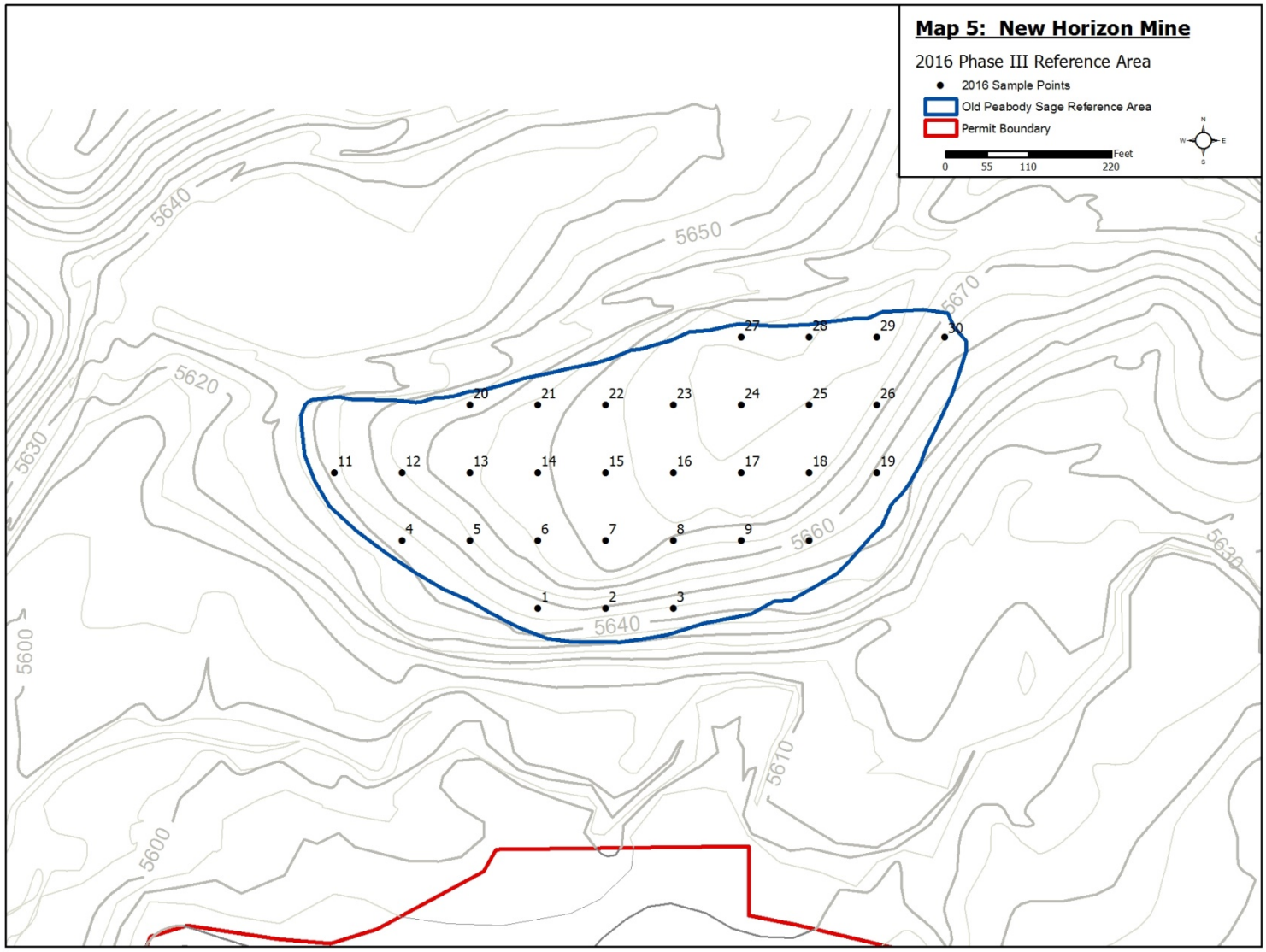
29
30


Map 5: New Horizon Mine
2016 Phase III Reference Area
2016 Sample Points
Old Peabody Sage Reference Area
Permit Boundary
0 55 110 220 Feet
N
W E
S
5640
5650
5670
5620
5630
5660
5600
5610
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

2.0 METHODOLOGY FOR VEGETATION SAMPLING / COMPARISON METHODS

2.1 Sample Site Selection / Location

A systematic procedure for sample location in the revegetated and reference units occurred in the following stepwise manner. First, a fixed point of reference was selected for the unit to facilitate location of the systematic grid in the field. Second, a systematic grid of appropriate dimensions was selected to provide a reasonable number of coordinate intersections (e.g., 30) that could then be used for the set of sample sites. Third, a scaled representation of the grid was overlain on a computer-generated map of the target unit. Fourth, the initial placement of this grid was implemented by selection of two random numbers (an X and Y distance) used for locating the first coordinate from the fixed point of reference, thereby making the effort unbiased. Fifth, where an excess number of potential sample points (grid intersections) were indicated by overlain maps, the excess points were randomly chosen for elimination. (If later determined that additional samples would be needed, the eliminated potential sample sites would be added back in reverse order until enough samples could be collected.) Sixth, utilizing a GPS or handheld compass and pacing techniques (or a hip-chain), the sample points were located in the field.

Once a selected grid point was located in the field, ground cover sampling transects were always oriented in the direction of the next site to be physically sampled to further limit any potential bias while facilitating sampling efficiency. This orientation protocol is shown on Figure 1. Depending on logistics, timing, and access points to the target sampling area, the field crew would occasionally layout a set of points along coordinates in one direction and then sample them in reverse order. However, orientation protocol was always maintained (i.e., in the direction of the next point to be physically sampled). If the boundary of an area was encountered before reaching the full length of a transect, the orientation of the transect was turned 90° in the appropriate direction so the transect could be completed. In this manner, boundary transects were retained entirely within the target unit by "bouncing" off the boundaries. Production quadrats were always oriented 90° to the right (clockwise) of the ground cover transect and placed one meter from the starting point so as to avoid any trampled vegetation.

2.2 Determination of Ground Cover

Ground cover at each sample point was evaluated in accordance with Rule 4.15.11(1)(a)(i) utilizing the point-intercept methodology as illustrated on Figure 1. As indicated on this figure, Cedar Creek utilizes state-of-the-art instrumentation it has pioneered to facilitate much more rapid and accurate collection of data. A transect of 10 meters length was extended in the direction of the next sampling location from the flagged center of each systematically located sample point. At each one-meter interval along the transect, a "laser point bar" was situated parallel to, and approximately 4.5 to 5.0 feet vertically

