



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

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August 10, 2020

Steve Christensen  
Coal Program Manager  
Oil, Gas & Mining  
1594 West North Temple, Suite 1210  
Salt Lake City, UT 84114-5801

Re: **Phase 2 Bond Release, Alton Coal Development, LLC, Coal Hollow Project,  
Kane County, Utah, C/025/0005**

Dear Mr. Christensen:

Pursuant to R645-301-880.300, enclosed on behalf of Alton Coal Development, LLC is a copy of the application for Phase 2 Bond Release for select areas of the Coal Hollow Mine as follows:

- Application for Phase 2 Bond Release
- C1 and C2 Forms
- Public Notice for Bond Release Application
- Plan view Figure of "Proposed Phase 2 Bond Release"

Also, as required by R645-301-880.600, notifications of the proposed bond release have been made to the following:

- Southern Utah News
- Alecia Swapp Dame Trust - Richard Dame
- C. Burton Pugh
- Heaton Brothers, LLC
- BLM-KFO
- Darlynn Sorensen
- Kane County Planning Commission
- Kane County Water Conservancy District

- Alton Mayor – Alton, Utah

Please contact me at 435-691-1551 should you have any questions or comments. This submittal is being provided electronically, a hard copy with certified drawings will follow.

Sincerely

A handwritten signature in black ink, appearing to read "B. Kirk Nicholes". The signature is fluid and cursive, with a prominent initial "B" and a stylized "K".

B. Kirk Nicholes  
Environmental Specialist

**Application for Phase 2 Bond Release  
Coal Hollow Mine**

**Alton Coal Development, LLC  
463 N 100 W, Suite 1  
Cedar City, UT 84721**

**Permit # C/025/0005  
Permit Approval 11/08/2010**

Alton Coal Development, LLC (“ACD”) files this application with the Utah Division of Oil, Gas and Mining for Phase 2 Bond Release for 86.21 acres of the Coal Hollow Mine, C/025/0005.

ACD has met the requirements of the Coal Hollow Mine (“CHM”), Mining and Reclamation Plan (“MRP”) and the Utah Coal Rules as to whether the lands to which the release would be applicable are contributing suspended solids to streamflow or runoff outside the permit area in excess of the water quality requirements for Phase 2 Bond Release (refer to R645-301-880.300). Phase III requirements are not considered as part of this Phase 2 release. No sediment control structures have been included as part of this release, and all bond associated with these structures remains unchanged. This application for Phase 2 bond release is for the following described areas of the Coal Hollow Mine (“Reclaimed Coal Mine”) as shown on Figure 1:

## **I. LEGAL DESCRIPTION.**

### **1. BRP2 - 3**

The following described lands located in Kane County, Utah within the NW 1/4 NE1/4, E 1/2 NE 1/4 and the NE 1/4 SE 1/4 of Sec. 30 T39S, R5W:

Beginning from the Section Corner 19-20-29-30 T39S, R5W, proceeding N 89°18'51" W a distance of 420.3603' along the section line; thence S 00°00'00" E a distance of 967.2014' to the true point of beginning; thence S 67°36'41" W a distance of 77.5'; thence S 50°46'33" W a distance of 142.6'; thence S 72°01'01" W a distance of 71.4'; thence S 14°48'49" W a distance of 70.8'; thence N 55°21'58" W a distance of 99.9'; thence N 71°48'40" W a distance of 255.1'; thence N 85°47'41" W a distance of 90.8'; thence S 72°07'39" W a distance of 88.6'; thence S 45°47'14" W a distance of 26.5'; thence N 35°09'59" W a distance of 270.1'; thence S 01°28'46" W a distance of 445.2'; thence S 89°10'59" E a distance of 47.3'; thence S 00°20'24" W a distance of 675.2'; thence S 00°19'55" W a distance of 547.7'; thence S 71°04'12" E a distance of 41.3'; thence S 84°58'24" E a distance of 36.9'; thence N 84°55'20" E a distance of 301.8'; thence N 81°50'49" E a distance of 157.8'; thence S 00°14'08" W a distance of 325.3'; thence S 18°58'14" E a distance of 126.0'; thence S 09°37'32" E a distance of 169.9'; thence S 00°41'59" E a distance of 340.7'; thence S 11°22'49" E a distance of 305.2'; thence S 89°59'55" E a distance of 566.1'; thence N 14°56'07" E a distance of 11.4'; thence N 15°54'21" W a distance of 174.1'; thence N 31°23'24" W a distance of 259.2'; thence N 36°28'26" W a distance of 164.7'; thence N 57°23'37" W a distance of 87.9'; thence N 89°16'51" E a distance of 294.9'; thence N 00°06'54" E a distance of 1,089.3'; thence N 30°00'15" W a distance of 341.0'; thence N 03°51'03" W a distance of 340.7'; thence N 04°16'42" E a distance of 341.5'; thence N 35°50'33" W a distance of 162.4'; which is the true point of beginning, having an area of 2,261,891.5 square feet, or **51.93 acres**

### **2. BRP2 - 4**

The following described lands located in Kane County, Utah within the NW 1/4, NE 1/4 and the NE 1/4, NW 1/4 of Sec. 30 T39S, R5W and the SW 1/4, SE 1/4 of Sec. 19 T39S, R5W:

Beginning from the Section Corner 19-24-25-30 T39S, R5W, proceeding S 89°40'35" E a distance of 2531.0552' along the section line to the quarter corner 19-30 T39S, R5W; thence S

76°48'47" E a distance of 393.1843' to the true point of beginning; thence S 89°59'20" E a distance of 688.9'; thence S 00°38'51" W a distance of 48.4'; thence S 00°38'51" W a distance of 183.0'; thence S 85°10'59" E a distance of 172.7'; thence S 89°17'44" E a distance of 18.6'; thence S 02°34'10" W a distance of 644.6'; thence S 01°10'53" W a distance of 350.4'; thence N 89°10'58" W a distance of 165.9'; thence N 89°10'58" W a distance of 719.2'; thence N 89°10'59" W a distance of 150.5'; thence N 89°11'08" W a distance of 105.0'; thence N 32°38'24" W a distance of 210.1'; thence N 02°54'35" W a distance of 144.0'; thence N 20°23'29" E a distance of 410.2'; thence N 17°46'10" W a distance of 26.8'; thence N 17°46'10" W a distance of 13.2'; thence N 05°33'22" W a distance of 49.5'; thence N 25°32'59" E a distance of 169.3'; thence N 43°48'57" E a distance of 215.6'; thence N 40°59'52" E a distance of 62.6'; thence N 22°15'57" E a distance of 82.1'; which is the point of beginning, having an area of 1,365,538.9 square feet or **31.35 acres**

### **3. BRP2 – 5**

The following described lands located in Kane County, Utah within the NW 1/2, NE 1/4 of Sec. 13 T39S, R6W:

Beginning from the Quarter Corner section 13 - 18 T39S, R6W, proceeding N 89°23'25" W a distance of 2203.5515' along the quarter corner line; thence N 00°00'00" W a distance of 296.3521' to the true point of beginning; thence N 57°57'02" W a distance of 54.7'; thence N 56°42'34" W a distance of 86.9'; thence N 67°33'15" W a distance of 11.1'; thence N 00°04'20" E a distance of 261.1'; thence N 43°22'19" E a distance of 52.6'; thence N 00°00'00" W a distance of 132.9'; thence N 48°20'36" W a distance of 49.2'; thence N 00°37'55" E a distance of 313.6'; thence N 04°50'11" W a distance of 171.9'; thence N 15°23'27" E a distance of 21.0'; thence N 50°15'30" E a distance of 17.5'; thence N 76°01'14" E a distance of 101.7'; thence S 13°58'46" E a distance of 1.7'; thence S 01°39'41" W a distance of 46.6'; thence S 07°07'47" E a distance of 239.2'; thence S 00°19'39" W a distance of 649.1'; thence S 00°48'07" W a distance of 152.1'; which is the point of beginning, having an area of 127,498.2 square feet, **2.93 acres**

## **II. RECLAMATION TREATMENTS UTILIZED**

**BRP2 - 3** includes the former Pit 20A, Pit 20B, HWT 1-A through HWT 3-B and Surf4 & 5 of the South Private Lease. Phase 1 bond release was approved for the Pit and HWT areas on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2015, 2016 and spring of 2016 for various portions of BRP2-3. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in December of 2014, January of 2015 and October & March of 2016. The grasses and forbs were drill seeded, while the shrubs were broadcast from a broadcaster mounted on the drill using the following seed mix:

**Revegetation Seed Mixture for the Sagebrush/Grass Community at the Coal Hollow Project**

	<b>Rate** (# PLS/Ac)</b>	<b>Seeds/ft2</b>
<b>SHRUBS</b>		
<i>Artemisia nova</i>	0.20	4.16
<i>Artemisia tridentata</i>	0.10	5.74
<i>Ceratoides lanata</i>	1.00	1.26
<i>Purshia tridentata</i>	2.00	0.69
<i>Symphoricarpos oreophilus</i>	1.00	1.72
<b>FORBS</b>		
<i>Achillea millefolium</i>	0.03	1.91
<i>Hedysarum boreale</i>	1.00	0.77
<i>Linum lewisii</i>	0.70	4.47
<i>Lupinus argenteus</i>	1.00	0.29
<i>Penstemon palmeri</i>	0.30	4.20
<i>Sphaeralcea grossulariifolia</i>	0.40	4.59
<i>Viguiera multiflora</i>	0.20	4.84
<b>GRASSES</b>		
<i>Elymus smithii</i>	1.50	4.34
<i>Elymus trachycaulus</i>	1.50	5.51
<i>Poa pratensis</i>	0.10	5.00
<i>Poa secunda</i>	0.20	4.25
<i>Stipa hymenoides</i>	1.00	4.32
Sterile Triticale - Quick Guard	10.00	4.59
<b>TOTALS</b>	<b>22.23</b>	<b>62.66</b>

**Revegetation Seed Mixture for the Pasture Lands at the Coal Hollow Project**

(Final determination to be made by landowners)	Rate* (# PLS/Ac)	Seeds/ft2
<b>SHRUBS</b>		
<b>FORBS</b>		
<i>Achillea millefolium var. occidentalis</i>	0.04	2.55
<i>Astragalus cicer</i>	1.5	4.22
<i>Hedysarum boreale</i>	1	0.77
<i>Linum perenne</i>	1	6.39
<i>Medicago sativa</i>	1	5.21
<b>GRASSES</b>		
<i>Bromus inermis</i>	1	2.45
<i>Dactylis glomerata</i>	0.2	0.00
<i>Pascopyrum smithii</i>	1.5	4.34
<i>Elymus lanceolatus ssp. lanceolatus</i>	1.5	5.27
<i>Psathyrostachys juncea</i>	1	0.00
<i>Thinopyrum intermedium</i>	2	0.00
<i>Phleum pretense</i>	0.2	0.00
<i>Poa pratensis</i>	0.1	5.00
Sterile Triticale - Quick Guard	10.00	4.59
<b>TOTALS</b>	<b>22.04</b>	<b>40.78</b>

**BRP2 - 4** includes the former Pit 1A, Pit 1B, Pit 2, Pit 4, Pit 7 and Pit 8 of the South Private Lease. Phase 1 bond release was approved for this area on November 7, 2015 and May 4, 2016. Topsoil (approximately 8”) was placed in the fall of 2014, 2015 and Spring of 2016 for various portions of BRP2-4. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed on the soil surface. Following top soiling and mulching, the prepared portions were seeded in November 2014, March & October 2016 and November of 2017. The grasses and forbs were drill seeded, while the shrubs were broadcast from a broadcaster mounted on the drill (following the approved MRP Drawing 3-7, Reclamation Treatments, Monitoring & Sampling Locations) using the following seed mix:

**Revegetation Seed Mixture for the Sagebrush/Grass Community at the Coal Hollow Project**

	Rate** (# PLS/Ac)	Seeds/ft2
<b>SHRUBS</b>		
<i>Artemisia nova</i>	0.20	4.16
<i>Artemisia tridentata</i>	0.10	5.74
<i>Ceratoides lanata</i>	1.00	1.26
<i>Purshia tridentata</i>	2.00	0.69
<i>Symphoricarpos oreophilus</i>	1.00	1.72
<b>FORBS</b>		
<i>Achillea millefolium</i>	0.03	1.91
<i>Hedysarum boreale</i>	1.00	0.77
<i>Linum lewisii</i>	0.70	4.47
<i>Lupinus argenteus</i>	1.00	0.29
<i>Penstemon palmeri</i>	0.30	4.20
<i>Sphaeralcea grossulariifolia</i>	0.40	4.59
<i>Viguiera multiflora</i>	0.20	4.84
<b>GRASSES</b>		
<i>Elymus smithii</i>	1.50	4.34
<i>Elymus trachycaulus</i>	1.50	5.51
<i>Poa pratensis</i>	0.10	5.00
<i>Poa secunda</i>	0.20	4.25
<i>Stipa hymenoides</i>	1.00	4.32
Sterile Triticale - Quick Guard	10.00	4.59
<b>TOTALS</b>	<b>22.23</b>	<b>62.66</b>

**BRP2 - 5** includes the former Pit 1 of the North Private Lease. Phase 1 bond release was approved for the Pit 1 on January 18, 2017. Topsoil (approximately 18”) was placed in the fall of 2016. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in October of 2016. The grasses and forbs were drill seeded, using the following seed mix:

**Revegetation Seed Mixture for the Pasture Lands at the Coal Hollow Project**

(Final determination to be made by landowners)	Rate* (# PLS/Ac)	Seeds/ft2
<b>SHRUBS</b>		
<b>FORBS</b>		
<i>Achillea millefolium var. occidentalis</i>	0.04	2.55
<i>Astragalus cicer</i>	1.5	4.22
<i>Hedysarum boreale</i>	1	0.77
<i>Linum perenne</i>	1	6.39
<i>Medicago sativa</i>	1	5.21
<b>GRASSES</b>		
<i>Bromus inermis</i>	1	2.45
<i>Dactylis glomerata</i>	0.2	0.00
<i>Pascopyrum smithii</i>	1.5	4.34
<i>Elymus lanceolatus ssp. lanceolatus</i>	1.5	5.27
<i>Psathyrostachys juncea</i>	1	0.00
<i>Thinopyrum intermedium</i>	2	0.00
<i>Phleum pratense</i>	0.2	0.00
<i>Poa pratensis</i>	0.1	5.00
Sterile Triticale - Quick Guard	10.00	4.59
<b>TOTALS</b>	<b>22.04</b>	<b>40.78</b>

### **III. VEGETATION ANALYSIS DEMONSTRATION THAT AREA IS NOT CONTRIBUTING SUSPENDED SOLIDS OUTSIDE PERMIT**

The Vegetation analysis for BRP2-3, see attached report “Vegetation Monitoring for Phase II Bond Release 2018 at the Coal Hollow Mine Kane County, Utah” prepared by Mt. Nebo Scientific, Inc. The bond release area for BRP-3 has been reduced in the area of Surf5 from the original vegetation report due to a change in bond polygons that occurred from the addition of LBA Block 1. The Vegetation analysis for BRP2-4 and BRP2-5, see attached report “Vegetation Monitoring for Phase II Bond Release 2019 at the Coal Hollow Mine Kane County, Utah” prepared by Steven Petersen, Ph.D. ACD Wildlife and Vegetation Consultant. The bond release area for BRP-4 has been reduced in the area of Pit8 from the original vegetation report due to a change in bond polygons that occurred from the addition of LBA Block 1.

### **IV. SURETY BOND REDUCTION**

The Phase 2 bond release application is for a liability reduction of \$ 347,697 from the current disturbance liability of \$ 13,272,562. The current bond for Coal Hollow Mine will remain at \$13,370,000. All of the above-described areas within the Reclaimed Coal Mine meet the requirements of the MRP and the Division’s regulations for post mine land use and for backfilling, regrading and drainage control standards.

### **V. PUBLIC NOTICE**

As required by R645-301-880.600, notification of the proposed bond release has been made to the following:

- Southern Utah News
- Alecia Swapp Dame Trust - Richard Dame
- C. Burton Pugh
- Heaton Brothers, LLC
- BLM-KFO
- Darlynn Sorensen
- Kane County Planning Commission
- Kane County Water Conservancy District
- Alton Mayor – Alton, Utah

Copies of these notices are attached.

VI. CERTIFICATION

I hereby certify to the best of my information and belief that all information contain in this request for bond release is true and correct, to the best of my knowledge and that all applicable reclamation activities have been accomplished in accordance with the requirement of the Act, the regulatory program and the approved reclamation plan.

By B. K. M. M. M.

Title Environmental Specialist

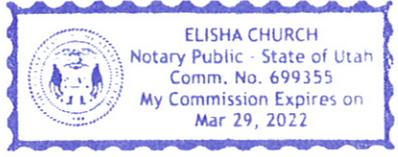
Subscribed and Sworn to before me this 10 day of August 2020.

Notary Public Elisha Church

My Commission Expires: 3/29/2022

Attest: State of Utah

County of Iron



**PUBLIC NOTICE PHASE 2 BOND RELEASE APPLICATION  
COAL HOLLOW MINE,  
ALTON COAL DEVELOPMENT, LLC**

**Public Notice  
Phase 2 Bond Release Application  
Coal Hollow Mine (CHM)  
Alton Coal Development, LLC  
463 N 100 W, Suite 1  
Cedar City, UT 84721  
MSHA # 42-02519  
Permit # C/025/0005  
Permit Approval 11/08/2010**

Notice is hereby given that Alton Coal Development, LLC has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of the Coal Hollow Mine (“CHM” or the “Reclaimed Coal Mine”).

All areas for bond release have met the standards of the Utah Coal Program as to the vegetation and water quality requirements for Phase 2 Bond Release (refer to R645-301-880). The locations of the Reclaimed Coal Mine areas in Kane County, Utah are as follows:

**BRP2 - 3** - A portion of the CHM within the NW 1/4 NE1/4, E 1/2 NE 1/4 and the NE 1/4 SE 1/4 of Sec. 30 T39S, R5W containing **51.93** acres. **BRP2 - 3** includes the former Pit 20A, Pit 20B, HWT 1-A through HWT 3-B and Surf4 &5 of the South Private Lease. Phase 1 bond release was approved for the Pit and HWT areas on November 7, 2015 and May 4, 2016. Topsoil (approximately 8”) was placed in the fall of 2015, 2016 and spring of 2016 for various portions of BRP2-3. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in December of 2014, January of 2015 and October & March of 2016.

**BRP2 - 4** - A portion of the CHM within the NW 1/4, NE 1/4 and the NE 1/4, NW 1/4 of Sec. 30 T39S, R5W and the SW 1/4, SE 1/4 of Sec. 19 T39S, R5W containing **31.35** acres. **BRP2 - 4** includes the former Pit 1A, Pit 1B, Pit 2, Pit 4, Pit 24, Pit 7 and Pit 8 of the South Private Lease. Phase 1 bond release was approved for this area on November 7, 2015 and May 4, 2016. Topsoil (approximately 8”) was placed in the fall of 2014, 2015 and Spring of 2016 for various portions of BRP2-4. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed on the soil surface. Following top soiling and mulching, the prepared portions were seeded in November 2014, March & October 2016 and November of 2017.

**BRP2 - 5** - A portion of the CHM within the NW 1/2, NE 1/4 of Sec. 13 T39S, R6W containing **2.93** acres. **BRP2 - 5** includes the former Pit 1 of the North Private Lease. Phase 1 bond release was approved for the Pit 1 on January 18, 2017. Topsoil (approximately 18”) was placed in the fall of 2016. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in October of 2016.

The Phase 2 bond release application is for a liability reduction of \$ 347,697 from the current disturbance liability of \$ 13,272,562. The current bond for Coal Hollow Mine will remain at \$13,370,000. All of the above-described areas within the Reclaimed Coal Mine meet the requirements of the MRP and the Division's regulations for post mine land use and for backfilling, regrading and drainage control standards.

A copy of the Phase 2 bond release application with the complete legal description for each area may be examined at the office of Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, Salt Lake City, Utah 84114-5801 and written comments, objections, or requests for an informal conference may be submitted to the Salt Lake City address. Said comments must be submitted thirty (30) days from the date of the last publication of this notice. This notice is being published to comply with the Surface Mining Control and Reclamation Act of 1977, the Utah Coal Mining and Reclamation Act and State and Federal regulations promulgated pursuant to said Acts. Published in the Southern Utah News Aug. 13<sup>th</sup>, 20<sup>th</sup>, 27<sup>th</sup> & Sep. 3<sup>rd</sup>.



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

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August 10, 2020

Alecia Swapp Dame Trust  
c/o Richard Dame, Trustee  
1620 Georgia Ave.  
Boulder City, Nevada 89005

Dear Mr. Dame:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine). A portion of the area subject to the Phase 2 Bond Release is leased by ACD from the Alecia Swapp Dame Trust.

All areas for bond release have met the standards of the Utah Coal Program as to the vegetation and water quality requirements for Phase 2 Bond Release (refer to R645-301-880). The locations of the Reclaimed Coal Mine areas in Kane County, Utah are as follows:

**BRP2 - 3** - A portion of the CHM within the NW 1/4 NE1/4, E 1/2 NE 1/4 and the NE 1/4 SE 1/4 of Sec. 30 T39S, R5W containing **51.93** acres. **BRP2 - 3** includes the former Pit 20A, Pit 20B, HWT 1-A through HWT 3-B and Surf4 &5 of the South Private Lease. Phase 1 bond release was approved for the Pit and HWT areas on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2015, 2016 and spring of 2016 for various portions of BRP2-3. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in December of 2014, January of 2015 and October & March of 2016.

**BRP2 - 4** - A portion of the CHM within the NW 1/4, NE 1/4 and the NE 1/4, NW 1/4 of Sec. 30 T39S, R5W and the SW 1/4, SE 1/4 of Sec. 19 T39S, R5W containing **31.35** acres. **BRP2 - 4** includes the former Pit 1A, Pit 1B, Pit 2, Pit 4, Pit 24, Pit 7 and Pit 8 of the South Private Lease. Phase 1 bond release was approved for this area on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2014, 2015 and Spring of 2016 for various portions of BRP2-4. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed on the soil surface. Following top soiling and mulching, the prepared portions were seeded in November 2014, March & October 2016 and November of 2017.

**BRP2 - 5** - A portion of the CHM within the NW 1/2, NE 1/4 of Sec. 13 T39S, R6W containing **2.93** acres. **BRP2 - 5** includes the former Pit 1 of the North Private Lease. Phase 1 bond release was approved for the Pit 1 on January 18, 2017. Topsoil

Alecia Swapp Dame Trust  
Through Richard Dame, Trustee

(approximately 18") was placed in the fall of 2016. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in October of 2016.

The Phase 2 bond release application is for a liability reduction of \$ 347,697 from the current disturbance liability of \$ 13,272,562. The current bond for Coal Hollow Mine will remain at \$13,370,000. All of the above-described areas within the Reclaimed Coal Mine meet the requirements of the MRP and the Division's regulations for post mine land use and for backfilling, regrading and drainage control standards.

A copy of the Phase 2 bond release application with the complete legal description for each area may be examined at the office of Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, Salt Lake City, Utah 84114-5801 and written comments, objections, or requests for an informal conference may be submitted to the Salt Lake City address. Said comments must be submitted thirty (30) days from the date of the last publication of this notice. This notice is being published to comply with the Surface Mining Control and Reclamation Act of 1977, the Utah Coal Mining and Reclamation Act and State and Federal regulations promulgated pursuant to said Acts. Published in the Southern Utah News Aug. 13<sup>th</sup>, 20<sup>th</sup>, 27<sup>th</sup> & Sep. 3<sup>rd</sup>.

If you have any questions, please call me at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes  
Environmental Specialist



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

August 10, 2020

C. Burton Pugh  
533 N 650 E.  
Lindon, Utah 84042-1567

Dear Mr. Pugh:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine). A portion of the area subject to the Phase 2 Bond Release is leased by ACD from the Alecia Swapp Dame Trust.

All areas for bond release have met the standards of the Utah Coal Program as to the vegetation and water quality requirements for Phase 2 Bond Release (refer to R645-301-880). The locations of the Reclaimed Coal Mine areas in Kane County, Utah are as follows:

**BRP2 - 3** - A portion of the CHM within the NW 1/4 NE1/4, E 1/2 NE 1/4 and the NE 1/4 SE 1/4 of Sec. 30 T39S, R5W containing **51.93** acres. **BRP2 - 3** includes the former Pit 20A, Pit 20B, HWT 1-A through HWT 3-B and Surf4 &5 of the South Private Lease. Phase 1 bond release was approved for the Pit and HWT areas on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2015, 2016 and spring of 2016 for various portions of BRP2-3. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in December of 2014, January of 2015 and October & March of 2016.

**BRP2 - 4** - A portion of the CHM within the NW 1/4, NE 1/4 and the NE 1/4, NW 1/4 of Sec. 30 T39S, R5W and the SW 1/4, SE 1/4 of Sec. 19 T39S, R5W containing **31.35** acres. **BRP2 - 4** includes the former Pit 1A, Pit 1B, Pit 2, Pit 4, Pit 24, Pit 7 and Pit 8 of the South Private Lease. Phase 1 bond release was approved for this area on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2014, 2015 and Spring of 2016 for various portions of BRP2-4. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed on the soil surface. Following top soiling and mulching, the prepared portions were seeded in November 2014, March & October 2016 and November of 2017.

**BRP2 - 5** - A portion of the CHM within the NW 1/2, NE 1/4 of Sec. 13 T39S, R6W containing **2.93** acres. **BRP2 - 5** includes the former Pit 1 of the North Private Lease. Phase 1 bond release was approved for the Pit 1 on January 18, 2017. Topsoil (approximately 18") was placed in the fall of 2016. Straw mulch at a minimum of 1,500

### C. Burton Pugh

lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in October of 2016.

The Phase 2 bond release application is for a liability reduction of \$ 347,697 from the current disturbance liability of \$ 13,272,562. The current bond for Coal Hollow Mine will remain at \$13,370,000. All of the above-described areas within the Reclaimed Coal Mine meet the requirements of the MRP and the Division's regulations for post mine land use and for backfilling, regrading and drainage control standards.

A copy of the Phase 2 bond release application with the complete legal description for each area may be examined at the office of Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, Salt Lake City, Utah 84114-5801 and written comments, objections, or requests for an informal conference may be submitted to the Salt Lake City address. Said comments must be submitted thirty (30) days from the date of the last publication of this notice. This notice is being published to comply with the Surface Mining Control and Reclamation Act of 1977, the Utah Coal Mining and Reclamation Act and State and Federal regulations promulgated pursuant to said Acts. Published in the Southern Utah News Aug. 13<sup>th</sup>, 20<sup>th</sup>, 27<sup>th</sup> & Sep. 3<sup>rd</sup>.

If you have any questions, please call me at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes  
Environmental Specialist



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

---

August 10, 2020

William H. Heaton  
Heaton Brothers, LLC  
7285 Dean Martin Dr., Ste. 180  
Las Vegas, Nevada 89118

To Whom it may concern:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine). A portion of the area subject to the Phase 2 Bond Release is leased by ACD from the Heaton Brothers, LLC.

All areas for bond release have met the standards of the Utah Coal Program as to the vegetation and water quality requirements for Phase 2 Bond Release (refer to R645-301-880). The locations of the Reclaimed Coal Mine areas in Kane County, Utah are as follows:

**BRP2 - 3** - A portion of the CHM within the NW 1/4 NE1/4, E 1/2 NE 1/4 and the NE 1/4 SE 1/4 of Sec. 30 T39S, R5W containing **51.93** acres. **BRP2 - 3** includes the former Pit 20A, Pit 20B, HWT 1-A through HWT 3-B and Surf4 &5 of the South Private Lease. Phase 1 bond release was approved for the Pit and HWT areas on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2015, 2016 and spring of 2016 for various portions of BRP2-3. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in December of 2014, January of 2015 and October & March of 2016.

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### C. Burton Pugh

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If you have any questions, please call me at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes  
Environmental Specialist



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

---

August 10, 2020

BLM-KFO  
James Holland  
669 South Highway 89A  
Kanab, Utah 84741

Dear Mr. Holland:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine).

All areas for bond release have met the standards of the Utah Coal Program as to the vegetation and water quality requirements for Phase 2 Bond Release (refer to R645-301-880). The locations of the Reclaimed Coal Mine areas in Kane County, Utah are as follows:

**BRP2 - 3** - A portion of the CHM within the NW 1/4 NE1/4, E 1/2 NE 1/4 and the NE 1/4 SE 1/4 of Sec. 30 T39S, R5W containing **51.93** acres. **BRP2 - 3** includes the former Pit 20A, Pit 20B, HWT 1-A through HWT 3-B and Surf4 &5 of the South Private Lease. Phase 1 bond release was approved for the Pit and HWT areas on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2015, 2016 and spring of 2016 for various portions of BRP2-3. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in December of 2014, January of 2015 and October & March of 2016.

**BRP2 - 4** - A portion of the CHM within the NW 1/4, NE 1/4 and the NE 1/4, NW 1/4 of Sec. 30 T39S, R5W and the SW 1/4, SE 1/4 of Sec. 19 T39S, R5W containing **31.35** acres. **BRP2 - 4** includes the former Pit 1A, Pit 1B, Pit 2, Pit 4, Pit 24, Pit 7 and Pit 8 of the South Private Lease. Phase 1 bond release was approved for this area on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2014, 2015 and Spring of 2016 for various portions of BRP2-4. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed on the soil surface. Following top soiling and mulching, the prepared portions were seeded in November 2014, March & October 2016 and November of 2017.

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BLM-KFO  
James Holland

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If you have any questions, please call me at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes  
Environmental Specialist



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

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August 10, 2020

Darlynn Sorensen  
P.O. Box 47  
Orderville, Utah 84758

Dear Mr. Sorensen:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine).

All areas for bond release have met the standards of the Utah Coal Program as to the vegetation and water quality requirements for Phase 2 Bond Release (refer to R645-301-880). The locations of the Reclaimed Coal Mine areas in Kane County, Utah are as follows:

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Darlynn Sorensen

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If you have any questions, please call me at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes  
Environmental Specialist



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

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August 10, 2020

Kane County Planning Commission  
180 West 300 North  
Kanab, Utah 84741

Dear Mr. McBride:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine).

All areas for bond release have met the standards of the Utah Coal Program as to the vegetation and water quality requirements for Phase 2 Bond Release (refer to R645-301-880). The locations of the Reclaimed Coal Mine areas in Kane County, Utah are as follows:

**BRP2 - 3** - A portion of the CHM within the NW 1/4 NE1/4, E 1/2 NE 1/4 and the NE 1/4 SE 1/4 of Sec. 30 T39S, R5W containing **51.93** acres. **BRP2 - 3** includes the former Pit 20A, Pit 20B, HWT 1-A through HWT 3-B and Surf4 &5 of the South Private Lease. Phase 1 bond release was approved for the Pit and HWT areas on November 7, 2015 and May 4, 2016. Topsoil (approximately 8") was placed in the fall of 2015, 2016 and spring of 2016 for various portions of BRP2-3. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in December of 2014, January of 2015 and October & March of 2016.