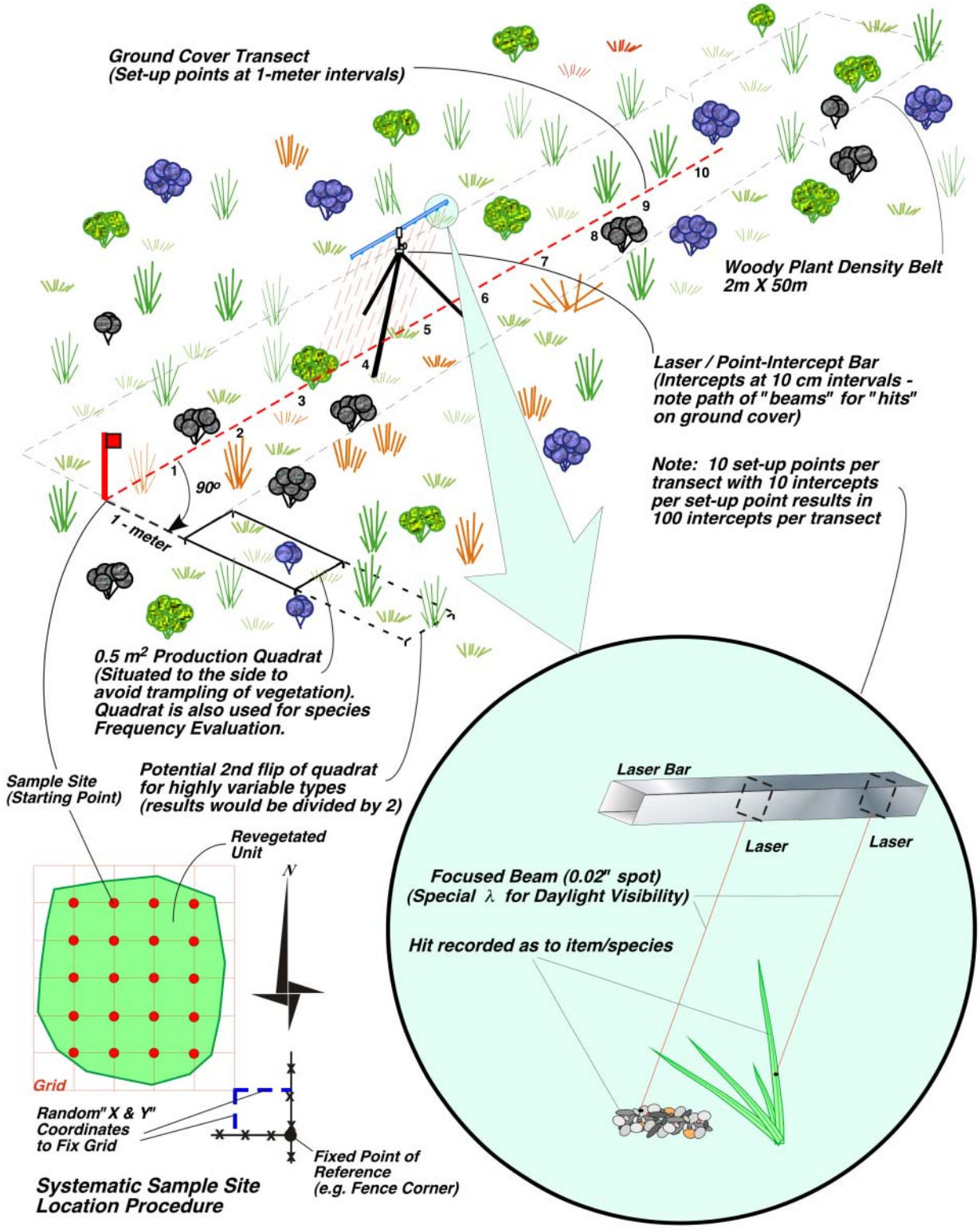


Figure 1

Sampling Procedure at a Systematic Sample Site Location

above the ground surface. A set of 10 readings was taken specifically to record hits on vegetation (by species), litter (including standing dead), rock (>2mm), or bare soil. Hits were determined at each meter interval by activating a battery of 10 low-energy specialized lasers situated along the bar at 10 centimeter intervals and recording the variable intercepted by each of the narrowly focused (0.02") beams (Figure 1). In this manner, a total of 100 intercepts per transect were recorded resulting in 1 percent cover per intercept. This methodology and instrumentation facilitates the collection of the most unbiased, repeatable, and precise ground cover data possible. To facilitate diversity calculations, second hits were recorded when an overstory shrub stratum was present. However, these second hits were not included in the determination of ground cover.

Ground cover transects were implemented at every sample point in the Phase III area, whereas ground transects were not implemented on every third sample point in the reference areas for the 2015 evaluation efforts. Every third sample point was evaluated for production only.

2.3 Determination of Current Annual Production

At each sample site, current annual production was collected from a $^1/_2$ m^2 quadrat frame placed one meter and 90° to the right (clockwise) of the ground cover transect to facilitate avoidance of vegetation trampled by investigators during sample site location (Figure 1). From within each quadrat, all above ground current annual vegetation within the vertical boundaries of the frame were clipped and bagged separately by life form as follows:

Perennial Grass	*Perennial Forb*
Annual Grass	*Annual Forb*
Sub-shrubs	*Noxious Weeds (if found)*

All production samples were returned to the lab for drying and weighing. Drying was conducted at 105° C until a stable weight was achieved (24 hours). Samples were then re-weighed to the nearest 0.1 gram.

2.4 Sample Adequacy Determination

Sampling within each unit (Phase III Bond Release Block or Reference Area) was conducted to a minimum of 30 cover and production samples (45 production sample on Reference Area in 2015). From these preliminary efforts, sample means and standard deviations for total non-overlapping vegetation ground cover were calculated. The Cochran formula (below) for determining sample adequacy was used to calculate $\mathbf{n_{min}}$, whereby the population is estimated to within 10% of the true mean (μ) with 90% confidence.

When the inequality ($\mathbf{n_{min}} \leq \mathbf{n}$) is true, sampling is deemed adequate; and $\mathbf{n_{min}}$ is determined as follows:

$$n_{min} = (t^2 s^2) / (0.1 \bar{X})^2$$

where: n = the number of actual samples collected (initial size = 30 or 45)

t = the value from the one-tailed t distribution for 90% confidence with n-1 degrees of freedom;

s^2 = the variance of the estimate as calculated from the initial samples;

$\bar{X}$ = the mean of the estimate as calculated from the initial samples.

If the initial samples do not provide a suitable estimate of the mean (i.e., the inequality is false), a reverse null success evaluation which does not require adequacy would be employed (Rule 4.15.11 (2)(c)). Sample adequacy results are presented on Table 1.

Table 1 Sample Adequacy Table

		Ground Cover		Production	
		Phase III Bond Release Block	Reference Areas	Phase III Bond Release Block	Reference Areas
2015	**Mean =**	35.4	30.0	60.1	21.1
	Variance =	79.1	73.6	270.2	57.3
	n =	30	30	30	45
	n_{min} =	10.87	14.06	12.9	21.8
		Ground Cover		**Production**	
		Phase III Bond Release Block	Reference Areas	Phase III Bond Release Block	Reference Areas
2016	**Mean =**	38.7	27.9	47.8	23.1
	Variance =	58.0	20.3	248.1	83.6
	n =	30	30	30	30
	n_{min} =	6.7	4.5	18.7	27.0

2.5 Success Evaluation

Success evaluations involve a direct comparison and, where necessary, statistical testing of the ground cover, production, and forage quality parameters. In the case of ground cover and production, comparisons are made against reference area data of the same year.

3.0 RESULTS

3.1 2015 Vegetation Evaluation Results

3.1.1 Dryland Pasture - Phase III Bond Release Block

A total of 14 plant species were encountered within the Dryland Pasture Phase III Bond Release Block evaluated in 2015 (Table 2). Ground cover in the Dryland Pasture Phase III Bond Release Block (Chart 1 and Table 2) consisted of 35.37% live vegetation, 3.80% rock, 12.90% litter, and bare ground exposure of 47.93%. Desirable perennial cover across the unit averaged 26.73%, with annual and biennial cover averaging 2.53% absolute cover. Noxious weed cover was 7.87%. The dominant taxon was Russian wildrye (*Elymus junceus*) with 22.10% average cover. Current annual herbaceous production across the Phase III area averaged 1,070.8 pounds per acre based on oven-dry samples (Table 3). Desirable perennial vegetation contributed 1,024.5 pounds per acre in 2015 (Table 3 and Chart 2).

3.1.2 Old Peabody Sage - Reference Area

A total of 26 plant species were encountered within the Old Peabody Sage Reference Area evaluated in 2015 (Table 2). Ground cover in the Old Peabody Sage Reference Area (Chart 1 and Table 2) consisted of 30.00% live vegetation, 23.90% rock, 16.37% litter, and bare ground exposure of 29.73%. Desirable perennial cover across the unit averaged 27.30%, with annual and biennial cover averaging 1.20% absolute cover. Noxious weed cover was 1.57%. Dominant taxa were blue grama (*Bouteloua gracilis*) and big sagebrush (*Artemisia tridentata*) with 8.07% and 4.53% average cover, respectively. Current annual herbaceous production across the Reference Area averaged 375.9 pounds per acre based on oven-dry samples (Table 3). Desirable perennial vegetation contributed 306.6 pounds per acre in 2015 (Table 3 and Chart 2).

3.2 2016 Vegetation Evaluation Results

3.2.1 Dryland Pasture - Phase III Bond Release Block

A total of 12 plant species were encountered within the Dryland Pasture Phase III Bond Release Block evaluated in 2016 (Table 2). Ground cover in the Dryland Pasture Phase III Bond Release Block (Chart 1 and Table 2) consisted of 38.70% live vegetation, 2.47% rock, 23.40% litter, and bare ground exposure of 35.43%. Desirable perennial cover across the unit averaged 33.87%, with annual and biennial cover averaging 4.07% absolute cover. Noxious weed cover was 0.37%. The dominant taxon was Russian wildrye with 30.37% average cover. Current annual herbaceous production across the Phase III area averaged 850.9 pounds per acre based on oven-dry samples (Table 3). Desirable perennial vegetation contributed 844.0 pounds per acre in 2016 (Table 3 and Chart 2).

3.2.2 Old Peabody Sage - Reference Area

A total of 24 plant species were encountered within the Old Peabody Sage Reference Area evaluated in 2016 (Table 2). Ground cover in the Old Peabody Sage Reference Area (Chart 1 and Table 2) consisted of 27.87% live vegetation, 20.87% rock, 17.93% litter, and bare ground exposure of 33.33%. Desirable perennial cover across the unit averaged 27.13%, with annual and biennial cover averaging 0.23% absolute cover. Noxious weeds cover was 0.50%. Dominant taxa were blue grama and snakeweed (*Gutierrezia sarothrae*) with 6.50% and 5.63% average cover, respectively. Current annual herbaceous production across the Reference Area averaged 411.3 pounds per acre based on oven-dry samples (Table 3). Desirable perennial vegetation contributed 396.0 pounds per acre in 2016 (Table 3 and Chart 2).

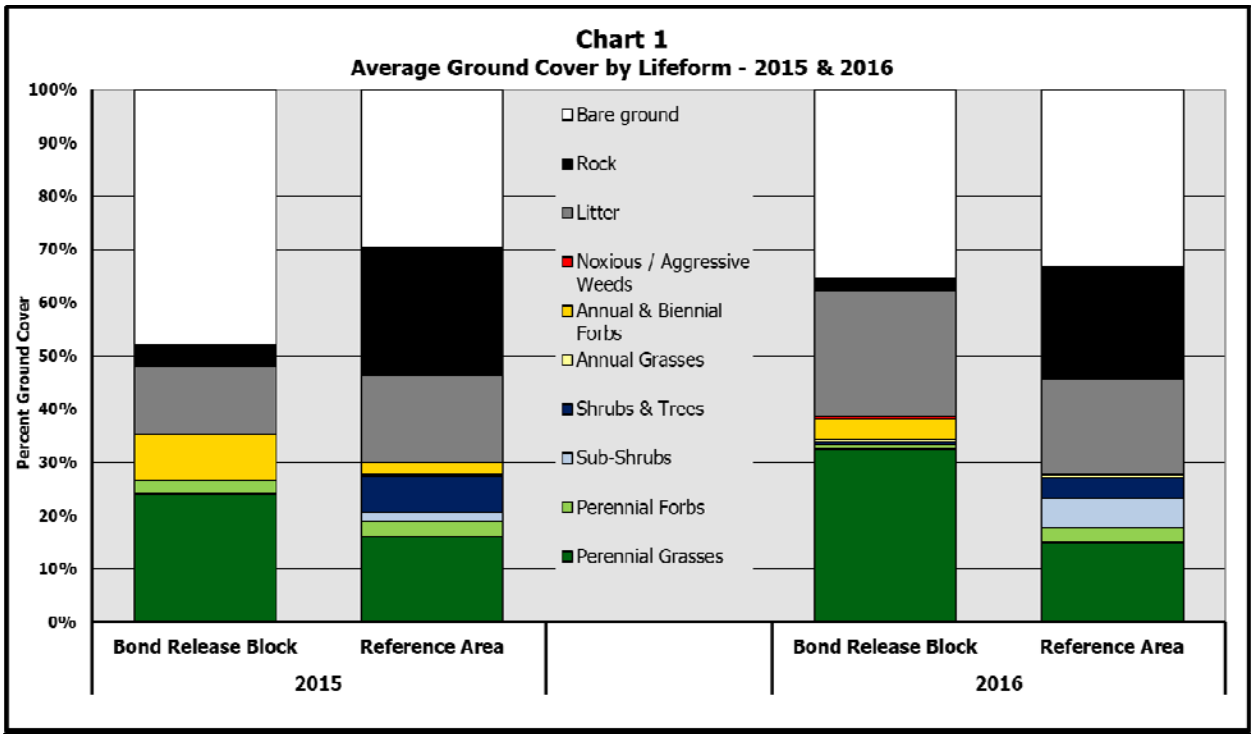


Table 2 New Horizon - Vegetation Cover - 2015 & 2016

Average Cover Summary

				2015		2016	
			Unit ——>	Dryland Pasture Bond Release Block	Old Peabody Sage Reference Area	Dryland Pasture Bond Release Block	Old Peabody Sage Reference Area
Grasses and Grass-likes							
N	P	*Agropyron cristatum*	Crested Wheatgrass	1.63	-	2.17	-
N	P	*Aristida purpurea*	Purple Threeawn	-	0.07	-	0.07
N	P	*Bouteloua gracilis*	Blue Grama	-	8.07	-	6.50
X	A	*Bromus tectorum*	Cheatgrass	-	0.40	0.40	0.50
N	P	*Elymus elymoides*	Squirreltail	-	-	-	0.27
I	P	*Elymus junceus*	Russian Wildrye	22.10	-	30.37	0.03
N	P	*Hesperostipa comata*	Needle and Thread	-	4.40	-	3.57
N	P	*Hilaria jamesii*	James' Galleta	-	3.27	-	4.23
N	P	*Hordeum jubatum*	Foxtail Barley	0.33	0.13	-	-
N	P	*Muhlenbergi sp.*	Muhly	-	-	-	0.10
N	P	*Oryzopsis hymenoides*	Indian Ricegrass	-	0.03	-	0.17
N	P	*Sporobolus cryptandrus*	Sand Dropseed	-	0.17	-	0.07
Forbs							
I	P	*Acroptilon repens*	Hardheads	0.03	-	-	-
N	A	*Alyssum alyssoides*	Pale Madwort	0.03	0.33	-	0.03
N	P	*Asclepias speciosa*	Showy Milkweed	-	0.10	-	-
I	A	*Bassia prostrata*	Forage Kochia	1.77	-	-	-
I	A	*Camelina microcarpa*	Littlepod False Flax	0.47	-	0.50	-
X	P	*Cardaria draba*	Whitetop	-	0.03	0.37	-
N	B	*Chaenactis douglasii*	Douglas' Dustymaiden	-	0.53	-	-
N	A	*Collomia linearis*	Tiny Trumpet	-	0.03	-	-
I	P	*Convolvulus arvensis*	Field Bindwed	0.10	-	0.17	-
N	A	*Descurainia pinnata*	Pinnate Tansymustard	0.03	-	0.13	0.07
N	P	*Erigeron sspeciosus*	Aspen Fleabane	-	0.17	-	0.37
X	B	*Erodium cicutarium*	Redstem Stork's Bill	7.87	1.13	2.83	-
N	P	*Haplopappus spinulosus*	Lacy Tansyaster	-	0.53	-	0.27
N	P	*Heterotheca villosa*	Hairy False Goldenaster	-	-	-	0.23
I	A	*Kochia scoparia*	Burningbush	-	-	0.60	-
I	P	*Medicago sativa*	Alfalfa	0.67	-	0.67	-
N	P	*Phlox hoodii*	Spiny Phlox	-	0.17	-	-
N	A	*Plantago patagonica*	Woolly Plantain	-	0.10	-	0.13
I	A	*Salsola tragus*	Pacific Blacksnakeroot	0.23	-	-	-
I	A	*Sisymbrium altissimum*	Tumble Mustard	-	0.20	-	-
N	P	*Sphaeralcea coccinea*	Scarlet Globemallow	0.03	1.77	0.17	1.80
Sub-Shrubs							
N	P	*Gutierrezia sarothrae*	Snakeweed	-	1.77	-	5.63
Shrubs & Trees							
N	P	*Artemisia tridentata*	Big Sagebrush	-	4.53	-	3.13
N	P	*Atriplex canescens*	Four-wing Saltbush	-	0.73	-	0.07
N	P	*Chrysothamnus nauseosus*	Rubber Rabbitbrush	0.07	-	0.33	-
N	P	*Eriogonum sp.*	Buckwheat	-	0.50	-	0.13
N	P	*Juniperus osteosperma*	Utah Juniper	-	0.43	-	0.17
N	P	*Opuntia polyacantha*	Plains Pricklypear	-	0.40	-	0.23
N	P	*Pinus edulis*	Twoneedle Pinyon	-	-	-	0.10
			Total Plant Cover	**35.37**	**30.00**	**38.70**	**27.87**
			Rock	3.80	23.90	2.47	20.87
			Litter	12.90	16.37	23.40	17.93
			Bare ground	47.93	29.73	35.43	33.33
			Total Perennial Cover (Excluding Noxious Weeds)	**26.73**	**27.30**	**33.87**	**27.13**
			Total Annual Cover	8.63	2.30	4.07	0.23
Summary by Lifeform:							
			Perennial Grasses	**24.07**	**16.13**	**32.53**	**15.00**
			Annual Grasses	-	0.40	0.40	0.50
			Perennial Forbs	**2.60**	**2.80**	**1.00**	**2.67**
			Annual & Biennial Forbs	8.63	2.30	4.07	0.23
			Noxious / Aggressive Weeds	-	-	0.37	-
			Sub-Shrubs	**-**	**1.77**	**-**	**5.63**
			Shrubs & Trees	**0.07**	**6.60**	**0.33**	**3.83**
Sample Adequacy Calculations							
			Mean=	35.37	30.00	38.70	27.87
			Variance=	79.07	73.59	58.01	20.33
			n=	30	30	30	30
			n_{min}=	10.87	14.06	6.66	4.50

N=Native, I=Introduced, X=Noxious A=Annual, B=Biennial, P=Perennial

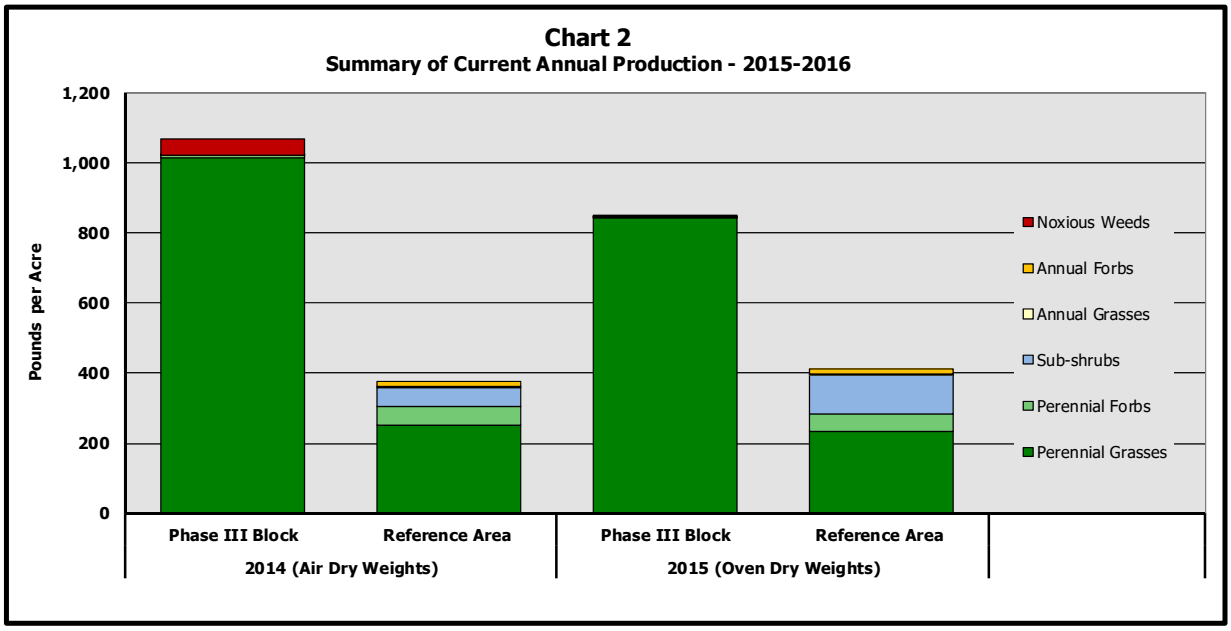
Table 3 New Horizon - Vegetation Production - 2015 - 2016