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**BRP2 - 5** - A portion of the CHM within the NW 1/2, NE 1/4 of Sec. 13 T39S, R6W containing **2.93** acres. **BRP2 - 5** includes the former Pit 1 of the North Private Lease. Phase 1 bond release was approved for the Pit 1 on January 18, 2017. Topsoil (approximately 18") was placed in the fall of 2016. Straw mulch at a minimum of 1,500 lbs./acre and Nutri-Mulch® at a minimum of 1,500 lbs./acre was placed soil surface. Following top soiling and mulching, the prepared portions were seeded in October of 2016.

Kane County Planning Commission  
August 11, 2020

The Phase 2 bond release application is for a liability reduction of \$ 347,697 from the current disturbance liability of \$ 13,272,562. The current bond for Coal Hollow Mine will remain at \$13,370,000. All of the above-described areas within the Reclaimed Coal Mine meet the requirements of the MRP and the Division's regulations for post mine land use and for backfilling, regrading and drainage control standards.

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If you have any questions, please call me at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes  
Environmental Specialist



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

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July 31, 2020

Kane County Water Conservancy District  
190 E. Center Street Suite 200  
Kanab, Utah 84741

To whom it may concern:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine).

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## Kane County Water Conservancy District

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If you have any questions, please call me at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes  
Environmental Specialist



## Alton Coal Development, LLC

463 North 100 West, Suite 1

Cedar City, Utah 84720

Phone (435) 867-5331 / Fax (435) 867-1192

---

August 10, 2020

Alton, Utah  
Mayor Cox  
156 West 100 North  
Alton, Utah 84710

Dear Mayor Cox:

Notice is hereby given that Alton Coal Development, LLC (ACD) has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for Phase 2 Bond Release on approximately 86.21 acres of Coal Hollow Mine (CHM or Reclaimed Coal Mine).

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Alton, Utah  
Mayor Cox

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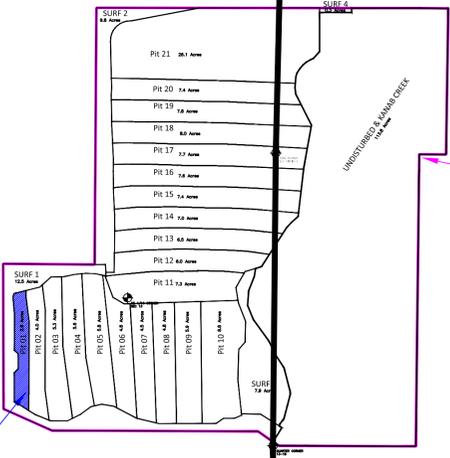
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Sincerely,

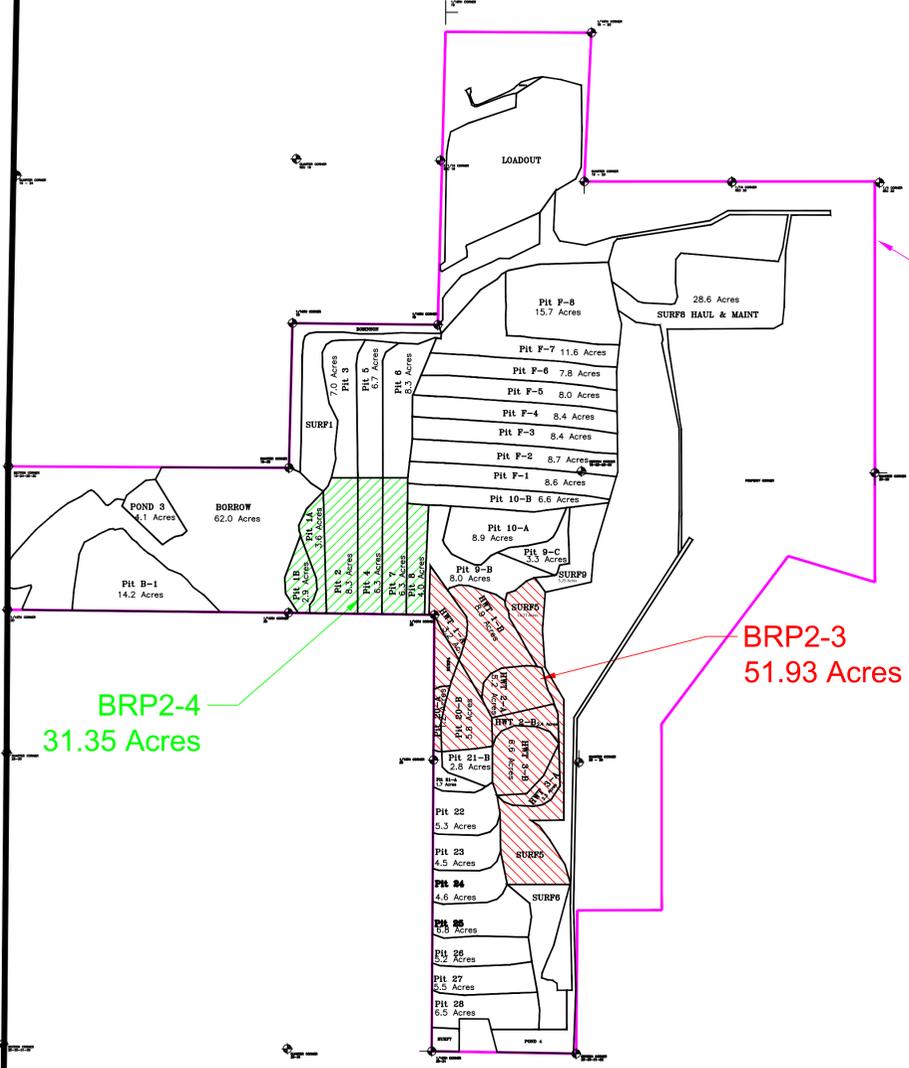
B. Kirk Nicholes  
Environmental Specialist

R 6 W R 5 W



NPL

BRP2-5  
2.93 Acres



SPL

BRP2-3  
51.93 Acres

BRP2-4  
31.35 Acres

LEGEND:

	PERMIT BOUNDARY
	BOND POLYLINE
	FOUND SECTION CORNER
	BONDED AREA

DRAWN BY: K NICHOLAS	CHECKED BY: ARC
DRAWING: FIGURE 1	DATE: 06/13/2017
JOB NUMBER: 1400	SCALE: 1" = 500'
	SHEET

REVISIONS	
DATE:	BY:
08/01/17	KN
07/31/20	KN

BOND RELEASE  
PHASE 2

COAL HOLLOW  
PROJECT  
ALTON, UTAH

FIGURE 1



Alton Coal Development  
**Coal Hollow**  
PROJECT

463 North 100 West, Suite 1  
Cedar City, Utah 84721  
Phone (435)867-5331  
Fax (435)867-1192

VEGETATION MONITORING  
FOR  
PHASE II BOND RELEASE  
2018

AT THE  
COAL HOLLOW MINE  
KANE COUNTY, UTAH



Reclaimed Pastures at the Coal Hollow Mine

*Prepared by*

**MT. NEBO SCIENTIFIC, INC.**

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P.O. Box 337

Springville, Utah 84663

(801) 489-6937

*by*

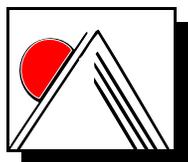
Patrick Collins, Ph.D.

*for*

**ALTON COAL DEVELOPMENT, LLC**

463 North 100 West

Cedar City, Utah 84721



March 2019

# TABLE OF CONTENTS

INTRODUCTION .....	1
Purpose of the Study .....	1
Study Areas .....	2
Reclaimed Areas .....	2
Reference Area .....	2
METHODS .....	3
Transect & Quadrat Placement .....	3
Cover, Frequency & Composition .....	3
Sample Size & Adequacy .....	4
Photographs & Sample Area Map .....	4
RESULTS .....	5
DISCUSSION .....	6
SUMMARY TABLES .....	9
COLOR PHOTOGRAPHS .....	16
PLANT NAMES USED IN THIS DOCUMENT .....	(Appendix A)
SAMPLE LOCATION MAP 1 .....	(Attachment)

# INTRODUCTION

## Purpose of the Study

The Coal Hollow Mine has been mining coal in Kane County, Utah since February 2011. As the mining operations have continued and the coal has been extracted, several areas have been reclaimed and reseeded with the final seed mixtures. Reclaimed mine sites are required to provide enough time for acceptable plant establishment before applications can be made for bond releases. One such time-frame, called the *Responsibility Period*, prescribes at least 10 years before the mine operator can submit a request for *Final* or *Phase III Bond Release* through the State of Utah, Division of Oil, Gas & Mining (DOGM). It has been estimated that this period of time is long enough to determine whether or not adequate re-establishment of a given reclaimed plant community has occurred on sites at this precipitation zone in the western United States.

Prior to the end of the Responsibility Period required for Final Bond Release, a portion of the bond can be recovered through the *Phase II Bond Release* process. State Code regulation R646-301-880.321 states that at the completion of Phase II, after revegetation has been established on the regraded mined lands in accordance with the approved reclamation plan, a portion of bond may be released. Phase II Bond Release success standards are primarily based on establishing vegetation to meet runoff control requirements, or as stated in the regulation, “*no part of the bond or deposit will be released under this paragraph so long as the lands to which the release would be applicable are contributing suspended solids to streamflow or runoff outside the permit area in excess of the requirements set by UCA 40-10-17(2)(j) of the Act and by R645-301-751*”.

One method to address the requirements for Phase II Release and to show the limits for the contribution of excess *suspended solids to streamflow or runoff outside the permit area*, is to employ erosion control equations and soil loss measurements. Another way to meet these requirements involve vegetation monitoring studies on the reclaimed lands. The purpose of this report is to address the latter – to conduct a study and record quantitative data to ascertain whether or not the revegetated areas have enough plant cover to adequately control soil loss. Some of the reclaimed areas have been compared to the background

conditions, or nearby undisturbed native plant communities that have not been disturbed by mining operations. Consequently, the total living cover of the vegetation in the reclaimed areas have been quantitatively sampled along with those areas chosen for final revegetation success standards, some which are *reference areas*, whereas other standards have been “pre-determined” in advance. *Reference areas* are often native, undisturbed plant communities chosen beforehand that approximate the mine site before it was disturbed by the mining activities. Using this approach, data are recorded in the reference areas to be compared with the reclaimed areas.

Study Areas

**Reclaimed Areas** - The reclaimed areas sampled for Phase II Bond Release in 2018 along with their acreage, year seeded, seed mixture used and the standard chosen for revegetation success are shown in Table 1.

**Table 1: Reclaimed Area, Seed Mixtures Used and Revegetation Success Standards.**

SITE NAME	Acres	YEAR SEEDED	SEED MIXTURE USED	REVEGETATION SUCCESS STANDARD
LAS 09	4.0	2014	Pasture Lands	Pre-Determined Total Living Cover Standard
LAS 10	10.6	2015	Pasture Lands	Pre-Determined Total Living Cover Standard
LAS 11A	2.2	2016	Pasture Lands	Pre-Determined Total Living Cover Standard
LAS 12	3.7	2016	Sagebrush-Grass	Sagebrush/Grass Reference Area
LAS 16	12.0	2016	Pasture Lands	Pre-Determined Total Living Cover Standard
LAS 17	22.1	2016	Sagebrush-Grass	Sagebrush/Grass Reference Area

**Reference Area** - There was only one reference area that will be used for final revegetation success standards in these particular reclaimed areas – the Sagebrush/Grass Reference Area. The reclaimed Pasture Lands will use a pre-determined and approved cover standard.

## METHODS

Quantitative and qualitative data were taken of the vegetation in the reclaimed and reference areas at the Coal Hollow Coal Mine in September 2018. Methodologies used for sampling were performed in accordance with the guidelines provided by DOGM.

### Transect & Quadrat Placement

Random/regular placement of sample quadrats was designed as an attempt to provide unbiased accuracy of the data compiled. This was accomplished by establishing long transect lines along the entire lengths of the reclaimed and reference areas. At regular intervals along the transect lines, random numbers were generated and used to measure distances at right angles to determine sample locations. Whether these random numbers were odd or even determined which side of the transect line a given quadrat was placed. The number of transect lines and random numbers selected were of ample size to insure that the sample locations reached the entire lengths and widths of each study area. This insured that the sample quadrats were placed randomly over the entire study area in an attempt to adequately represent the site as a whole.

### Cover, Frequency & Composition

Cover estimates were made using ocular methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on the raw data sheets were: slope, exposure, problem areas, grazing use, animal disturbance and other appropriate notes. Plant nomenclature followed *A Utah Flora* (Welsh et al. 2008)<sup>1</sup>.

---

<sup>1</sup> Welsh, S.L., N.D. Atwood, S. Goodrich and L.C. Higgins. 2008. *A Utah flora*. Print Services, Brigham Young University, Provo, UT. 1019 pp.

## Sample Size & Adequacy

Sampling adequacy was calculated using the formula given below.

$$nMIN = \frac{t^2 s^2}{(dx)^2}$$

where,

<i>nMIN</i>	= minimum adequate sample
<i>t</i>	= appropriate confidence t-value
<i>s</i>	= standard deviation
<i>x</i>	= sample mean
<i>d</i>	= desired change from mean

The values used for “t” and “d” insured that sample adequacy was met with 80% confidence within a 10% deviation from the true mean.

## Photographs & Sample Area Map

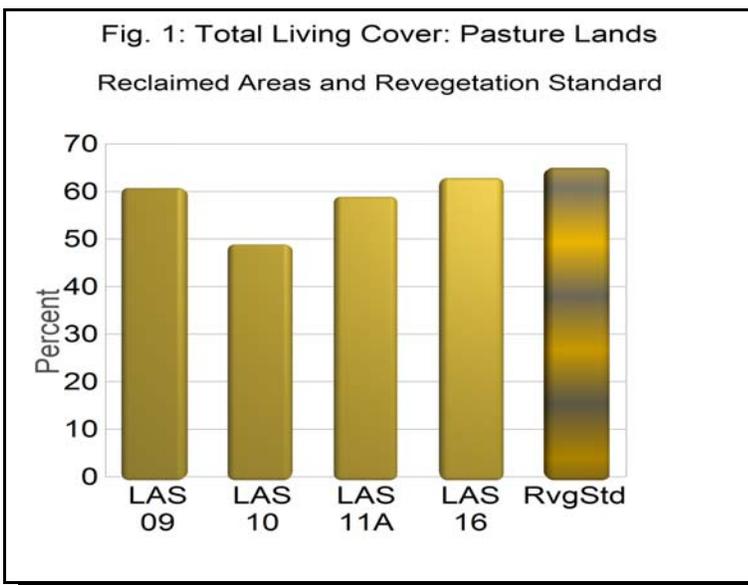
Color photographs of each sample area were taken at the time of sampling and submitted with this report. A 2014 Google Earth© aerial image was marked to show the 2018 sample areas.

## RESULTS

Results from quantitative sampling the reclaimed and reference areas in 2018 are shown in the summary tables below. Table 2 shows the total living cover of each reclaimed area at the Coal Hollow Mine in 2018. The table also includes the revegetation success standard for total living cover of each area, whether it was from the reference area or a pre-determined standard. As can be observed from the table, the total living cover of

**Table 2: Reclaimed Area, Seed Mixtures Used and Revegetation Success Standards.**

SITE NAME	RECLAIMED AREA PERCENT TOTAL LIVING COVER	SUCCESS STANDARD PERCENT TOTAL LIVING COVER
LAS 09	60.33	64.50
LAS 10	48.67	64.50
LAS 11A	58.50	64.50
LAS 12	62.67	57.00
LAS 16	62.38	64.50
LAS 17	57.67	57.00



some of the reclaimed areas are somewhat higher when compared to their success standard whereas others are marginally lower.

For locations of the sample areas refer to MAP 1 and color photographs of each sample area are shown following the data summary tables.