Production Summary

Pounds (lbs) per Acre

	Area	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual Forbs*	*Noxious Weeds*	TOTAL		
								lbs / ac	Desirable* lbs / ac	Perennial lbs / ac
2015	**Phase III Block**	1,015.3	7.7	1.1	0.5	-	46.3	**1,070.8**	**1,022.9**	**1,024.0**
	Reference Area	250.1	56.5	53.7	2.2	13.3	-	**375.9**	**306.6**	**360.4**
2016	**Phase III Block**	844.0	-	-	0.2	2.4	4.3	**850.9**	**844.0**	**844.0**
	Reference Area	235.2	50.4	110.4	2.5	12.8	-	**411.3**	**285.6**	**396.0**

* Desirable includes perennial grasses and perennial forbs



4.0 SUCCESS COMPARISON

4.1 Ground Cover

The demonstration of adequacy and a minimum of 15 transects in each unit (Table 1 and Table 2) allow for a direct comparison for perennial cover per Rule 4.15.11 (2)(a). Chart 3 displays the results from ground cover sampling in 2015, and reveals that the Dryland Pasture Phase III Bond Release Block exceeds the reference area comparison with 26.73% perennial cover versus the 24.57% perennial cover standard (90% of 27.30%).

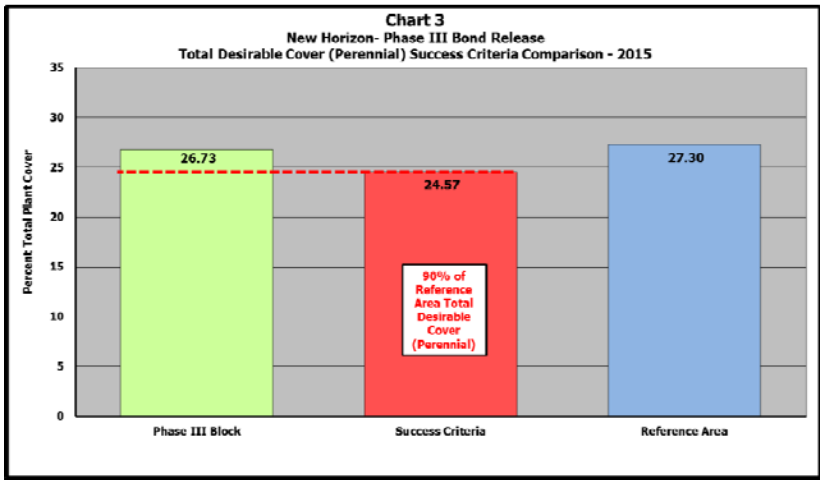
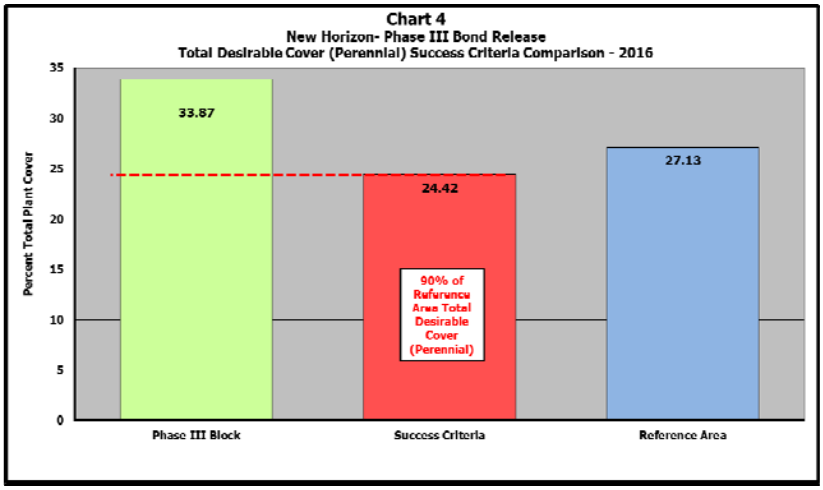


Chart 4 displays the results from ground cover sampling in 2016, and reveals that the Dryland Pasture Phase III Bond Release Block exceeds the reference area comparison with 33.87% perennial cover versus the 24.42% perennial cover standard (90% of 27.13%).



4.2 Production

The demonstration of adequacy and a minimum of 30 quadrats in each unit (Table 1 and Table 2) allow for a direct comparison for desirable perennial production per Rule 4.15.11 (2)(a). Chart 5 displays the results from production sampling in 2015, and reveals that the Dryland Pasture Phase III Bond Release Block exceeds the reference area comparison with 1,022.9 pounds per acre of perennial production versus the 276.0 pounds per acre perennial production standard (90% of 306.6 pounds per acre).

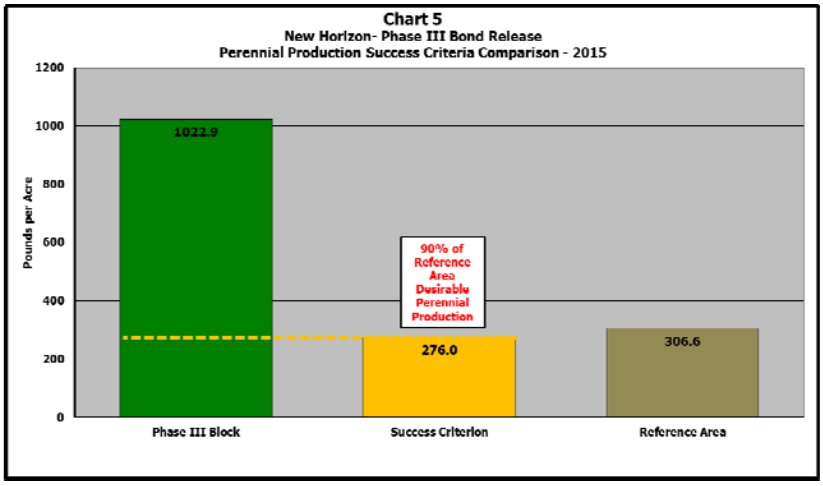
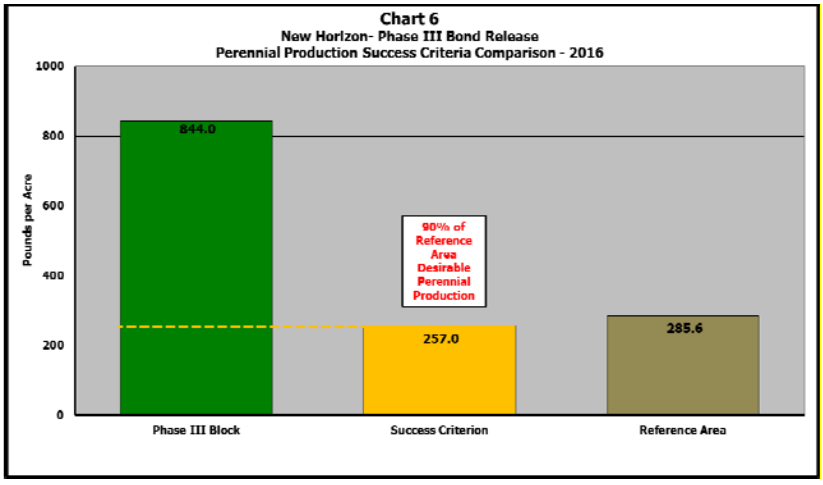


Chart 6 displays the results from production sampling in 2016, and reveals that the Dryland Pasture Phase III Bond Release Block exceeds the reference area comparison with 844.0 pounds per acre of perennial production versus the 257.0 pounds per acre perennial production standard (90% of 285.6 pounds per acre).



4.3 Forage Quality

The forage quality standard states that at least 75% of the relative forage production will be comprised of seeded species or species of comparable quality as livestock forage. The results of forage quality testing for 2015 and 2016 are presented on Table 4. The Dryland Pasture Phase III Bond Release Block exceeds the standard for forage quality for both 2015 and 2016.

Table 4 Forage Quality - 2015 & 2016

		2015			2016		
		Production Results (lbs/acre)	Relative Production	Test Result	Production Results (lbs/acre)	Relative Production	Test Result
Desirable Production	Perennial Grasses	1,015.3	95.5%	**Pass >75%**	844.0	99.2%	**Pass >75%**
	Perennial Forbs	7.7			-		
Undesirable Production	Sub-shrubs	1.1	0.1%		-	0.3%	
	Annual Grasses	0.5			0.2		
	Annual Forbs	-			2.4		
Noxious Weeds	Noxious Weeds	46.3	4.3%		4.3	0.5%	
Total		**1,070.8**	**100.0%**		**850.9**	**100.0%**	

5.0 CONCLUSION

It has been at least 10 years since the last seeding effort on the Dryland Pasture Phase III Bond Release Block. Revegetation evaluation in 2015 and 2016 revealed that the Dryland Pasture Phase III Bond Release Block exceeds all applicable performance standards from the New Horizon permit.

6.0 LITERATURE CITED

New Horizon 2 Mine. Permit Number C-1987-008. Section 2.05.4.

Weber, W.A. and Wittman, R.C., 1996. Colorado Flora: Western Slope - Revised Edition. University Press of Colorado. 496 p

Appendix A

Tables and Plates

Appendix A List of Tables

Appendix A List of Plates

Table A1 New Horizon - Vegetation Cover - 2015

Dry Phase III

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.—→	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	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																																			
N	P	*Agropyron cristatum*	Crested Wheatgrass				5	1			26		6					4						3		2		1					1	**1.63**	**3.55**	**25**
I	P	*Elymus junceus*	Russian Wildrye	25	24	31	19	25	28	25	14	23	35	24	17	22	24	22	19	23	36	21	15	30	19	7	15	15	20	19	25	15	26	**22.10**	**48.04**	**100**
N	P	*Hordeum jubatum*	Foxtail Barley							5	5																							**0.33**	**0.72**	**0**
Forbs																																			
I	P	*Acroptilon repens*	Hardheads							1																								**0.03**	**0.07**	**0**
N	A	*Alyssum alyssoides*	Pale Madwort	1																														**0.03**	**0.07**	**0**
I	P	*Bassia prostrata*	Forage Kochia								1	2	13									1				20	5	11						**1.77**	**3.84**	**20**
I	A	*Camelina microcarpa*	Littlepod False Flax								1							1								14								**0.47**	**1.01**	**5**
I	P	*Convolvulus arvensis*	Field Bindweed								1							1						1										**0.10**	**0.22**	**10**
N	A	*Descurainia pinnata*	Pinnate Tansymustard							1																								**0.03**	**0.07**	**0**
X	B	*Erodium cicutarium*	Redstem Stork's Bill	12	2	3	9	9	9	2			6	11	12	3	3	4	1	16	6	12	8		9	3	24	23	8	17	8	11	5	**7.87**	**17.10**	**95**
I	P	*Medicago sativa*	Alfalfa			2				2	1						1							12								2	**0.67**	**1.45**	**15**
I	A	*Salsola tragus*	Pacific Blacksnakeroot	1		1												1		2									2					**0.23**	**0.51**	**15**
N	P	*Sphaeralcea coccinea*	Scarlet Globemallow																										1					**0.03**	**0.07**	**5**
Sub-Shrubs																																			
		None																																**0.00**	**0.00**	**0**
Shrubs & Trees																																			
N	P	*Chrysothamnus nauseosus*	Rubber Rabbitbrush																2															**0.07**	**0.14**	**5**
																																		Mean		
			Total Plant Cover	**39**	**26**	**37**	**33**	**35**	**37**	**36**	**48**	**25**	**60**	**35**	**29**	**25**	**28**	**32**	**22**	**41**	**42**	**34**	**23**	**46**	**28**	**46**	**44**	**50**	**31**	**36**	**33**	**26**	**34**	**35.37**		
			Rock	3	3	5	2	6	5	5	1	3	0	1	4	7	1	3	2	6	4	7	3	0	1	2	4	9	6	4	6	9	2	**3.80**		
			Litter	25	10	9	17	13	10	26	17	12	6	7	18	7	10	7	7	10	12	2	14	32	11	7	11	12	25	8	11	18	13	**12.90**		
			Bare ground	33	61	49	48	46	48	33	34	60	34	57	49	61	61	58	69	43	42	57	60	22	60	45	41	29	38	52	50	47	51	**47.93**		
			Total Perennial Cover (Excluding Noxious Weeds)	**25**	**24**	**33**	**24**	**26**	**28**	**33**	**48**	**25**	**54**	**24**	**17**	**22**	**25**	**27**	**21**	**23**	**36**	**22**	**15**	**46**	**19**	**29**	**20**	**27**	**21**	**19**	**25**	**15**	**29**	**26.73**		

Sample Adequacy Calculations	**Plant Cover Mean = 35.37**	**t= 1.31**	**n = 30**
	Variance = 79.07	**n_{min} = 10.87**	

N=Native, I=Introduced, X=Noxious A=Annual, B=Biennial, P=Perennial

Table A2 New Horizon - Vegetation Cover - 2015

Old Peabody Sage Reference Area

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.——>	1	2	4	5	7	8	10	11	13	14	16	17	19	20	22	23	25	26	28	29	31	32	34	35	37	38	40	41	43	44	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																																			
N	P	*Aristida purpurea*	Purple Threeawn									1										1												**0.07**	**0.22**	**7**
N	P	*Bouteloua gracilis*	Blue Grama	5	2	9	8	1	3	15	7	3	11	7	17	14		13	24	6			1	22	9	10	9	15	7		9		15	**8.07**	**26.89**	**83**
X	A	*Bromus tectorum*	Cheatgrass			3				1		1					2	2		1					1		1							**0.40**	**1.33**	**27**
N	P	*Hesperostipa comata*	Needle and Thread	13	1	1	14	13	13		5	2	3	1		5			2			10	12	11	5			2	1	18				**4.40**	**14.67**	**63**
N	P	*Hilaria jamesii*	James' Galleta			4	1	2			3		15			4			2	11	14	1		4			11	10	10		6			**3.27**	**10.89**	**50**
N	P	*Hordeum jubatum*	Foxtail Barley		1									1				1	1															**0.13**	**0.44**	**13**
N	P	*Oryzopsis hymenoides*	Indian Ricegrass			1																												**0.03**	**0.11**	**3**
N	P	*Sporobolus cryptandrus*	Sand Dropseed													1			1		3													**0.17**	**0.56**	**10**
Forbs																																			
N	P	*Asclepias speciosa*	Showy Milkweed						3																									**0.10**	**0.33**	**3**
N	P	*Chaetopappa ericoides*	Rose Heath					1																					2					**0.03**	**0.11**	**3**
N	A	*Collomia linearis*	Tiny Trumpet				1			1	1	1			4				2	3	1								2					**0.53**	**1.78**	**30**
N	P	*Cryptantha flava*	Yellow Cryptantha								1																							**0.03**	**0.11**	**3**
N	P	*Erigeron speciosus*	Aspen Fleabane		1	3	1																											**0.17**	**0.56**	**10**
I	B	*Erodium cicutarium*	Redstem Stork's Bill			1			1		1	2					4	3		7					8		3		3				1	**1.13**	**3.78**	**37**
N	P	*Haplopappus spinulosus*	Lacy Tansyaster						1							1	6	3					1			4								**0.53**	**1.78**	**20**
I	A	*Lepidium*	Pepperweed				1					1	2				4			1									1					**0.33**	**1.11**	**20**
N	P	*Phlox hoodii*	Spiny Phlox	2									2									1												**0.17**	**0.56**	**10**
N	A	*Plantago patagonica*	Woolly Plantain																	1								1	1					**0.10**	**0.33**	**10**
I	A	*Sisymbrium altissimum*	Tumble Mustard			1						2					1								1				1					**0.20**	**0.67**	**17**
N	P	*Sphaeralcea coccinea*	Scarlet Globemallow			3		2	2	2		3	3		13	2			4	1	1		2		7	5		1		1			1	**1.77**	**5.89**	**57**
Sub-Shrubs																																			
N	P	*Gutierrezia sarothrae*	Snakeweed	4			3	8	2		10	6		2		3	1			1	1	3	3	1	3					2				**1.77**	**5.89**	**53**
Shrubs & Trees																																			
N	P	*Artemisia tridentata*	Big Sagebrush	1	24	2				19	4	11			4	1	16	11	1		4		4			14	14	4		6				**4.53**	**15.11**	**53**
N	P	*Atriplex canescens*	Four-wing Saltbush		4														5	4							2			3				**0.73**	**2.44**	**20**
N	P	*Eriogonum sp.*	Buckwheat											2								6	3								1	2	1	**0.50**	**1.67**	**20**
N	P	*Juniperus osteosperma*	Utah Juniper		1			8						2												2								**0.43**	**1.44**	**13**
N	P	*Opuntia polyacantha*	Plains Pricklypear						6					1		2		1		1		1												**0.40**	**1.33**	**20**
																																	Mean		
			Total Plant Cover	**25**	**34**	**28**	**29**	**35**	**31**	**38**	**32**	**33**	**36**	**16**	**38**	**33**	**34**	**34**	**42**	**37**	**24**	**23**	**26**	**38**	**34**	**35**	**40**	**33**	**26**	**30**	**16**	**2**	**18**	**30.00**		
			Rock	24	5	35	24	35	1	0	14	2	30	63	17	9	3	0	7	4	17	36	41	15	3	8	34	41	46	37	49	71	46	**23.90**		
			Litter	21	53	18	13	10	25	18	23	20	11	7	11	14	42	23	11	21	15	10	1	9	19	26	16	12	7	6	15	3	11	**16.37**		
			Bare ground	30	8	19	34	20	43	44	31	45	23	14	34	44	21	43	40	38	44	31	32	38	44	31	10	14	21	27	20	24	25	**29.73**		
			Total Perennial Cover (Excluding Noxious Weeds)	**25**	**34**	**23**	**27**	**35**	**30**	**36**	**30**	**26**	**34**	**16**	**34**	**33**	**23**	**29**	**40**	**24**	**23**	**23**	**26**	**38**	**24**	**35**	**36**	**32**	**18**	**30**	**16**	**2**	**17**	**27.30**		

Sample Adequacy Calculations	**Plant Cover Mean = 30.00**	**t= 1.31**	**n = 30**
	Variance = 73.59	**n_{min} = 14.06**	