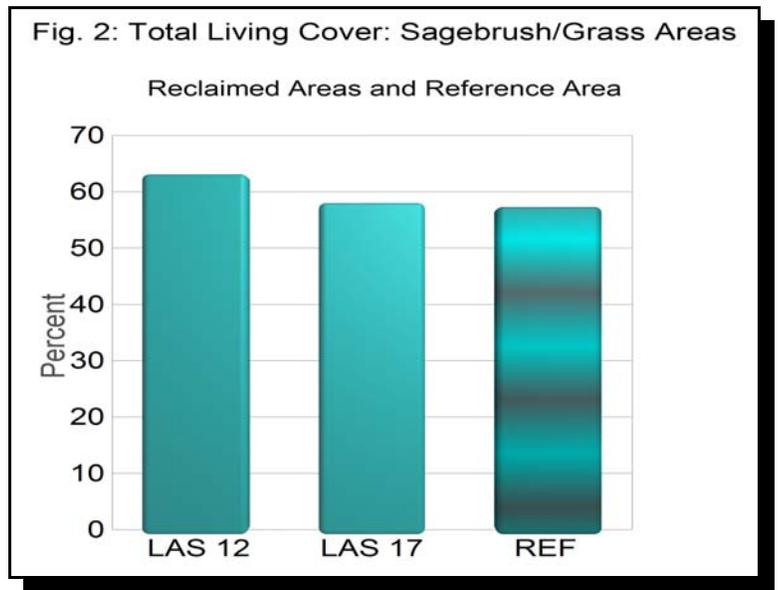
Figure 1 is an illustration of the total living cover values for the reclaimed Pasture Lands

compared to the revegetation success standard. Figure 2 shows the reclaimed sagebrush

areas and compares them to the Sagebrush/Grass Reference Area.

## DISCUSSION

As can be noted from the summary tables and the graphs shown in the Results section above, some of the total living cover values of the reclaimed sites were slightly lower than the success standards. The question is – are these values significantly lower or not? This question was more difficult to answer because the reclaimed Pasture Lands have a pre-determined cover success standard, so comparing them statistically to determine if the differences were significant was somewhat more challenging. To address this issue, the methods, logic and datasets were revisited that were



used to establish the revegetation success standards of the reclaimed Pasture Lands.

The first pastures proposed to be disturbed by mining activities were sampled in 2007 during the initial mine permitting process. In Coal Hollow’s Mining and Reclamation Plant (MRP), Appendix 3-4 it was stated:

*Because the pasture lands were unnatural, or comprised of non-native conditions, a native reference area was not chosen. Appropriate standards of revegetation success will be developed using the site-specific knowledge contributed by the landowners and as well as qualified botanists representing the coal company and regulatory agencies.*

Later several more pastures proposed for future disturbance were sampled during the permit process for the North Private Lease Area (NPLA). A report was submitted by Mt. Nebo

Scientific, Inc. called “Vegetation & Wildlife of the North Private Lease Area for the Coal Hollow Project, Kane County, Utah”

(MRP, Appendix 3-9) provided the results of vegetation sampling at that time. All revegetation success standards were revisited and revised in 2017 for the entire mine site. These standards are shown in the Coal Hollow MRP, Section 356.120. As stated in a table in that section, the pre-determined revegetation success standard for the reclaimed Pasture Lands was made by taking “the average total living cover measured for all Pasture Lands sampled (see Appendix 3-4 and Volume 12 for the Pasture Land data).”

**Fig. 3.** Statistical Analyses - Student’s t-tests comparing total living cover of the reclaimed Pasture Land sites with the revegetation success standards (2018).

Reclaimed Areas: LAS 09, 10, 11A, 16:  $\bar{x}$ =57.47; s=5.26; n=4  
Pre-Determined Standard:  $\bar{x}$ =64.50; s=11.56; n=9  
t=1.1431; df=11; SL=NS

$\bar{x}$  = sample mean,  
s = sample standard deviation,  
n = sample size,  
NS = non-significant,  
t = Student's t-value,  
df = degrees of freedom,  
SL = significance level,  
p = probability level

Consequently, the mean for the total living cover values for all Pasture Lands provided the total living success standard of 64.50%. This success cover value as well as the standard deviation for the mean of those datasets were used to employ the statistics that compare the

**Fig. 4.** Statistical Analyses - Student’s t-tests comparing total living cover of the reclaimed Sagebrush/Grass sites with the revegetation success standards (2018).

Reclaimed Areas: LAS 12, 17:  $\bar{x}$ =58.67; s=8.80; n=75  
Sagebrush/Grass Reference Area:  $\bar{x}$ =57.00; s=11.34; n=20  
t=0.7078; df=93; SL=NS

$\bar{x}$  = sample mean,  
s = sample standard deviation,  
n = sample size,  
NS = non-significant,  
t = Student's t-value,  
df = degrees of freedom,  
SL = significance level,  
p = probability level

reclaimed Pasture Land data recorded for the 2018 study. Although the data for each reclaimed area were reported separately in this report, these datasets were also lumped according to the community types and seed mixtures. For example, reclaimed areas LAS 09, 10, 11A and 16 were all to be reclaimed as pasture and therefore were seeded with the Pasture Land seed mix. For

comparisons with the success standard (64.50%), the mean value for the lumped datasets

was used (57.47%). The difference in these cover values was not statistically significant (Fig. 3). Likewise, when the reclaimed Sagebrush/Grass areas were compared with the total living cover success standard (the reference area), the difference was again not significant statistically (Fig. 4).

Approval by the State of Utah, Division of Oil, Gas & Mining for Phase II Bond Release is dependent on several factors. One of the most important factors may be whether or not the reclaimed site is controlling erosional sediments as outlined in the INTRODUCTION of this report. Comparing “background” conditions (or in this case the approved reference area and pre-determined standards), it has been shown that the total living cover values, so important for erosion control, of the reclaimed area is not statistically dissimilar than the cover standards for revegetation success.

DOGM biologists also encourage the collection of quantitative data that will show what plant species are growing on the reclaimed sites along with the measured cover values of each species. Reporting cover in this study by species, frequency and lifeform composition enables the reviewer to see that most of the reclaimed areas are dominated by desirable plant species suggesting that they will eventually be “*diverse, effective and permanent*”, as mentioned in the regulations and are important characteristics for Phase II and Phase III Bond Release applications. As one can observe in the summary tables herein, most of the reclaimed areas were dominated by desirable perennial plant species. The two exceptions were LAS 16 and LAS 17 which were both dominated by the annual exotic plant called Russian thistle (*Salsola tragus*). Weeds are often common on newly reclaimed sites. They are usually later replaced (or out-competed) by more desirable plants. Hopefully that will be the case for these two reclaimed areas.

In conclusion, the 2018 data and analyses presented in this report suggest that the revegetation at the Coal Hollow Mine may be progressing well and Phase II Bond Release through DOGM may be warranted.

**Table 3: Coal Hollow Mine. Living Cover and Frequency by Plant Species (2018).**

<b>Reclaimed Site:</b>			
<b>LAS 09 (4 Acres)</b>			
	n=15		
	<b>Mean Percent</b>	<b>Standard Deviation</b>	<b>Percent Frequency</b>
<b>SHRUBS</b>			
<b>FORBS</b>			
<i>Aster sp.</i>	0.33	1.25	6.67
<i>Chenopodium fremontii</i>	0.67	1.70	13.33
<i>Iva axillaris</i>	2.00	4.40	20.00
<i>Medicago sativa</i>	11.00	13.06	73.33
<i>Salsola tragus</i>	2.00	4.40	20.00
<i>Solidago sp.</i>	0.33	1.25	6.67
<b>GRASSES</b>			
<i>Agropyron cristatum</i>	2.13	6.35	13.33
<i>Bromus inermis</i>	3.33	10.11	13.33
<i>Elymus junceus</i>	7.33	12.76	33.33
<i>Elymus lanceolatus</i>	9.67	13.72	46.67
<i>Elymus smithii</i>	14.87	14.43	73.33
<i>Elymus spicatus</i>	0.33	1.25	6.67
<i>Sporobolus airoides</i>	6.33	18.57	26.67

**Table 4: Coal Hollow Mine. Total Cover and Composition (2018).**

<b>Reclaimed Site:</b>		
<b>LAS 09 (4 Acres)</b>		
	n=15	
	<b>Mean Percent</b>	<b>Standard Deviation</b>
<b>A. TOTAL COVER</b>		
Total Living Cover	60.33	9.91
Litter	9.67	4.80
Bareground	25.67	10.93
Rock	4.33	2.24
<b>B. % COMPOSITION</b>		
Shrubs	0.00	0.00
Forbs	27.50	21.39
Grasses	72.50	21.39

**Table 5: Coal Hollow Mine. Living Cover and Frequency by Plant Species (2018).**

<b>Reclaimed Site:</b> <b>LAS 10</b> (10.6 Acres) <span style="float: right;">n=30</span>		<b>Mean Percent</b>	<b>Standard Deviation</b>	<b>Percent Frequency</b>
<b>SHRUBS</b>				
<b>FORBS</b>				
<i>Bassia scoparia</i>		0.17	0.90	3.33
<i>Linum perenne</i>		0.33	1.25	10.00
<i>Medicago sativa</i>		7.17	5.11	86.67
<i>Salsola tragus</i>		2.17	4.95	26.67
<i>Solidago. sp</i>		0.33	1.25	3.33
<b>GRASSES</b>				
<i>Agropyron cristatum</i>		3.33	6.87	20.00
<i>Bromus inermis</i>		1.17	2.79	16.67
<i>Dactylis glomerata</i>		1.17	3.58	10.00
<i>Elymus hispidus</i>		0.50	2.69	3.33
<i>Elymus lanceolatus</i>		15.50	11.57	76.67
<i>Elymus smithii</i>		14.17	14.61	70.00
<i>Elymus spicatus</i>		1.83	8.21	6.67
<i>Stipa hymenoides</i>		0.83	3.18	6.67

**Table 6: Coal Hollow Mine. Total Cover and Composition (2018).**

<b>Reclaimed Site:</b> <b>LAS 10</b> (10.6 Acres) <span style="float: right;">n=30</span>		<b>Mean Percent</b>	<b>Standard Deviation</b>
<b>A. TOTAL COVER</b>			
Total Living Cover		48.67	10.48
Litter		11.30	4.04
Bareground		32.67	11.74
Rock		7.37	3.02
<b>B. % COMPOSITION</b>			
Shrubs		0.00	0.00
Forbs		21.50	16.50
Grasses		78.50	16.50

**Table 7: Coal Hollow Mine. Living Cover and Frequency by Plant Species (2018).**

Reclaimed Site: LAS 11A (2.2 Acres) n=10			
	Mean Percent	Standard Deviation	Percent Frequency
<b>SHRUBS</b>			
<b>FORBS</b>			
<i>Linum perenne</i>	1.00	2.00	20.00
<i>Medicago sativa</i>	7.00	4.00	80.00
<i>Salsola tragus</i>	1.00	2.00	20.00
<i>Sphaeralcea coccinea</i>	0.50	1.50	10.00
<b>GRASSES</b>			
<i>Agropyron cristatum</i>	7.00	13.27	30.00
<i>Bromus inermis</i>	6.00	14.97	20.00
<i>Elymus junceus</i>	2.00	4.00	20.00
<i>Elymus lanceolatus</i>	5.00	7.75	40.00
<i>Elymus smithii</i>	20.50	20.55	60.00
<i>Elymus spicatus</i>	6.50	7.76	50.00
<i>Hordeum jubatum</i>	1.00	3.00	10.00
<i>Poa pratensis</i>	1.00	3.00	10.00

**Table 8: Coal Hollow Mine. Total Cover and Composition (2018).**

Reclaimed Site: LAS 11A (2.2 Acres) n=10		
A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover	58.50	8.96
Litter	8.50	2.29
Bareground	26.00	8.89
Rock	7.00	2.45
<b>B. % COMPOSITION</b>		
Shrubs	0.00	0.00
Forbs	17.16	10.72
Grasses	82.84	10.72

**Table 9: Coal Hollow Mine. Living Cover and Frequency by Plant Species (2018).**

Reclaimed Site: LAS 12 (3.7 Acres) n=15	Mean Percent	Standard Deviation	Percent Frequency
<b>SHRUBS</b>			
<i>Atriplex canescens</i>	0.67	2.49	6.67
<b>FORBS</b>			
<i>Bassia scoparia</i>	1.00	2.71	13.33
<i>Iva axillaris</i>	1.67	5.06	13.33
<i>Medicago sativa</i>	6.33	10.40	40.00
<i>Salsola tragus</i>	2.00	4.00	26.67
<i>Sphaeralcea coccinea</i>	0.33	1.25	6.67
<i>Viguiera multiflora</i>	0.33	1.25	3.37
<b>GRASSES</b>			
<i>Agropyron cristatum</i>	1.33	4.99	6.67
<i>Bromus inermis</i>	1.00	2.71	13.33
<i>Dactylis glomerata</i>	1.00	3.74	6.67
<i>Elymus hispidus</i>	4.67	11.61	20.00
<i>Elymus lanceolatus</i>	18.00	20.07	60.00
<i>Elymus smithii</i>	16.00	19.77	46.67
<i>Elymus spicatus</i>	5.67	10.14	26.67
<i>Hordeum jubatum</i>	2.67	9.98	6.67

**Table 10: Coal Hollow Mine. Total Cover and Composition (2018).**

Reclaimed Site: LAS 12 (3.7 Acres) n=15	Mean Percent	Standard Deviation
<b>A. TOTAL COVER</b>		
Total Living Cover	62.67	9.98
Litter	10.33	3.86
Bareground	17.33	7.93
Rock	9.67	5.62
<b>B. % COMPOSITION</b>		
Shrubs	1.21	4.54
Forbs	20.58	21.07
Grasses	78.20	20.36

**Table 11: Coal Hollow Mine. Living Cover and Frequency by Plant Species (2018).**

<b>Reclaimed Site:</b> <b>LAS 16</b> (12.0 Acres) n=40		<b>Mean Percent</b>	<b>Standard Deviation</b>	<b>Percent Frequency</b>
<b>SHRUBS</b>				
FORBS				
<i>Astragalus cicer</i>		1.25	3.11	15.00
<i>Linum perenne</i>		0.25	1.09	5.00
<i>Medicago sativa</i>		2.00	4.58	20.00
<i>Melilotus officinalis</i>		1.38	8.59	2.50
<i>Penstemon palmeri</i>		0.38	1.73	5.00
<i>Salsola tragus</i>		27.88	18.94	82.50
<i>Sphaeralcea coccinea</i>		0.38	2.34	2.50
GRASSES				
<i>Bouteloua gracilis</i>		1.50	9.37	2.50
<i>Bromus inermis</i>		0.63	2.29	7.50
<i>Elymus hispidus</i>		0.75	4.68	2.50
<i>Elymus junceus</i>		1.88	7.96	7.50
<i>Elymus lanceolatus</i>		10.50	13.96	50.00
<i>Elymus smithii</i>		8.00	12.69	50.00
<i>Elymus spicatus</i>		3.00	7.05	27.50
<i>Hordeum jubatum</i>		1.75	5.87	10.00
<i>Stipa hymenoides</i>		0.88	2.93	10.00

**Table 12: Coal Hollow Mine. Total Cover and Composition (2018).**

<b>Reclaimed Site:</b> <b>LAS 16</b> (12.0 Acres) n=40		<b>Mean Percent</b>	<b>Standard Deviation</b>
<b>A. TOTAL COVER</b>			
Total Living Cover		62.38	8.73
Litter		9.38	3.39
Bareground		19.63	9.45
Rock		8.63	3.53
<b>B. % COMPOSITION</b>			
Shrubs		0.00	0.00
Forbs		53.11	25.65
Grasses		46.89	25.65

**Table 13: Coal Hollow Mine. Living Cover and Frequency by Plant Species (2018).**

<b>Reclaimed Site:</b> <b>LAS 17</b> (22.1 Acres) n=60	<b>Mean Percent</b>	<b>Standard Deviation</b>	<b>Percent Frequency</b>
<b>SHRUBS</b>			
<i>Artemisia tridentata</i>	0.58	2.06	8.33
<i>Atriplex canescens</i>	0.92	4.42	5.00
<i>Chrysothamnus nauseosus</i>	0.17	1.28	1.67
<b>FORBS</b>			
<i>Artemisia ludoviciana</i>	0.83	4.67	5.00
<i>Bassia scoparia</i>	1.00	5.31	6.67
<i>Convolvulus arvensis</i>	0.42	1.38	8.33
<i>Grindelia squarrosa</i>	0.58	4.48	1.67
<i>Helianthus annuus</i>	0.17	0.90	3.33
<i>Iva axillaris</i>	0.17	1.28	1.67
<i>Linum perenne</i>	0.08	0.64	1.67
<i>Melilotus officinalis</i>	1.75	4.06	18.33
<i>Polygonum aviculare</i>	0.17	1.28	1.67
<i>Salsola tragus</i>	28.50	18.20	95.00
<i>Sphaeralcea coccinea</i>	2.25	6.29	16.67
<i>Viguiera multiflora</i>	0.58	2.06	8.33
<b>GRASSES</b>			
<i>Agropyron cristatum</i>	0.67	2.66	6.67
<i>Bromus inermis</i>	0.33	2.01	3.33
<i>Bromus tectorum</i>	0.83	3.67	6.67
<i>Dactylis glomerata</i>	0.33	1.80	3.33
<i>Elymus junceus</i>	0.17	1.28	1.67
<i>Elymus lanceolatus</i>	3.33	6.03	36.67
<i>Elymus smithii</i>	6.50	10.54	43.33
<i>Elymus spicatus</i>	0.50	2.69	5.00
<i>Hordeum jubatum</i>	0.83	4.20	5.00
<i>Stipa hymenoides</i>	6.00	9.03	43.33

**Table 14: Coal Hollow Mine. Total Cover and Composition (2018).**

<b>Reclaimed Site:</b> <b>LAS 17</b> (22.1 Acres) n=60	<b>Mean Percent</b>	<b>Standard Deviation</b>
<b>A. TOTAL COVER</b>		
Total Living Cover	57.67	8.97
Litter	10.40	8.51
Bareground	25.55	9.29
Rock	6.38	3.14
<b>B. % COMPOSITION</b>		
Shrubs	2.93	8.32
Forbs	61.80	27.07
Grasses	35.27	25.67

**Table 15: Coal Hollow Mine. Living Cover and Frequency by Plant Species (2018).**

<b>Sagebrush Reference Area</b>			
	n=20		
	<b>Mean Percent</b>	<b>Standard Deviation</b>	<b>Percent Frequency</b>
<b>SHRUBS</b>			
<i>Artemisia nova</i>	11.75	12.77	60.00
<i>Artemisia tridentata</i>	22.75	17.85	80.00
<i>Chrysothamnus nauseosus</i>	6.75	11.97	30.00
<i>Gutierrezia sarothrae</i>	0.50	2.18	5.00
<i>Juniperus osteosperma</i>	0.25	1.09	5.00
<b>FORBS</b>			
<i>Erigeron religiosus</i>	2.00	3.32	30.00
<i>Iva axillaris</i>	1.25	2.68	20.00
<i>Penstemon palmeri</i>	0.50	2.18	5.00
<b>GRASSES</b>			
<i>Elymus spicatus</i>	5.50	10.59	30.00
<i>Junceus arcticus</i>	5.75	11.32	25.00

**Table 16: Coal Hollow Mine. Total Cover and Composition (2018).**

<b>Sagebrush Reference Area</b>		
	n=20	
	<b>Mean Percent</b>	<b>Standard Deviation</b>
<b>A. TOTAL COVER</b>		
Total Living Cover	57.00	11.34
Litter	17.95	5.83
Bareground	22.00	11.87
Rock	3.05	1.96
<b>B. % COMPOSITION</b>		
Shrubs	72.70	29.23
Forbs	6.00	7.59
Grasses	21.30	27.72

## COLOR PHOTOGRAPHS OF THE SAMPLE AREAS



Photo 1: Reclaimed Pasture (LAS 09)



Photo 2: Reclaimed Pasture (LAS 10)

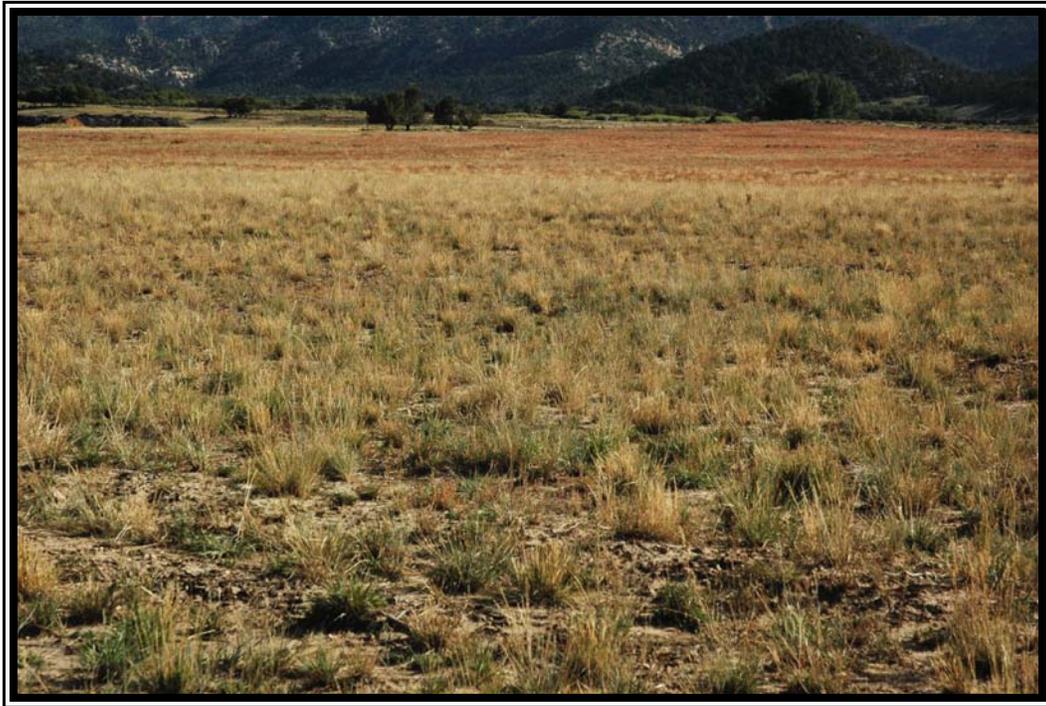


Photo 3: Reclaimed Pasture (LAS 11A)

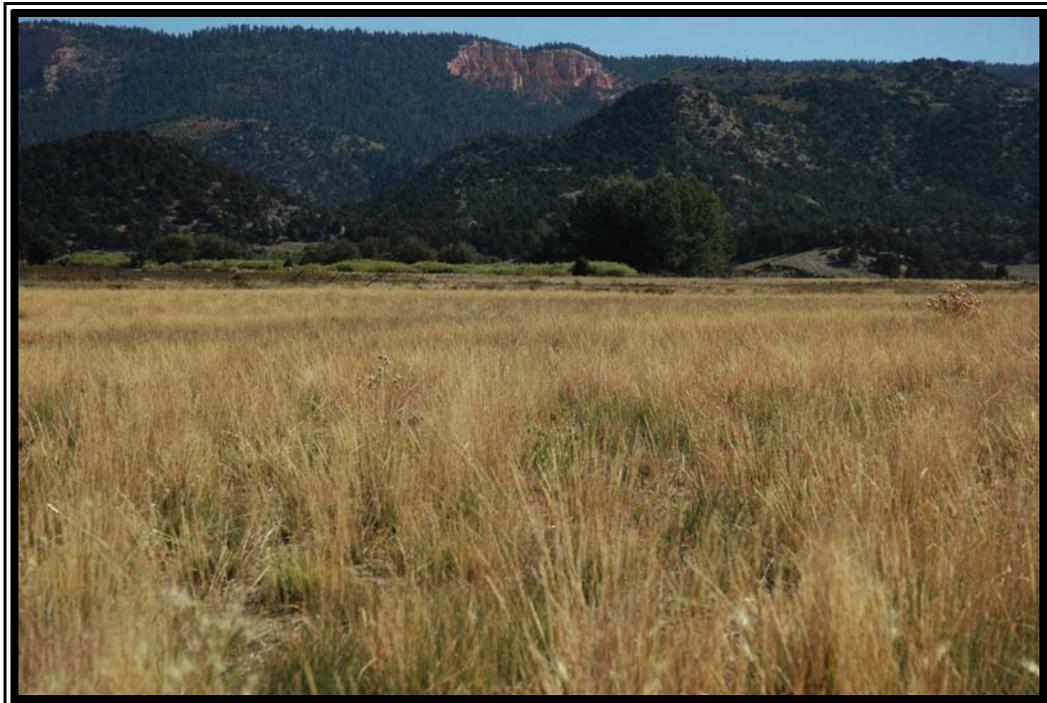


Photo 4: Reclaimed Sagebrush/Grass (LAS 12)



Photo 5: Reclaimed Pasture (LAS 16)



Photo 6: Reclaimed Sagebrush/Grass (LAS 17)



Photo 7: Sagebrush/Grass Reference Area (1 of 2)



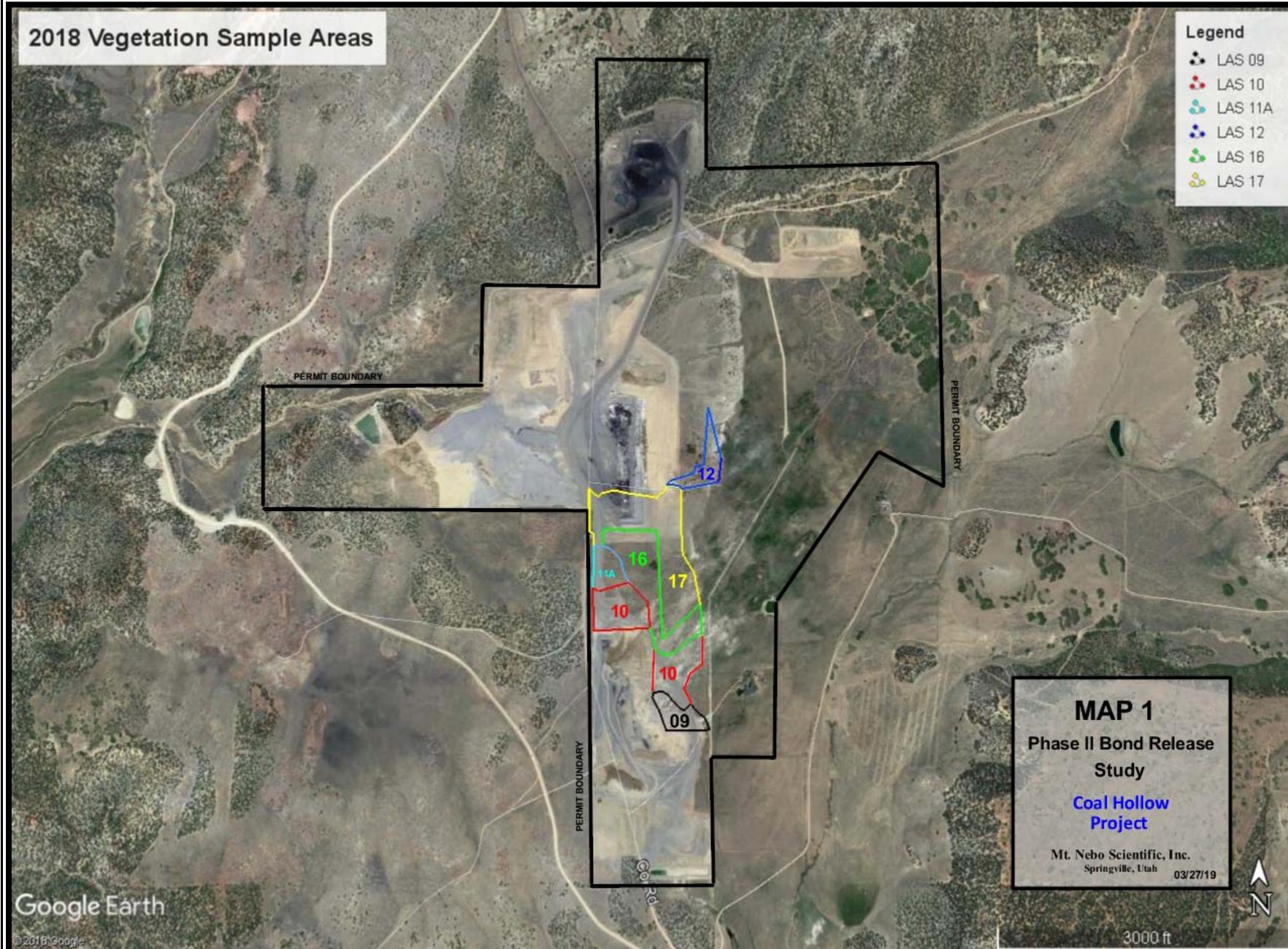
Photo 8: Sagebrush/Grass Reference Area (2 of 2)

## APPENDIX A

<b>Plants Names Used in This Document</b>	
<b>Scientific Name</b>	<b>Common Name</b>
<i>Agropyron cristatum</i>	Crested wheatgrass
<i>Artemisia ludoviciana</i>	Louisiana wormwood
<i>Artemisia nova</i>	Black sagebrush
<i>Artemisia tridentata</i>	Big sagebrush
<i>Aster sp.</i>	Aster
<i>Astragalus cicer</i>	Cicer milkvetch
<i>Atriplex canescens</i>	Fourwing saltbush
<i>Bassia scoparia</i>	Summer-cypress
<i>Bouteloua gracilis</i>	Blue grama
<i>Bromus inermis</i>	Smooth brome
<i>Bromus tectorum</i>	Cheatgrass
<i>Chrysothamnus nauseosus</i>	Rubber Rabbitbrush
<i>Chenopodium fremontii</i>	Fremont's Goosefoot
<i>Convolvulus arvense</i>	Bindweed
<i>Dactylis glomeratus</i>	Orchard Grass
<i>Elymus hispidus</i>	Intermediate wheatgrass
<i>Elymus junceus</i>	Russian wildrye
<i>Elymus lanceolatus</i>	Thickspike wheatgrass
<i>Elymus smithii</i>	Western wheatgrass
<i>Elymus spicatus</i>	Bluebunch wheatgrass
<i>Erigeron religiosus</i>	Religious daisy
<i>Grindelia squarrosa</i>	Gumweed
<i>Gutierrezia sarothrae</i>	Broom snakeweed
<i>Helianthus annuus</i>	Common sunflower
<i>Hordeum jubatum</i>	Foxtail barley
<i>Iva axillaris</i>	Poverty weed
<i>Juncus arcticus</i>	Wiregrass
<i>Juniperus osteosperma</i>	Utah juniper
<i>Linum perenne</i>	Blue flax
<i>Medicago sativa</i>	Alfalfa
<i>Melilotus officinalis</i>	Yellow sweet-clover
<i>Penstemon palmeri</i>	Palmer's penstemon
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Polygonum aviculare</i>	Knotweed
<i>Salsola tragus</i>	Russian thistle
<i>Solidago sp.</i>	Goldenrod
<i>Sphaeralcea coccinea</i>	Common globemallow
<i>Sporobolus airoides</i>	Alkali saccaton
<i>Stipa hymenoides</i>	Indian ricegrass
<i>Viguiera multiflora</i>	Showy goldeneye

# 2018 Vegetation Sample Areas

- Legend**
- LAS 09
  - LAS 10
  - LAS 11A
  - LAS 12
  - LAS 16
  - LAS 17



**MAP 1**  
Phase II Bond Release  
Study  
**Coal Hollow  
Project**  
Mt. Nebo Scientific, Inc.  
Springville, Utah 03/27/19

Google Earth

© 2016 Google

3000 ft

# VEGETATION MONITORING FOR PHASE II BOND RELEASE 2019



## COAL HOLLOW MINE KANE COUNTY, UTAH

February 2020

Prepared by  
Steven Petersen, Ph.D.  
ACD Wildlife and Vegetation Consultant

## TABLE OF CONTENTS

<b>INTRODUCTION .....</b>	<b>3</b>
<b>Phase II Reclamation Study Area Description .....</b>	<b>4</b>
<b>METHODS .....</b>	<b>4</b>
<b>Transect and Quadrat Placement Description .....</b>	<b>4</b>
<b>Vegetation Inventory Description .....</b>	<b>5</b>
<b>Sample Size and Adequacy .....</b>	<b>5</b>
<b>RESULTS AND DISCUSSION.....</b>	<b>6</b>
<b>REFERENCES.....</b>	<b>18</b>
<b>Plant Names (Scientific and Common) Used in This Document .....</b>	<b>19</b>
<b>Maps of the Reclamation Sites .....</b>	<b>20</b>

## INTRODUCTION

Alton Coal Inc. has been mining coal from the Coal Hollow Mine since February 2011. After the coal is extracted from the open pits, they are filled with fill material and covered with stockpiled topsoil that provides organics and soil microflora that facilitate ecological succession (Brenner et al. 1984). Final reclamation consists of preparing the final seedbed and seeding with a mix of native and introduced grass, forb and shrub species. The aim of the post-mining reclamation activities is to reestablish a healthy plant community dominated by perennial vegetation that facilitates soil stabilization, improves hydrologic function, and creates habitat for local plant and animal species (Pyke 2011, Dumrosese et al. 2015). Before sites are considered for bond release, sufficient plant community establishment is required which typically is associated with the amount of time since reclamation activities are implemented. This period of time (Responsibility Period) prescribes a minimum of 10 years before ACD is able to submit a request for final or Phase III Bond Release with the Utah Division of Oil, Gas & Mining (DOG M). During this Phase III Bond Release assessment, sites are evaluated to determine if plant community establishment has sufficiently met the standards for vegetation structure and composition (Collins 2019).