N=Native, I=Introduced, X=Noxious A=Annual, B=Biennial, P=Perennial

Table A3 New Horizon - Vegetation Cover - 2016

Dry Phase III

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.—>	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	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																																				
N	P	*Agropyron cristatum*	Crested Wheatgrass			1								3	11			18			12			7						1	3	5	4	**2.17**	**5.42**	**45**
X	A	*Bromus tectorum*	Cheatgrass																	12														**0.40**	**1.00**	**5**
I	P	*Elymus junceus*	Russian Wildrye	30	33	31	40	30	35	33	42	29	35	38	21	43	24	11	28	35	40	26	31	23	34	22	35	24	39	32	13	20	34	**30.37**	**75.92**	**100**
Forbs																																				
I	A	*Camelina microcarpa*	Littlepod False Flax																								1				14			**0.50**	**1.25**	**10**
X	P	*Cardaria draba*	Whitetop							1																				5	5			**0.37**	**0.92**	**10**
I	P	*Convolvulus arvensis*	Field Bindweed																									1	4					**0.17**	**0.42**	**10**
N	A	*Descurainia pinnata*	Pinnate Tansymustard																											1		3		**0.13**	**0.33**	**10**
I	B	*Erodium cicutarium*	Redstem Stork's Bill	1			1	8			2				1	1	10	12	1	6			3	10				2		1	7	6	13	**2.83**	**7.08**	**65**
I	A	*Kochia scoparia*	Kochia											1	1		11		1												4			**0.60**	**1.50**	**25**
I	P	*Medicago sativa*	Alfalfa	3	1																3							3	5		2	3		**0.67**	**1.67**	**25**
N	P	*Sphaeralcea coccinea*	Scarlet Globemallow						1														1							3				**0.17**	**0.42**	**10**
Sub-Shrubs																																				
		None																																**0.00**	**0.00**	**0**
Shrubs & Trees																																				
N	P	*Chrysothamnus nauseosus*	Rubber Rabbitbrush																			10												**0.33**	**0.83**	**5**
																																		Mean		
		Total Plant Cover		**34**	**34**	**32**	**41**	**38**	**36**	**34**	**44**	**29**	**35**	**42**	**34**	**44**	**45**	**41**	**30**	**53**	**55**	**36**	**35**	**40**	**34**	**22**	**36**	**30**	**48**	**40**	**45**	**40**	**54**	**38.70**		
		Rock		2	3	3	2	3	2	1	3	1	4	0	2	3	4	7	8	0	2	0	9	2	1	1	3	0	0	4	3	1	0	**2.47**		
		Litter		28	22	25	14	25	22	21	22	29	15	27	33	25	27	32	13	29	21	26	12	35	20	26	30	29	22	16	21	17	18	**23.40**		
		Bare ground		36	41	40	43	34	40	44	31	41	46	31	31	28	24	20	49	18	22	38	44	23	45	51	31	41	30	40	31	42	28	**35.43**		
	0	**Total Perennial Cover (Excluding Noxious Weeds)**		**33**	**34**	**32**	**40**	**30**	**36**	**33**	**42**	**29**	**35**	**41**	**32**	**43**	**24**	**29**	**28**	**35**	**55**	**36**	**32**	**30**	**34**	**22**	**35**	**28**	**48**	**33**	**19**	**27**	**41**	**33.87**		

Sample Adequacy Calculations	Plant Cover Mean = 38.70	t= 1.31	n = 30
	Variance = 58.01	n_{min} = 6.66	

N=Native, I=Introduced, X=Noxious A=Annual, B=Biennial, P=Perennial

Table A4 New Horizon - Vegetation Cover - 2016

Peabody Sage Reference Area

Percent Ground Cover Based on Point-Intercept Sampling

			Transect No.—>	5	4	1	2	3	10	9	8	7	6	17	18	25	26	19	12	13	14	15	16	23	22	21	20	12	30	29	28	27	24	Average Cover	Relative Cover	Freq.
Grasses and Grass-likes																																				
N	P	*Aristida purpurea*	Purple Threeawn				1							1																				**0.07**	**0.22**	**7**
N	P	*Bouteloua gracilis*	Blue Grama	3	17	2	4	5	19	19	5	6	7	6	4	5	4	24	2	6	6	2	9	6	12	1	2	2		6	3	1	7	**6.50**	**21.67**	**97**
X	A	*Bromus tectorum*	Cheatgrass		1		1				1	1		1	1		5					2			1				1					**0.50**	**1.67**	**33**
N	P	*Elymus elymoides*	Squirreltail											2	2									1	1					2				**0.27**	**0.89**	**17**
I	P	*Elymus junceus*	Russian Wildrye																		1													**0.03**	**0.11**	**3**
N	P	*Hilaria jamesii*	James' Galleta		9	5	4	19	7	7			7		1	4	9		18	6								10	5		1	9	6	**4.23**	**14.11**	**57**
N	P	*Hesperostipa comata*	Needle and Thread	19							4	2	3		2					7			7	3	11	9	12		11		12	3	2	**3.57**	**11.89**	**50**
N	P	*Muhlenbergi sp.*	Muhly																										3					**0.10**	**0.33**	**3**
N	P	*Oryzopsis hymenoides*	Indian Ricegrass			1	3																			1								**0.17**	**0.56**	**10**
N	P	*Sporobolus cryptandrus*	Sand Dropseed				2																											**0.07**	**0.22**	**3**
Forbs																																				
N	A	*Alyssum alyssoides*	Pale Madwort													1																		**0.03**	**0.11**	**3**
N	A	*Descurainia pinnata*	Pinnate Tansymustard													1			1															**0.07**	**0.22**	**7**
N	P	*Erigeron speciosus*	Aspen Fleabane		1	2					1		3				3										1							**0.37**	**1.22**	**20**
N	P	*Haplopappus spinulosus*	Lacy Tansyaster									1									3	3	1							7				**0.27**	**0.89**	**13**
N	P	*Heterotheca villosa*	Hairy False Goldenaster																															**0.23**	**0.78**	**3**
N	A	*Plantago patagonica*	Woolly Plantain							1				1				1															1	**0.13**	**0.44**	**13**
N	P	*Sphaeralcea coccinea*	Scarlet Globemallow			1		1	1	1		1	1	3	3		6			1	8	1	3	2	2	1	1		2	5	1	1	8	**1.80**	**6.00**	**73**
Sub-Shrubs																																				
N	P	*Gutierrezia sarothrae*	Snakeweed	4	3	14	3		2		14	3	7	10	14	4	4		4	4		5	4	5	6	14	6	7	4	2	12	5	9	**5.63**	**18.78**	**87**
Shrubs & Trees																																				
N	P	*Artemisia tridentata*	Big Sagebrush							1		13		3	2	13			3	3	5	15	6	4	5	2	6		5	3			5	**3.13**	**10.44**	**57**
N	P	*Atriplex canescens*	Four-wing Saltbush																					2										**0.07**	**0.22**	**3**
N	P	*Eriogonum sp.*	Buckwheat		1																							3						**0.13**	**0.44**	**7**
N	P	*Juniperus osteosperma*	Utah Juniper																										5					**0.17**	**0.56**	**3**
N	P	*Opuntia polyacantha*	Plains Pricklypear	3										1							1			2										**0.23**	**0.78**	**13**
N	P	*Pinus edulis*	Twoneedle Pinyon									3																						**0.10**	**0.33**	**3**
																																		Mean		
			Total Plant Cover	**29**	**32**	**25**	**18**	**25**	**29**	**29**	**25**	**30**	**28**	**28**	**29**	**28**	**31**	**25**	**28**	**27**	**24**	**28**	**30**	**25**	**38**	**28**	**28**	**22**	**36**	**25**	**29**	**19**	**38**	**27.87**		
			Rock	40	36	37	63	32	36	37	10	3	18	3	11	3	10	46	19	7	2	2	5	4	1	24	23	45	29	19	34	24	3	**20.87**		
			Litter	21	9	11	7	12	23	17	35	24	24	21	20	17	18	10	18	18	15	14	17	25	19	34	19	9	21	18	16	10	16	**17.93**		
			Bare ground	10	23	27	12	31	12	17	30	43	30	48	40	52	41	19	35	48	59	56	48	46	42	14	30	24	14	38	21	47	43	**33.33**		
			Total Perennial Cover (Excluding Noxious Weeds)	**29**	**31**	**25**	**17**	**25**	**29**	**28**	**24**	**29**	**28**	**26**	**28**	**26**	**26**	**24**	**27**	**27**	**24**	**26**	**30**	**25**	**37**	**28**	**28**	**22**	**35**	**25**	**29**	**19**	**37**	**27.13**		

Sample Adequacy Calculations	Plant Cover Mean = 27.87	t= 1.31	n = 30
	Variance = 20.33	n_{min} = 4.50	

N=Native, I=Introduced, X=Noxious A=Annual, B=Biennial, P=Perennial

Table A5 New Horizon - Vegetation Production - 2015

Dryland Pasture - Phase III Block

Air Dry Weight (grams per 1/4 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL		TOTAL DESIRABLE	
							g/0.5m^2	lbs / ac	g/0.5m^2	lbs / ac
1	63.2					3.9	**67.1**	**1,195.3**	**63.2**	**1,125.8**
2	44.2			0.9		3.3	**48.4**	**862.2**	**44.2**	**787.4**
3	68.1					1.2	**69.3**	**1,234.5**	**68.1**	**1,213.1**
4	56.1					1.0	**57.1**	**1,017.2**	**56.1**	**999.4**
5	52.7					1.7	**54.4**	**969.1**	**52.7**	**938.8**
6	49.6	6.9					**56.5**	**1,006.5**	**56.5**	**1,006.5**
7	52.6						**52.6**	**937.0**	**52.6**	**937.0**
8	44.8					1.5	**46.3**	**824.8**	**44.8**	**798.1**
9	76.5						**76.5**	**1,362.8**	**76.5**	**1,362.8**
10	56.1					1.9	**58.0**	**1,033.2**	**56.1**	**999.4**
11	71.5					2.4	**73.9**	**1,316.5**	**71.5**	**1,273.7**
12	77.9					2.2	**80.1**	**1,426.9**	**77.9**	**1,387.7**
13	72.6					1.3	**73.9**	**1,316.5**	**72.6**	**1,293.3**
14	44.1					1.4	**45.5**	**810.5**	**44.1**	**785.6**
15	99.9					0.1	**100.0**	**1,781.4**	**99.9**	**1,779.6**
16	24.6		1.8			0.6	**27.0**	**481.0**	**24.6**	**438.2**
17	55.9					5.1	**61.0**	**1,086.7**	**55.9**	**995.8**
18	48.8					1.3	**50.1**	**892.5**	**48.8**	**869.3**
19	34.3					5.5	**39.8**	**709.0**	**34.3**	**611.0**
20	88.3					1.4	**89.7**	**1,597.9**	**88.3**	**1,573.0**
21	55.4	5.4				0.4	**61.2**	**1,090.2**	**60.8**	**1,083.1**
22	67.3					2.3	**69.6**	**1,239.9**	**67.3**	**1,198.9**
23	32.0					27.3	**59.3**	**1,056.4**	**32.0**	**570.0**
24	29.8					4.1	**33.9**	**603.9**	**29.8**	**530.9**
25	74.1					2.5	**76.6**	**1,364.6**	**74.1**	**1,320.0**
26	71.4					1.9	**73.3**	**1,305.8**	**71.4**	**1,271.9**
27	40.6					0.5	**41.1**	**732.2**	**40.6**	**723.2**
28	59.0	0.6				0.8	**60.4**	**1,076.0**	**59.6**	**1,061.7**
29	56.8					2.0	**58.8**	**1,047.5**	**56.8**	**1,011.8**
30	41.6					0.3	**41.9**	**746.4**	**41.6**	**741.1**
Average	**57.0**	**0.4**	**0.1**	**0.0**	**0.0**	**2.6**	**60.1**	**1070.8**	**57.4**	**1022.9**

Sampling Adequacy: **t = 1.311** **var. = 270.166**

n= 30 **Mean = 60.11** **n_{min} = 12.860**

Table A6 New Horizon - Vegetation Production - 2015

Old Peabody Sage - Reference Area

Oven Dry Weight (grams per 1/2 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL		TOTAL DESIRABLE	
							g/0.5m^2	lbs / ac	g/0.5m^2	lbs / ac
1	16.2				0.6		**16.8**	**299.3**	**16.2**	**288.6**
2	16.5	1.5			0.3		**18.3**	**326.0**	**18.0**	**320.7**
3	15.1	5.2	4.8	0.4	0.8		**26.3**	**468.5**	**20.3**	**361.6**
4	26.7				0.7		**27.4**	**488.1**	**26.7**	**475.6**
5	9.6	0.1			1.1		**10.8**	**192.4**	**9.7**	**172.8**
6	38.8				0.1		**38.9**	**693.0**	**38.8**	**691.2**
7	15.3	0.3			2.0		**17.6**	**313.5**	**15.6**	**277.9**
8	6.1	14.5		0.5	0.4		**21.5**	**383.0**	**20.6**	**367.0**
9	5.5	8.5		0.7	0.6		**15.3**	**272.6**	**14.0**	**249.4**
10	19.3	1.4		0.1	0.6		**21.4**	**381.2**	**20.7**	**368.7**
11	1.0		6.4		0.3		**7.7**	**137.2**	**1.0**	**17.8**
12	1.8	11.7	8.6	0.5	0.4		**23.0**	**409.7**	**13.5**	**240.5**
13	24.2	2.1			0.1		**26.4**	**470.3**	**26.3**	**468.5**
14	9.2	4.3	1.0		0.4		**14.9**	**265.4**	**13.5**	**240.5**
15	25.5	14.0			0.2		**39.7**	**707.2**	**39.5**	**703.7**
16	11.4	11.0		0.2	1.3		**23.9**	**425.8**	**22.4**	**399.0**
17	12.2	8.4			2.2		**22.8**	**406.2**	**20.6**	**367.0**
18	21.3	2.3					**23.6**	**420.4**	**23.6**	**420.4**
19	14.8	1.5					**16.3**	**290.4**	**16.3**	**290.4**
20	13.7	4.0					**17.7**	**315.3**	**17.7**	**315.3**
21	17.0		1.9	0.1	0.1		**19.1**	**340.2**	**17.0**	**302.8**
22	2.6	4.2	3.7		0.7		**11.2**	**199.5**	**6.8**	**121.1**
23	0.2	0.9	11.0		0.3		**12.4**	**220.9**	**1.1**	**19.6**
24	22.7	13.9			1.5		**38.1**	**678.7**	**36.6**	**652.0**
25	10.0	7.2			1.8		**19.0**	**338.5**	**17.2**	**306.4**
26	16.1	0.2		0.8	1.3		**18.4**	**327.8**	**16.3**	**290.4**
27	25.4	1.4					**26.8**	**477.4**	**26.8**	**477.4**
28	20.3						**20.3**	**361.6**	**20.3**	**361.6**
29	12.5		2.8		0.2		**15.5**	**276.1**	**12.5**	**222.7**
30	8.3				1.4		**9.7**	**172.8**	**8.3**	**147.9**
31	2.4	0.4	13.6	0.4			**16.8**	**299.3**	**2.8**	**49.9**
32	9.2	1.0	12.0		0.3		**22.5**	**400.8**	**10.2**	**181.7**
33	20.8	0.4					**21.2**	**377.7**	**21.2**	**377.7**
34	13.6	0.7	6.8		0.9		**22.0**	**391.9**	**14.3**	**254.7**
35	18.7	3.2	8.0		0.5		**30.4**	**541.5**	**21.9**	**390.1**
36	22.2	0.3			0.6		**23.1**	**411.5**	**22.5**	**400.8**
37	10.0				0.3		**10.3**	**183.5**	**10.0**	**178.1**
38	6.3		6.4		0.8		**13.5**	**240.5**	**6.3**	**112.2**
39	2.6	2.5	4.1		1.1		**10.3**	**183.5**	**5.1**	**90.9**
40	22.9	0.6	1.4		0.2		**25.1**	**447.1**	**23.5**	**418.6**
41	19.6	0.3	5.8				**25.7**	**457.8**	**19.9**	**354.5**
42	1.7	14.7	7.9		0.6		**24.9**	**443.6**	**16.4**	**292.1**
43	30.2				0.3		**30.5**	**543.3**	**30.2**	**538.0**
44	2.1		18.9	1.5	8.3		**30.8**	**548.7**	**2.1**	**37.4**
45	10.3		10.6	0.4	0.4		**21.7**	**386.6**	**10.3**	**183.5**
Average	**14.0**	**3.2**	**3.0**	**0.1**	**0.7**	**0.0**	**21.1**	**375.9**	**17.2**	**306.6**

Sampling Adequacy: **t = 1.301** **var. = 57.260**
n= 45 **Mean = 21.10** **n_{min} = 21.767**

Table A7 New Horizon - Vegetation Production - 2016

Dryland Pasture - Phase III Block

Oven Dry Weight (grams per 1/2 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL DESIRABLE		TOTAL DESIRABLE	
							g/0.5m^2	lbs / ac	g/0.5m^2	lbs / ac
1	23.7					0.9	**24.6**	**438.2**	**23.7**	**422.2**
2	37.8				0.6		**38.4**	**684.1**	**37.8**	**673.4**
3	58.4						**58.4**	**1,040.3**	**58.4**	**1,040.3**
4	47.8						**47.8**	**851.5**	**47.8**	**851.5**
5	81.9						**81.9**	**1,459.0**	**81.9**	**1,459.0**
6	32.5						**32.5**	**579.0**	**32.5**	**579.0**
7	28.7						**28.7**	**511.3**	**28.7**	**511.3**
8	40.9						**40.9**	**728.6**	**40.9**	**728.6**
9	71.5					0.1	**71.6**	**1,275.5**	**71.5**	**1,273.7**
10	61.2						**61.2**	**1,090.2**	**61.2**	**1,090.2**
11	50.2						**50.2**	**894.3**	**50.2**	**894.3**
12	38.3					0.1	**38.4**	**684.1**	**38.3**	**682.3**
13	45.3					0.6	**45.9**	**817.7**	**45.3**	**807.0**
14	43.6						**43.6**	**776.7**	**43.6**	**776.7**
15	52.7					0.3	**53.0**	**944.1**	**52.7**	**938.8**
16	66.8					0.5	**67.3**	**1,198.9**	**66.8**	**1,190.0**
17	64.6					1.3	**65.9**	**1,173.9**	**64.6**	**1,150.8**
18	60.0						**60.0**	**1,068.8**	**60.0**	**1,068.8**
19	14.3						**14.3**	**254.7**	**14.3**	**254.7**
20	50.3					2.0	**52.3**	**931.7**	**50.3**	**896.0**
21	48.8					0.3	**49.1**	**874.7**	**48.8**	**869.3**
22	64.5						**64.5**	**1,149.0**	**64.5**	**1,149.0**
23	26.0					0.1	**26.1**	**464.9**	**26.0**	**463.2**
24	36.8						**36.8**	**655.6**	**36.8**	**655.6**
25	37.4					0.2	**37.6**	**669.8**	**37.4**	**666.2**
26	59.4						**59.4**	**1,058.2**	**59.4**	**1,058.2**
27	66.6			0.3	0.3	0.1	**67.3**	**1,198.9**	**66.6**	**1,186.4**
28	34.9				3.0	0.5	**38.4**	**684.1**	**34.9**	**621.7**
29	38.9				0.1	0.2	**39.2**	**698.3**	**38.9**	**693.0**
30	37.5					0.1	**37.6**	**669.8**	**37.5**	**668.0**
Average	**47.4**	**0.0**	**0.0**	**0.0**	**0.1**	**0.2**	**47.8**	**850.9**	**47.4**	**844.0**