Before the completion of the Responsibility Period that is required for the Final Bond Release, a portion of the bond can be recovered through the Phase II Bond Release Process. State code regulation R646-301-880.321 explains that upon the completion of Phase II, a portion of the bond may be released assuming that vegetation has been adequately established on the regraded mined lands in accordance with the approved reclamation plan. These standards are established according to runoff control requirements explicitly stated in regulation UCA 40-10-17(2)(j) and R645-301-751. The verbiage of this passage specifically states “no part of the bond or deposit will be released under this paragraph so long as the lands to which the release would be applicable are contributing suspended solids to streamflow or runoff outside the permit area in excess of the requirements” (Collins 2019).

A method that can be used to address the requirements for the Phase II release, which includes the demonstration of limited contribution of excess suspended solids to streamflow and runoff outside of the permitted area, is to either 1) conduct vegetation monitoring on reclaimed lands or 2) implement erosion control equations and soil loss measurements. In this document we implement option #1 by conducting vegetation inventory to determine if reclaimed areas have satisfactory plant cover to adequately control soil erosion and minimize soil loss. We compare these findings with data collected from a nearby undisturbed plant community. We selected the reference area because it is assumed that the plant community was comparable to the plant community structure that would have occurred prior to disturbances resulting from mining activities (Collins 2019).

## Phase II Reclamation Study Area Description

Following mining, sites are prepared for reclamation by restructuring soil properties and seeding species using drill seeders or broadcast techniques. Reclaimed sites are characterized as those areas that have experienced adequate time for plant establishment and growth that provide satisfactory ground cover and plant community development for Phase II Bond Release. In 2019, 5 sites were selected for release (Table 1). To determine reclamation success for each area, reference sites were selected in both sagebrush – perennial grass dominated areas or in established pastureland dominated by perennial grasses and a diversity of forbs (seeded or natural recruitment). All reference data used in this study was obtained by Dr. Patrick Collins.

Table 1. Reclaimed sites, the seed mixture used, and the standard used for comparing reclamation recovery with success standards.

Site Name	Acres	Year Seeded	Seed Mixture Used	Revegetation Success Standard
LAS 01	2.9	2016	Pasture	Pastureland Reference Area
LAS 05	15.4	2014	Sagebrush-Grass	Sagebrush/Grass Reference Area
LAS 15	5.1	2016	Sagebrush-Grass	Sagebrush/Grass Reference Area
LAS 18	6.0	2016	Sagebrush-Grass	Sagebrush/Grass Reference Area
LAS 19	17.5	2016	Sagebrush-Grass	Sagebrush/Grass Reference Area

## **METHODS**

Data was collected at each of the reclaimed and references sites using methodologies approved by UDOGM. These methods were chosen to collect vegetation cover, frequency, and composition. Plot and transect placement and methods used to collect vegetation data (cover, frequency, composition, production) are provided here.

### Transect and Quadrat Placement Description

Within each reclamation site, randomized transect lines were used to provide an unbiased quantification of vegetation structure. At regular intervals along each transect, random numbers were generated to provide sample locations. If the number was odd, the quadrat was placed on the right side of the tape and even on the left. The number of transect lines and quadrat placement locations was selected based on a minimum sample size equation to ensure that sample frequency was adequate. The approach was implemented in an attempt to adequately represent the site as a whole.

### Vegetation Inventory Description

The sagebrush-grass reference area was sampled in 2017 by Dr. Patrick Collins of Nebo Scientific. Percent plant cover was determined using an ocular estimation approach within 1m<sup>2</sup> quadrats. Species composition and frequency were calculated using the plant data collected in each quadrat. Additional site information was also recorded including site slope, impacts from grazing (signified by either grazed plants, mule deer droppings, or cow manure piles). Plant nomenclature follows the Plants National Database (<http://plants.usda.gov>).

Plant production was estimated for LAS 01 using methods and data provided by P. Collins (Collins 2016). According to Collins, the North Lease area is continually being modified to create pasturelands that make sampling and reference challenging. Pasturelands were compared with NRCS Ecological Site descriptions to assess the plant community and its function in providing effective habitat, stabilized soils, and returning ecological processes that prevent degraded rangeland conditions at the site (Stringham et al. 2003). For example, established perennial vegetation help maintain soil structure, minimize water and wind erosion, increase infiltration rates, and enhance nutrient cycling, all leading to greater ecological resilience (Briske et al. 2017). In addition to estimated production, vegetation cover, measured directly on reclamation site LAS 01, has been found to be an excellent predictor of site stability, erosion potential, and runoff in pastureland environments (Zuazo 2009).

### Sample Size and Adequacy

Sample adequacy was calculated using a formula provided by Hoffman and Ries (1990):

$$nMIN = \frac{t^2 s^2}{(dx)^2}$$

Where

- nMin = minimum adequate sample
- t = appropriate confidence t-value
- s = standard deviation
- x = sample mean
- d = desired change from mean

The values use for “t” and “d” insure that sample adequacy has been met with 80% confidence within a 15% deviation from the true mean.

Sample size was adequate for all sites when using this equation and the confidence criteria.

## RESULTS AND DISCUSSION

### LAS 01 (Pastureland Reference Area)

This site has experienced an establishment of perennial grasses and forbs throughout the area (Figure 2, Table 2). Total cover was 37.4%, dominated primarily by perennial grasses and forbs (36.8%). Perennial grasses and forbs may be considered the most crucial life forms at this stage of plant community development because of their role in stabilizing soils and facilitating site recovery (Figure 3). According to Collins (2018), the plant cover of the pastureland reference area is 64.5%. The difference in cover between LAS 01 and the reference area may be due to the patchy distribution plants resulting from variability in soil conditions, soil moisture content, and herbivory by ungulates (i.e. cows, deer, elk, horses). While the value is lower than the reference area, the total vegetation cover is comparable to other projects that seeded perennial grasses to stabilize sites within the general area (Petersen et al. 2004). Collins found that total production of this area is approximately 1,100 lbs/acre.



Figure 2. Reclamation site with a mix of perennial bunchgrass and forb establishment at site **LAS 01** located near the north lease mining region.

Table 2. Plant cover, standard deviation, and frequency by plant species (A). Total plant and non-living surface cover (B). Percent composition of grasses, forbs and shrubs (C) for **LAS 01**.

<b>A – TOTAL PLANT COVER BY SPECIES</b>			
	Mean (%)	Standard Deviation	Frequency (%)
<b>GRASSES</b>			
<i>Agropyron cristatum</i>	5.11	1.61	58.57
<i>Bromus inermis</i>	0.67	0.43	12.86
<i>Bromus tectorum</i>	0.14	0.15	8.57
<i>Elymus elymoides</i>	0.21	0.28	5.71
<i>Elymus junceus</i>	1.34	0.80	1.43
<i>Elymus lanceolatus</i>	0.07	0.19	1.43
<i>Elymus smithii</i>	0.03	0.08	2.86
<i>Elymus trachycaulus</i>	1.89	1.39	34.29
<i>Pseudoroegneria spicata</i>	0.04	0.11	1.43
<i>Thiopyrum intermedium</i>	7.21	3.15	71.43
<b>FORBS</b>			
<i>Achillia millefolium</i>	0.31	0.67	2.86
<i>Astragalus ciser</i>	0.14	0.23	5.71
<i>Grindelia squarosa</i>	0.11	0.30	1.43
<i>Helianthus annuus</i>	1.59	1.32	40.00
<i>Iva axillaris</i>	1.31	1.02	37.14
<i>Lactuca serriola</i>	6.81	6.30	72.86
<i>Linum lewisii</i>	0.59	0.68	17.41
<i>Melilotus officinale</i>	6.46	3.05	98.57
<i>Salsola iberica</i>	0.16	0.28	7.14
<i>Viguiera multiflora</i>	0.39	0.98	5.71
<b>SHURBS</b>			
<i>Atriplex canescens</i>	0.50	0.71	8.57
<i>Artemisia tridentata</i>	0.09	0.23	1.43
<b>B – TOTAL COVER (Table 2 Continued)</b>			
	Mean (%)	Standard Deviation	
Total Living Cover	37.39	9.64	
Litter	16.6	3.60	
Bareground	46.22	11.75	
Rock	0.41	0.37	
<b>C – PERCENT COMPOSITION</b>			
	Mean (%)		
Grasses	45.58		
Forbs	52.95		
Shrubs	1.57		

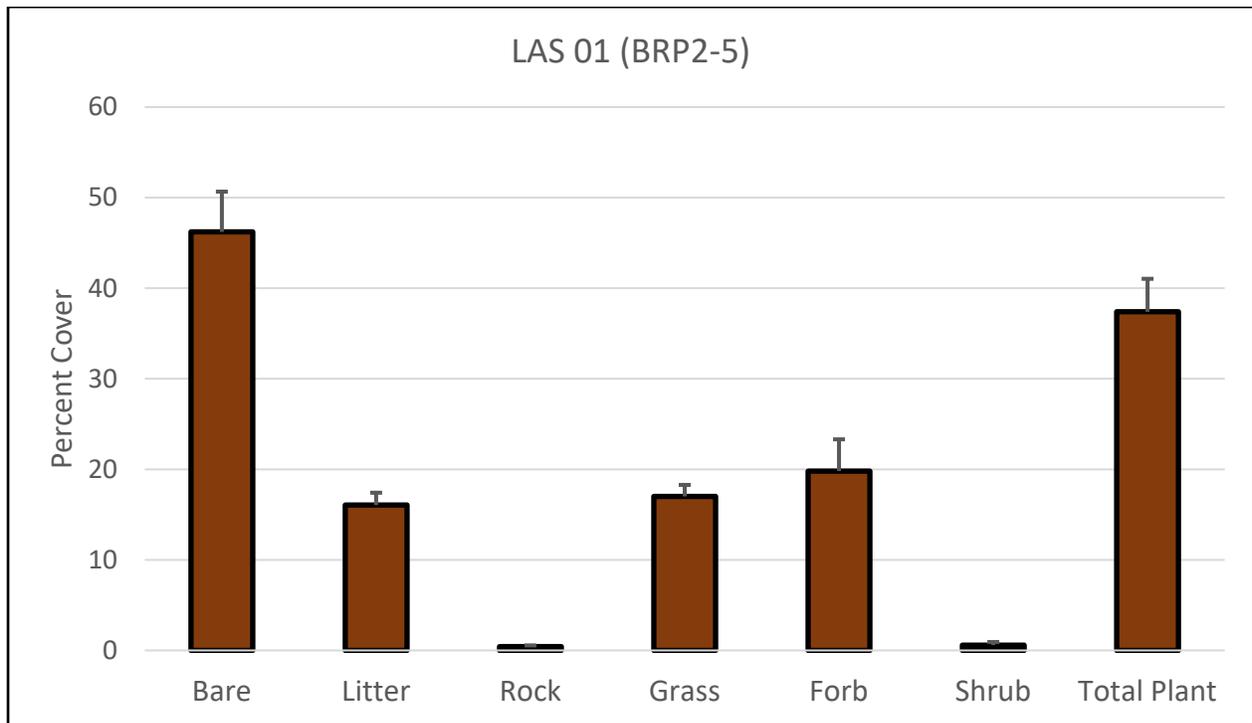


Figure 3. Percent cover of functional groups in **LAS 01**, located near the North Lease mining area.

LAS 05, LAS 15, LAS 18, LAS 19 (Sagebrush Reference Area)

The total plant cover for the sagebrush reference area was 57.0%. Total plant cover (all species across all life forms combined) was compared with the sagebrush-grass reference area (Figure 4).

The comparison between sites and the sagebrush reference area, using the confidence interval to detect differences in total plant cover, indicates a recovery of perennial vegetation and the return to a stabilized, resilient ecosystem condition. The degree of reliability of this information is evidenced by comparing confidence intervals to the mean reference site cover value, determined using equation 2:

Equation 2: 
$$\bar{x} \pm z \frac{s}{\text{Sqrt}(n)}$$

Where:

$\bar{x}$  is the population mean, **Z** is the Z-value from a Z score table  
 s is the standard deviation, n is the number of observations

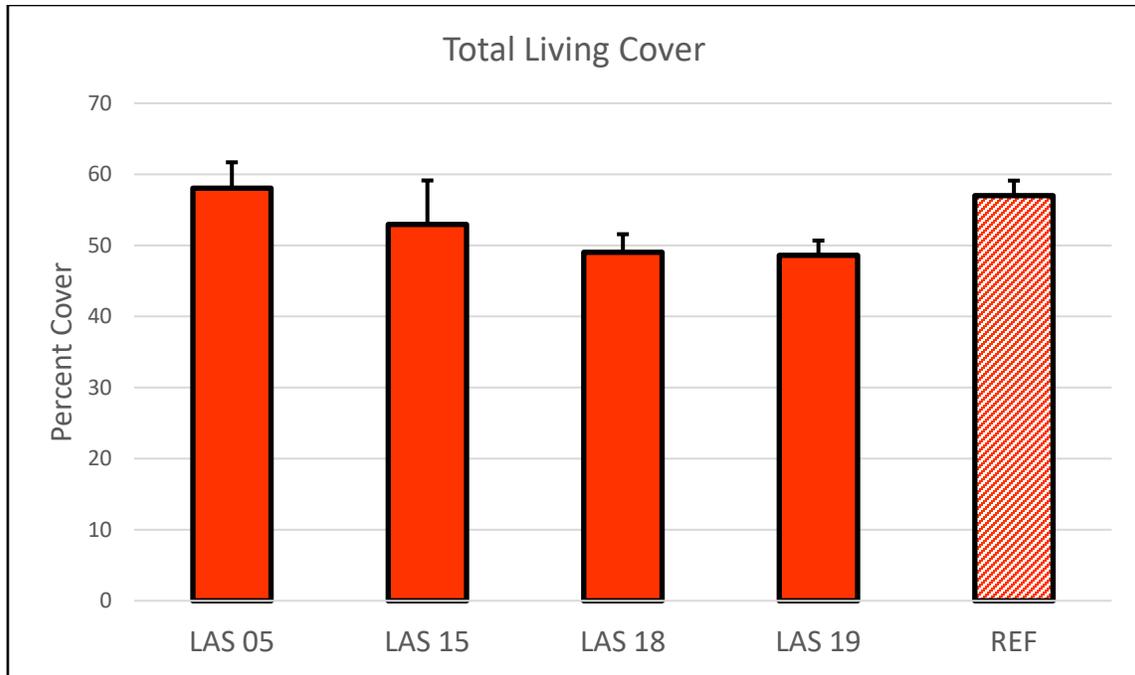


Figure 4. Total plant cover  $\pm$  standard error for each site compared to the sagebrush-grass reference area.