Sampling Adequacy: **t = 1.311** **var. = 248.053**
n= 30 **Mean = 47.76** **n_{min} = 18.700**

Table A8 New Horizon - Vegetation Production - 2016

Old Peabody Sage - Reference Area

Oven Dry Weight (grams per 1/2 square meter) er 1/2 square meter)

Sample No.	*Perennial Grasses*	*Perennial Forbs*	*Sub-shrubs*	*Annual Grasses*	*Annual / Biennial Forbs*	*Noxious Weeds*	TOTAL		TOTAL DESIRABLE	
							g/0.5m^2	lbs / ac	g/0.5m^2	lbs / ac
1	2.8	0.7	12.3				**15.8**	**281.5**	**3.5**	**62.3**
2	6.7				5.8		**12.5**	**222.7**	**6.7**	**119.4**
3			28.2				**28.2**	**502.4**	**0.0**	**0.0**
4	3.1		5.9		0.2		**9.2**	**163.9**	**3.1**	**55.2**
5	35.1		0.5				**35.6**	**634.2**	**35.1**	**625.3**
6	17.0	0.7	12.6		3.1		**33.4**	**595.0**	**17.7**	**315.3**
7	9.4			1.0	1.0		**11.4**	**203.1**	**9.4**	**167.5**
8	29.1		8.3				**37.4**	**666.2**	**29.1**	**518.4**
9	14.0		18.3		0.2		**32.5**	**579.0**	**14.0**	**249.4**
10	26.3			0.2	5.4		**31.9**	**568.3**	**26.3**	**468.5**
11	9.7	0.2	6.1	1.2			**17.2**	**306.4**	**9.9**	**176.4**
12	6.0		5.6		1.5		**13.1**	**233.4**	**6.0**	**106.9**
13	10.3	3.2	14.3				**27.8**	**495.2**	**13.5**	**240.5**
14	16.0	9.3	5.5				**30.8**	**548.7**	**25.3**	**450.7**
15	5.3	17.1	3.7	0.7			**26.8**	**477.4**	**22.4**	**399.0**
16	9.3		2.1	0.2	0.2		**11.8**	**210.2**	**9.3**	**165.7**
17	20.0	9.9		0.2			**30.1**	**536.2**	**29.9**	**532.6**
18	13.8	7.4			0.1		**21.3**	**379.4**	**21.2**	**377.7**
19	30.5						**30.5**	**543.3**	**30.5**	**543.3**
20	5.0	4.9					**9.9**	**176.4**	**9.9**	**176.4**
21	0.3	9.9	18.0		0.1		**28.3**	**504.1**	**10.2**	**181.7**
22	18.3	7.7		0.4			**26.4**	**470.3**	**26.0**	**463.2**
23	31.1	6.7					**37.8**	**673.4**	**37.8**	**673.4**
24	3.9	0.6	8.7	0.3	0.1		**13.6**	**242.3**	**4.5**	**80.2**
25	12.5		2.4		0.5		**15.4**	**274.3**	**12.5**	**222.7**
26	4.5		15.1		1.3		**20.9**	**372.3**	**4.5**	**80.2**
27	27.1	1.5			0.3		**28.9**	**514.8**	**28.6**	**509.5**
28	10.1	4.2	0.9				**15.2**	**270.8**	**14.3**	**254.7**
29	6.7	0.2	5.0		0.5		**12.4**	**220.9**	**6.9**	**122.9**
30	12.2	0.6	12.5		1.2		**26.5**	**472.1**	**12.8**	**228.0**
Average	**13.2**	**2.8**	**6.2**	**0.1**	**0.7**	**0.0**	**23.1**	**411.3**	**16.0**	**285.6**

Sampling Adequacy: **t = 1.311** **var. = 83.576**
n= 30 **Mean = 23.09** **n_{min} = 26.968**

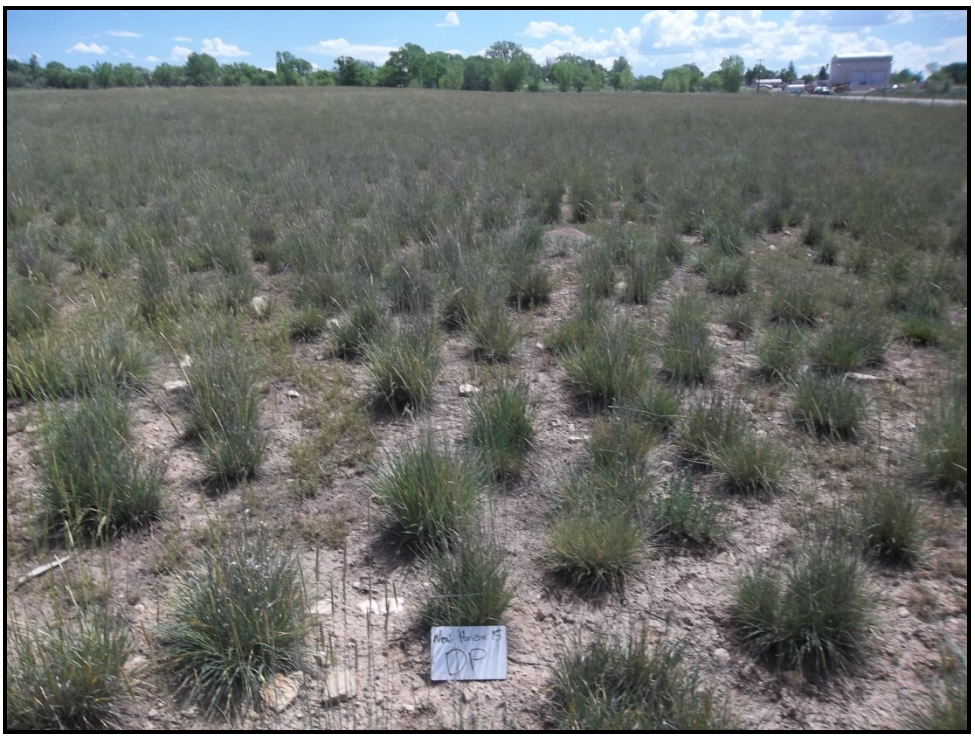


Plate 1: Dryland Pasture Bond Release Block - 2015

Plate 2: Old Peabody Sage Reference Area - 2015

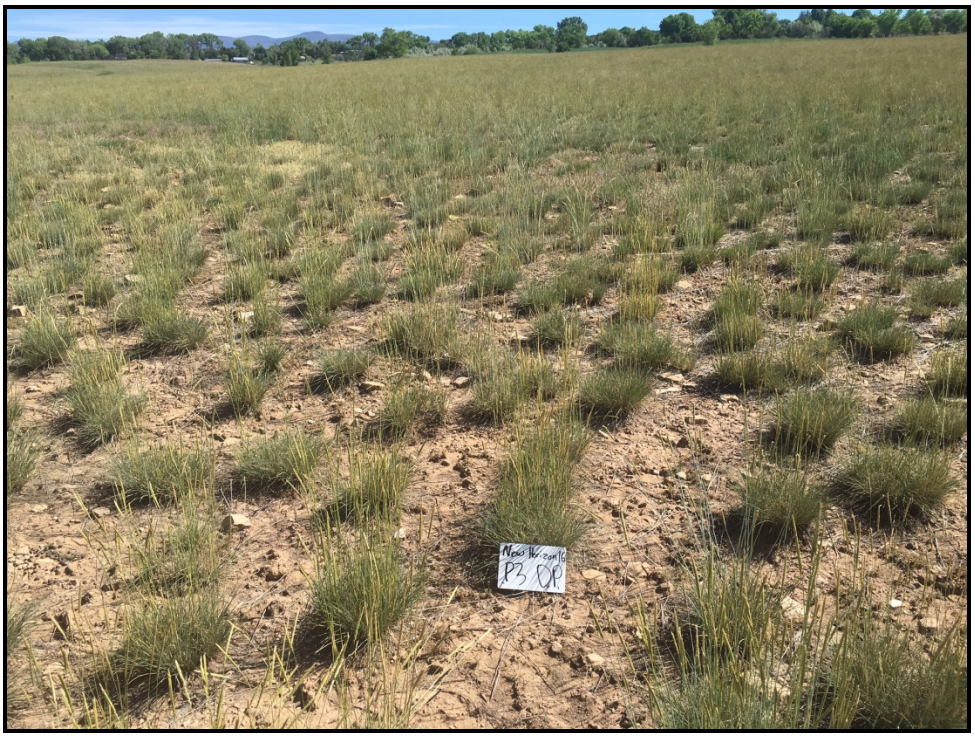


Plate 3: Dryland Pasture Bond Release Block - 2016

Plate 4: Old Peabody Sage Reference Area - 2016