Total plant cover and plant frequency are presented for individual species for each site and a photograph of each sites (Tables 3-7, Figures 5-14). The cover of surface characteristics (ie. Living cover, litter, bareground, rock) along with the composition of shrubs, forbs and grasses is also provided (Tables 3-7).

Table 3. Plant cover, standard deviation, and frequency by plant species (A). Total plant and non-living surface cover (B). Percent composition of grasses, forbs and shrubs (C) for **LAS 05**.

<b>A – TOTAL PLANT COVER BY SPECIES</b>			
	Mean (%)	Standard Deviation	Frequency (%)
<b>GRASSES</b>			
<i>Achnatherum hymenoides</i>	0.10	0.20	2.50
<i>Agropyron cristatum</i>	1.03	1.30	7.50
<i>Bromus inermis</i>	1.10	1.60	12.50
<i>Bromus tectorum</i>	0.65	0.65	10.00
<i>Elymus elymoides</i>	1.28	2.17	17.50
<i>Elymus lanceolatus</i>	31.93	19.26	87.50
<i>Elymus trachycaulus</i>	16.73	13.35	72.50
<i>Poa secunda</i>	0.25	0.29	7.50
<b>FORBS</b>			
<i>Artemisia ludoviciana</i>	0.10	0.20	2.50
<i>Aster</i> spp.	1.43	1.64	22.50
<i>Iva axillaris</i>	0.88	1.00	10.00
<i>Lactuca serriola</i>	0.57	0.30	12.50
<i>Melilotus officinale</i>	0.58	0.90	17.50
<i>Salsola iberica</i>	0.38	0.68	7.50
<b>SHURBS</b>			
<i>Atriplex canescens</i>	0.43	0.53	5.00
<i>Artemisia tridentata</i>	0.73	0.88	10.00
<b>B – TOTAL COVER</b>			
	Mean (%)	Standard Deviation	
Total Living Cover	58.05	4.23	
Litter	15.20	1.36	
Bareground	26.08	4.18	
Rock	0.68	0.28	
<b>C – PERCENT COMPOSITION</b>			
	Mean (%)		
Grasses	91.39		
Forbs	6.63		
Shrubs	1.98		

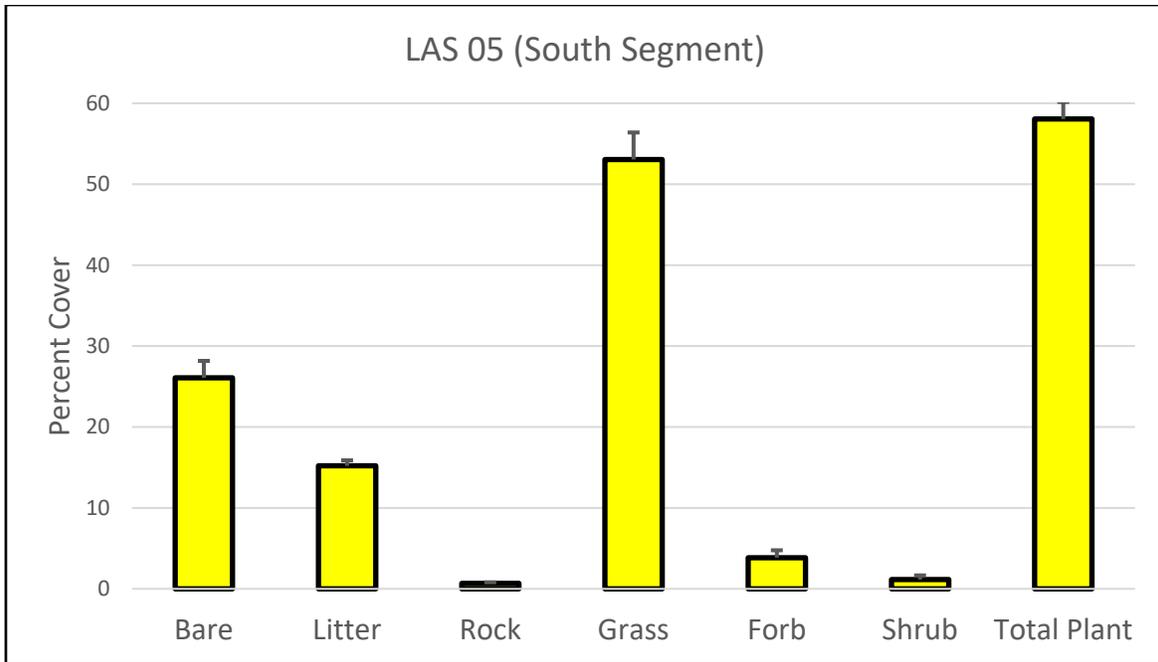


Figure 5. Percent cover of functional groups in LAS 05, located west of the mining headquarters in Sink Valley. This area consists of only the most southern portion of the larger **LAS 05** reclamation area.



Figure 6. Reclamation site with visual dominance of perennial bunchgrass establishment at site **LAS 05**.

Table 4. Plant cover, standard deviation, and frequency by plant species (A). Total plant and non-living surface cover (B). Percent composition of grasses, forbs and shrubs (C) for **LAS 15**.

<b>A – TOTAL PLANT COVER BY SPECIES</b>			
	Mean (%)	Standard Deviation	Frequency (%)
<b><u>GRASSES</u></b>			
<i>Bromus inermis</i>	0.85	0.07	20.00
<i>Bromus tectorum</i>	0.02	0.28	10.00
<i>Elymus elymoides</i>	4.90	0.00	70.00
<i>Elymus junceus</i>	2.45	2.33	40.00
<i>Elymus lanceolatus</i>	15.30	0.42	100.00
<i>Elymus trachycaulus</i>	3.30	0.57	45.00
<i>Pseudoroegneria spicata</i>	9.95	1.06	85.00
<i>Thiopyrum intermedium</i>	3.20	0.85	25.00
<b><u>FORBS</u></b>			
<i>Achillia millefolium</i>	0.05	0.71	5.00
<i>Helianthus annuus</i>	0.55	0.78	25.00
<i>Iva axillaris</i>	0.25	0.21	10.00
<i>Melilotus officinale</i>	10.35	0.78	95.00
<i>Salsola iberica</i>	0.65	0.92	20.00
<b><u>SHURBS</u></b>			
<i>Atriplex canescens</i>	0.50	0.14	10.00
<b>B – TOTAL COVER</b>			
	Mean (%)	Standard Deviation	
Total Living Cover	52.95	3.61	
Litter	13.10	0.71	
Bareground	31.30	4.24	
Rock	2.65	0.07	
<b>C – PERCENT COMPOSITION</b>			
	Mean (%)		
Grasses	75.83		
Forbs	23.23		
Shrubs	0.94		

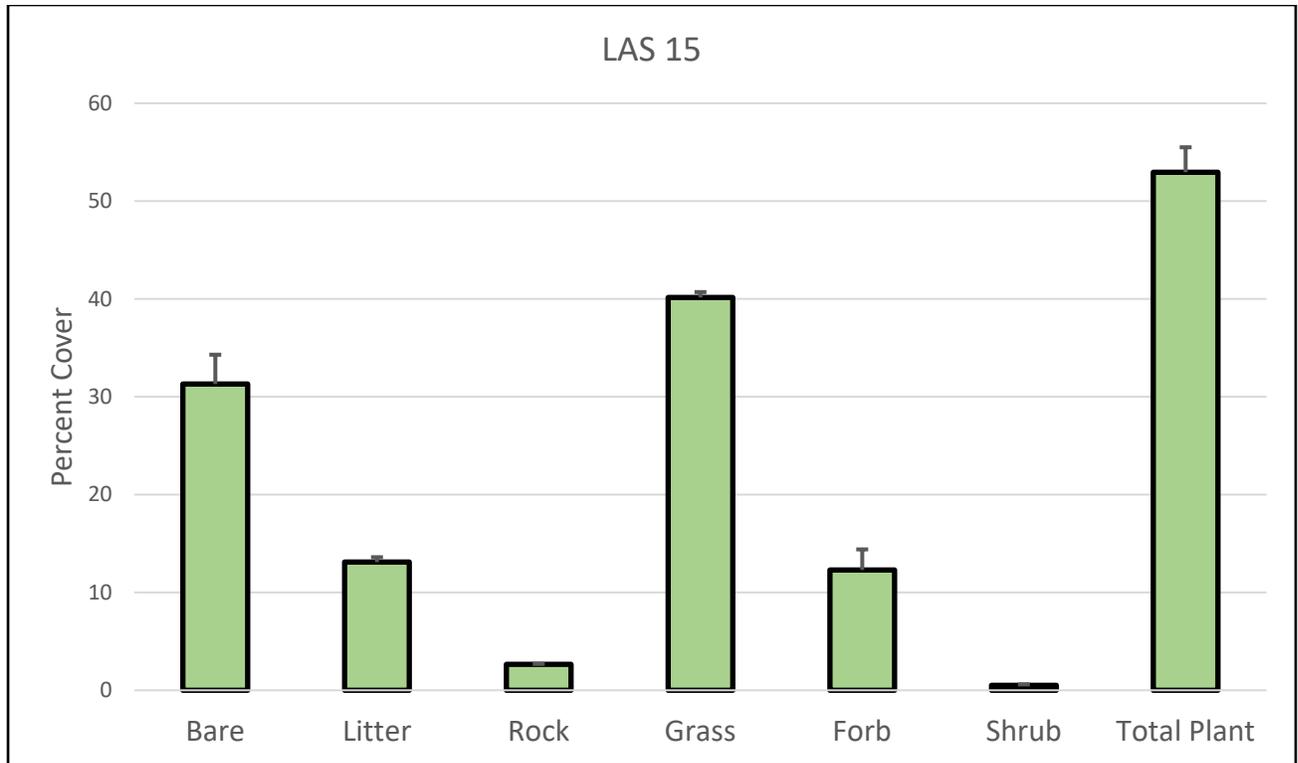


Figure 7. Percent cover of functional groups in **LAS 15**, located west of the mining headquarters in Sink Valley.



Figure 8. Reclamation site **LAS 15** with visual dominance of perennial bunchgrasses located along the access road.

Table 5. Plant cover, standard deviation, and frequency by plant species (A). Total plant and non-living surface cover (B). Percent composition of grasses, forbs and shrubs (C) for **LAS 18**.

<b>A – TOTAL PLANT COVER BY SPECIES</b>			
	Mean (%)	Standard Deviation	Frequency (%)
<b>GRASSES</b>			
<i>Achnatherum hymenoides</i>	0.80	0.57	27.50
<i>Agropyron cristatum</i>	3.95	4.46	35.00
<i>Bromus inermis</i>	0.05	0.10	2.50
<i>Bromus tectorum</i>	12.60	4.95	87.50
<i>Elymus elymoides</i>	2.58	0.36	45.00
<i>Elymus junceus</i>	0.38	0.57	7.50
<i>Elymus lanceolatus</i>	4.60	1.89	50.00
<i>Elymus trachycaulus</i>	13.30	8.31	80.00
<i>Thiopyrum intermedium</i>	1.25	1.14	20.00
<b>FORBS</b>			
<i>Artemisia ludoviciana</i>	0.05	0.10	2.50
<i>Helianthus annuus</i>	0.05	0.10	2.50
<i>Iva axillaris</i>	1.63	1.89	37.50
<i>Lactuca serriola</i>	0.40	0.38	17.50
<i>Melilotus officinale</i>	1.23	0.88	30.00
<i>Salsola iberica</i>	6.10	1.75	85.00
<b>SHURBS</b>			
<i>Artemisia tridentata</i>	0.08	0.15	5.00
<b>B – TOTAL COVER</b>			
	Mean (%)	Standard Deviation	
Total Living Cover	49.03	4.16	
Litter	15.68	5.23	
Bareground	33.35	7.17	
Rock	1.95	0.13	
<b>C – PERCENT COMPOSITION</b>			
	Mean (%)		
Grasses	80.57		
Forbs	19.28		
Shrubs	0.15		

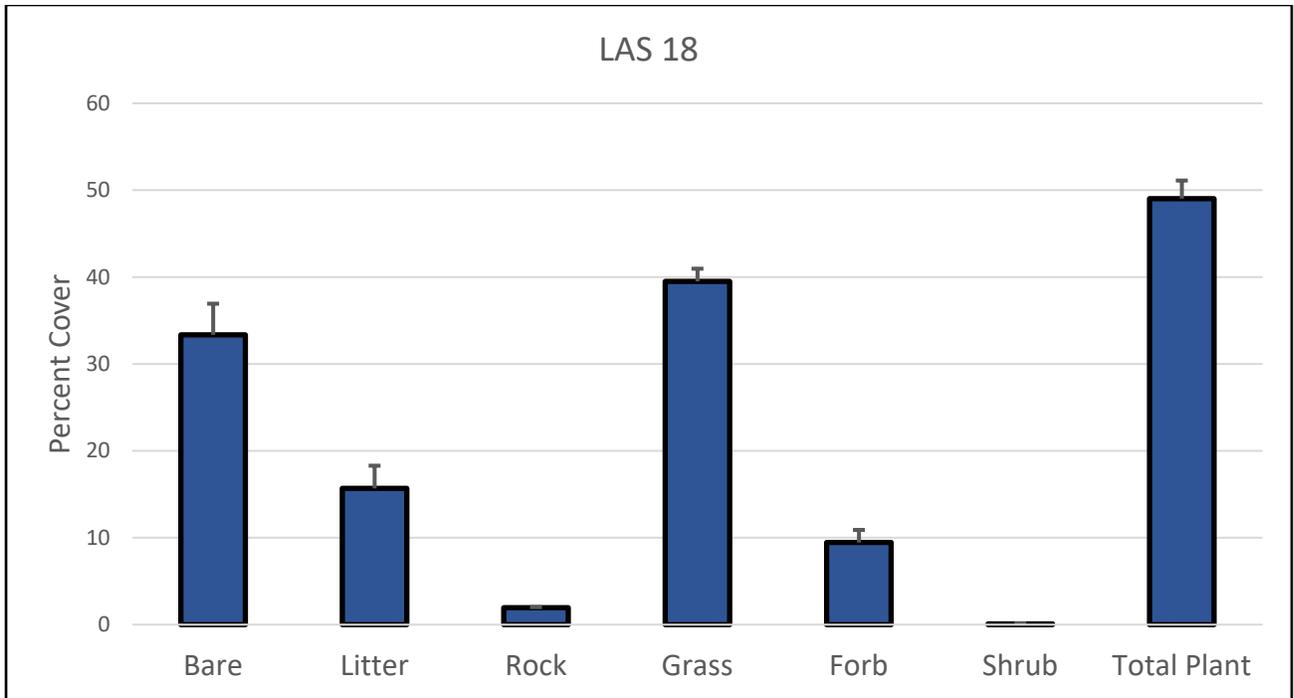


Figure 9. Percent cover of functional groups in **LAS 18**, located west of the mining headquarters in Sink Valley.



Figure 10. Reclamation site **LAS 18** exhibiting a mix of perennial bunchgrasses and forbs.

Table 6. Plant cover, standard deviation, and frequency by plant species (A). Total plant and non-living surface cover (B). Percent composition of grasses, forbs and shrubs (C) for **LAS 19**.

<b>A – TOTAL PLANT COVER BY SPECIES</b>			
	Mean (%)	Standard Deviation	Frequency (%)
<b>GRASSES</b>			
<i>Achnatherum hymenoides</i>	0.40	0.65	12.00
<i>Agropyron cristatum</i>	0.62	0.91	10.00
<i>Bromus inermis</i>	2.58	1.80	44.00
<i>Bromus tectorum</i>	0.40	0.69	8.00
<i>Elymus elymoides</i>	0.92	0.75	20.00
<i>Elymus junceus</i>	0.34	0.35	10.00
<i>Elymus lanceolatus</i>	5.16	3.23	62.00
<i>Elymus trachycaulus</i>	3.66	1.42	72.00
<i>Poa secunda</i>	0.04	0.09	2.00
<i>Thiopyrum intermedium</i>	0.82	1.43	8.00
<b>FORBS</b>			
<i>Artemisia ludoviciana</i>	3.36	3.68	38.00
<i>Astragalus ciser</i>	0.16	0.23	8.00
<i>Helianthus annuus</i>	0.04	0.09	2.00
<i>Iva axillaris</i>	14.72	7.95	90.00
<i>Lactuca serriola</i>	0.10	0.14	4.00
<i>Melilotus officinale</i>	5.92	3.82	68.00
<i>Salsola iberica</i>	8.40	5.79	56.00
<b>SHURBS</b>			
<i>Atriplex canescens</i>	0.08	0.13	4.00
<b>B – TOTAL COVER</b>			
	Mean (%)	Standard Deviation	
Total Living Cover	48.6	13.84	
Litter	19.28	7.06	
Bareground	25.98	8.73	
Rock	6.14	4.36	
<b>C – PERCENT COMPOSITION</b>			
	Mean (%)		
Grasses	31.89		
Forbs	67.94		
Shrubs	1.57		

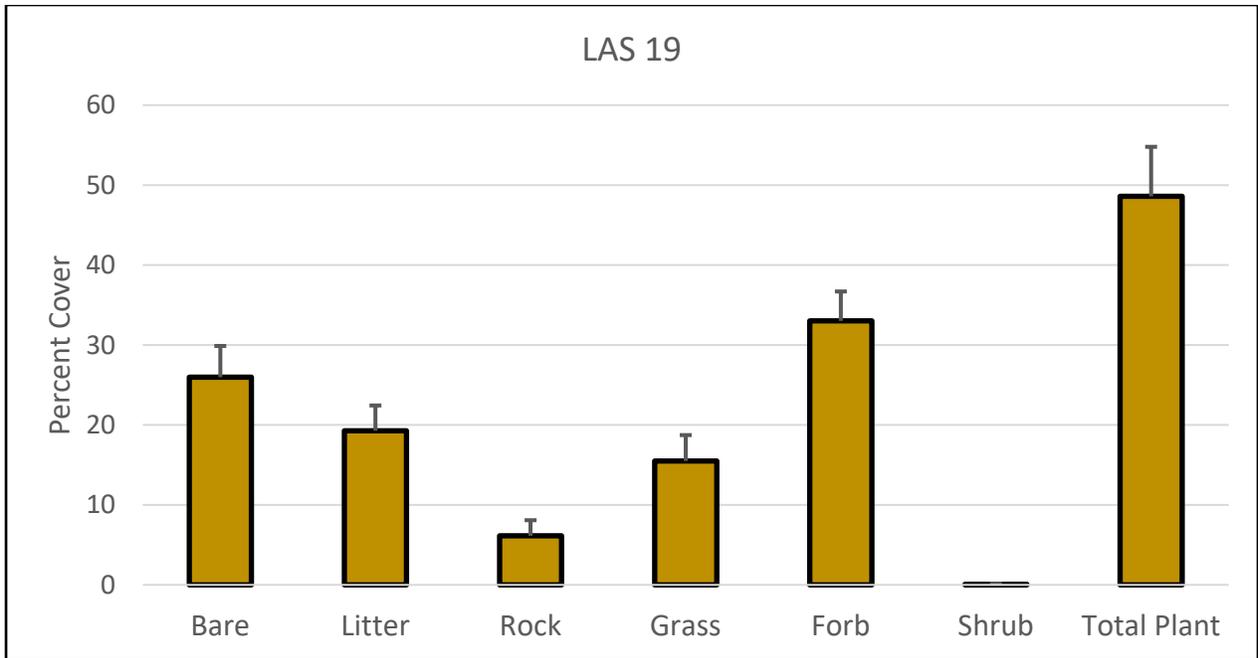


Figure 11. Percent cover of functional groups in **LAS 19**, located west of the mining headquarters in Sink Valley.



Figure 12. Reclamation site with a stronger appearance of annual and perennial forbs intermixed with perennial bunchgrasses, located at site **LAS 19**.

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## Plant Names (Scientific and Common) Used in This Document

### Grasses

<i>Achnatherum hymenoides</i>	Indian ricegrass
<i>Agropyron cristatum</i>	Crested wheatgrass
<i>Bromus inermis</i>	Smooth brome
<i>Bromus tectorum</i>	Cheatgrass
<i>Dactylis glomeratus</i>	Orchard Grass
<i>Elymus hispidus</i>	Intermediate wheatgrass
<i>Elymus junceus</i>	Russian wildrye
<i>Elymus lanceolatus</i>	Thickspike wheatgrass
<i>Elymus smithii</i>	Western wheatgrass
<i>Hordeum jubatum</i>	Foxtail barley
<i>Juncus arcticus</i>	Wiregrass
<i>Poa secunda</i>	Sandberg bluegrass
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass

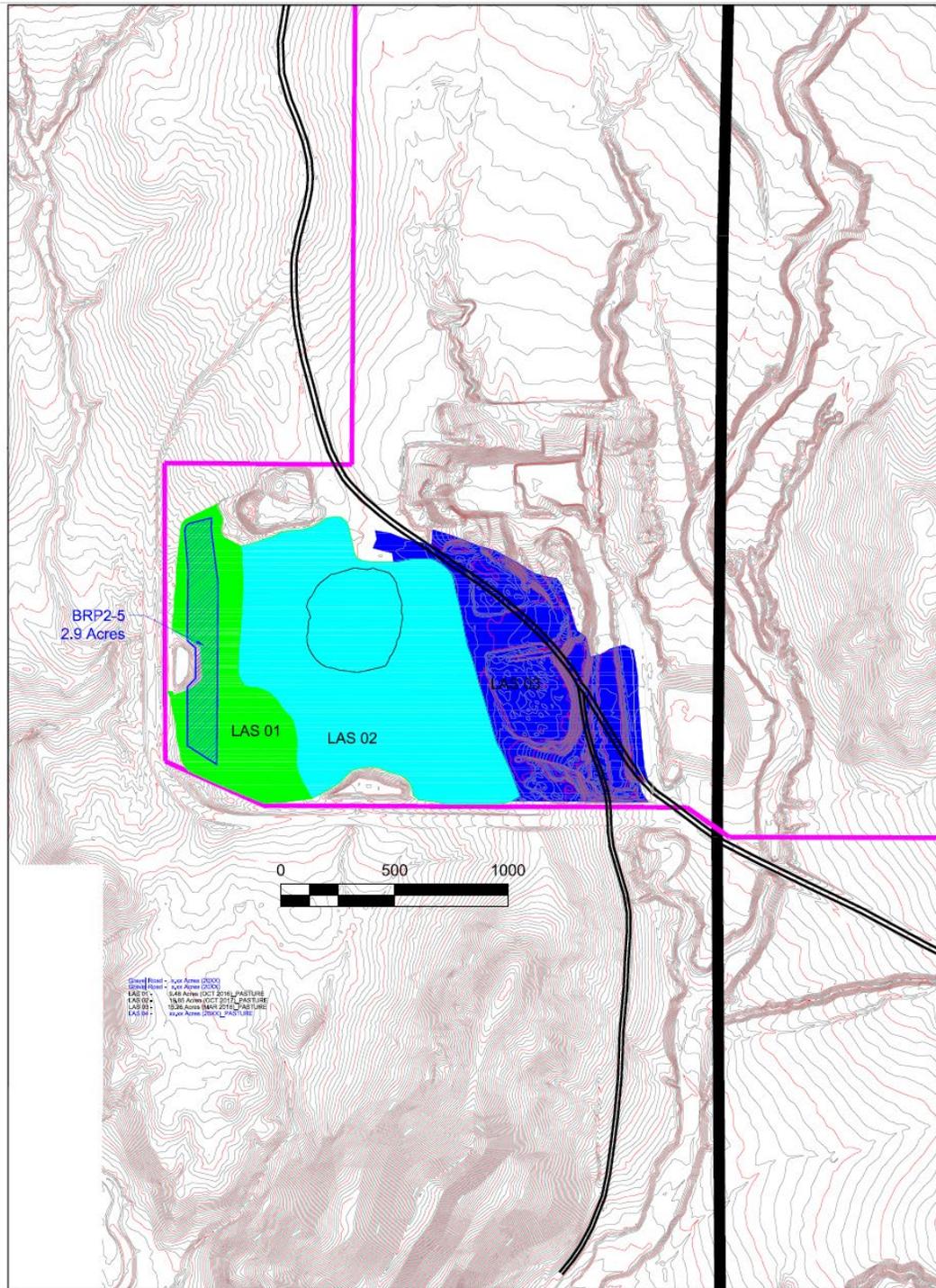
### Forbs

<i>Artemisia ludoviciana</i>	Louisiana wormwood
<i>Aster</i> spp.	Aster
<i>Astragalus cicer</i>	Cicer milkvetch
<i>Grindelia squarrosa</i>	Gumweed
<i>Helianthus annuus</i>	Common sunflower
<i>Iva axillaris</i>	Poverty weed
<i>Linum lewissii</i>	Lewis flax
<i>Melilotus officinalis</i>	Yellow sweet-clover
<i>Salsola iberica</i>	Russian thistle
<i>Viguiera multiflora</i>	Showy goldeneye

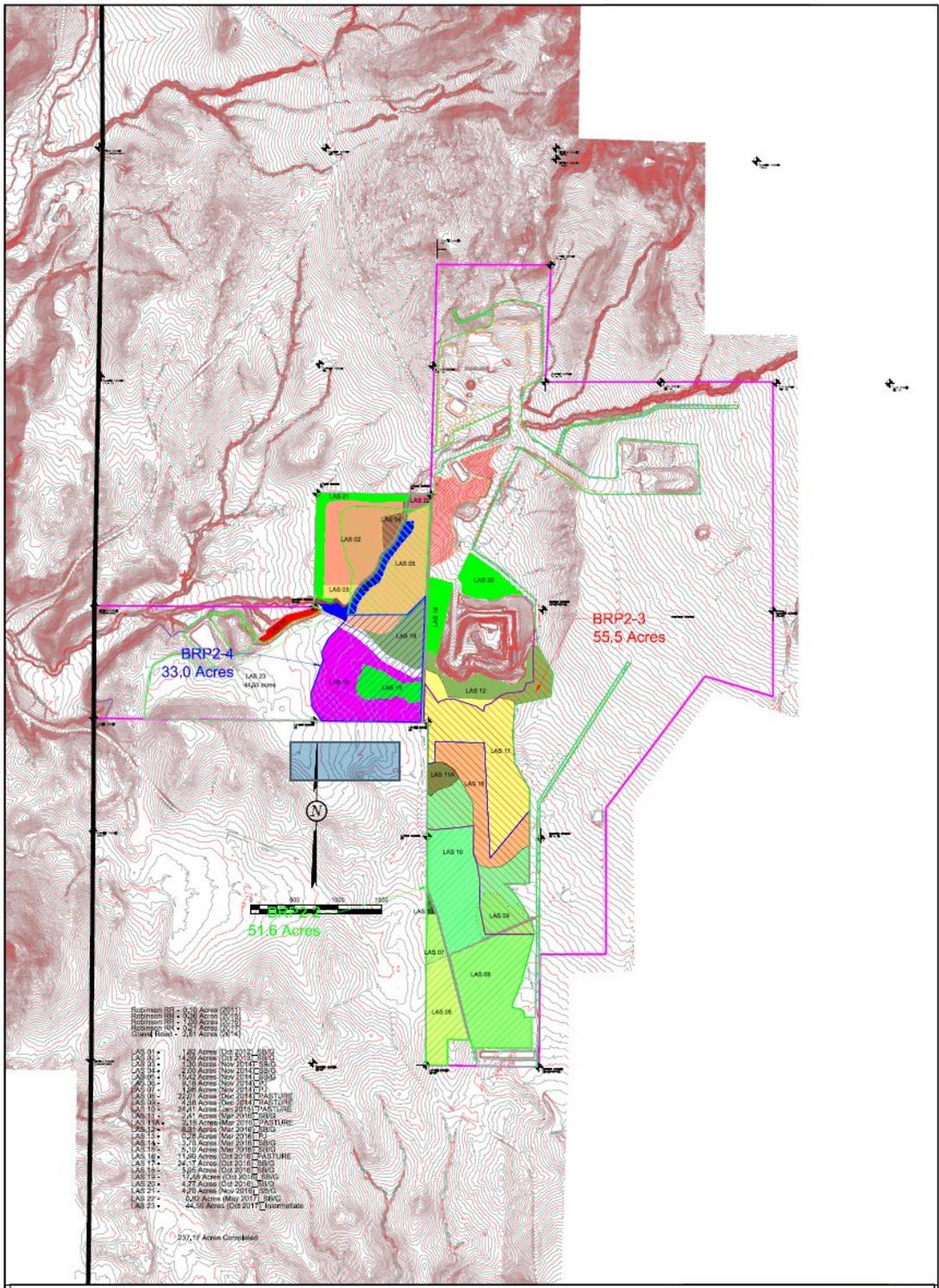
### Shrubs and Trees

<i>Artemisia nova</i>	Black sagebrush
<i>Artemisia tridentata</i>	Big sagebrush
<i>Atriplex canescens</i>	Fourwing saltbush
<i>Chrysothamnus nauseosus</i>	Rubber Rabbitbrush
<i>Juniperus osteosperma</i>	Utah juniper

# Maps of the Reclamation Sites



<b>LEGEND:</b> PERMIT BOUNDARY PRIVATE COAL OWNERSHIP SECTION LINE FOUND SECTION CORNER FOUND PROPERTY CORNER BONDED AREA	DRAWN BY: K NICHOLS	CHECKED BY:	REVISIONS		NORTH PRIVATE LEASE REVEGETATION	COAL HOLLOW PROJECT ALTON, UTAH	463 North 100 West, Suite Cedar City, Utah 84721 Phone (435)867-5331 Fax (435)867-1192
	DRAWING: FIGURE 1	DATE: 8/1/2016	DATE:      BY: XX/XX/XX    XX	SCALE:			
	JOB NUMBER: 1400	SHEET					



<b>LEGEND:</b> PERMIT BOUNDARY BOND RELEASE FOUND SECTION CORNER BONDED AREA	DRAWN BY:	CHECKED BY:	REVISIONS		BOND RELEASE PHASE 2 17_2  COAL HOLLOW PROJECT ALTON, UTAH FIGURE 2	 <small>400 North 100 West, Suite 1          Coal Hollow, UT 84721          Phone: (435)867-5333          Fax: (435)867-1192</small>
	K. NICHOLS	ARC	DATE:	BY:		
	DRAWING:	DATE:	08/01/17	KN		
	FIGURE 1	06/13/2017	SCALE:			
JOB NUMBER: 1400	SHEET	1" = 500'				