



Alton Coal Development, LLC

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9/30/2016

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Subject: 2016 OSM Over-site Inspection, Alton Coal Development, LLC, Coal Hollow Mine, Kane County, Utah, C/025/0005

Dear Mr. Haddock,

Alton Coal Development, LLC (ACD) is submitting this amendment in response to the June 13, 2016 OSM over-site inspection. Seven items in the inspection report were identified as requiring updates to the plan. They were addressed as follows:

1. GPS locations for the reference areas were added to Drawing 3-1
2. ACD met with Division staff Lisa Reinhart and DWR, Rhett Boswell on August 18 to review reclamation and associated reference areas. Woody plant densities for mine reclamation were recommended by DWR. At this time a formal recommendation (email from the DWR) has not been provided to the Division.
3. Based on the recommendation for woody plant densities from DWR in item 2, no treatment methods for improving woody plant densities on seeded areas were recommended.
4. Success standards for reclaimed pasture land have been developed and added to Chapter 3.
5. Based on the recommendation for woody plant densities from DWR in item 2, no woody plant density technical was developed.
6. Control of musk thistle has been ongoing at the Coal Hollow Mine in past years and was continued in 2016. Herbicide was applied on June 4, 9, 24, 25, 29, July 2, 9 and 16 as well as mechanical removal of individual plants when encountered.
7. NRCS was on site July 28, 2016 to perform range site evaluations for reference areas. Results have been added to the MRP as Appendix 3-11 with this submittal.

Changes to the MRP associated with this amendment have been uploaded to the DOGM's server for review. PDF versions of the drawing are not certified. Upon approval, 2 (two) clean hard copies of the text and certified drawings for insertion into the MRP will be submitted. Please do not hesitate to contact me if you have any questions 435-691-1551.

Sincerely

A handwritten signature in black ink, appearing to read "B. Kirk Nicholes". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

B. Kirk Nicholes
Environmental Specialist

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: Alton Coal Development, LLC

Mine: Coal Hollow Mine

Permit Number:

C/025/0005

Title: 2016 OSM Over-site Inspection

Description, Include reason for application and timing required to implement:

Instructions: If you answer yes to any of the first eight questions, this application may require Public Notice publication.

- Yes No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ increase decrease.
- Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
- Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes No 6. Does the application require or include public notice publication?
- Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- Yes No 9. Is the application submitted as a result of a Violation? NOV # _____
- Yes No 10. Is the application submitted as a result of other laws or regulations or policies?

Explain: _____

- Yes No 11. Does the application affect the surface landowner or change the post mining land use?
- Yes No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
- Yes No 13. Does the application require or include collection and reporting of any baseline information?
- Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- Yes No 15. Does the application require or include soil removal, storage or placement?
- Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
- Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- Yes No 19. Does the application require or include certified designs, maps or calculation?
- Yes No 20. Does the application require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided?
- Yes No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
- Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?
- Yes No 24. Does the application include confidential information and is it clearly marked and separated in the plan?

Please attach three (3) review copies of the application. If the mine is on or adjacent to Forest Service land please submit four (4) copies, thank you. (These numbers include a copy for the Price Field Office)

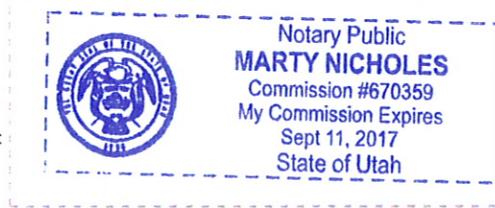
I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

B. Kirk Nicholes Environmental Specialist 09/30/2016
 Print Name Position Date Signature (Right-click above choose certify then have notary sign below)

Subscribed and sworn to before me this 30 day of Sept, 2016

Notary Public: Marty Nicholes, state of Utah.

My commission Expires: 9-11-2017
 Commission Number: 670359 } ss:
 Address: 1670 E Millstone Cir
 City: Enoch State: UT Zip: 84721



<p>For Office Use Only:</p>	<p>Assigned Tracking Number:</p>	<p>Received by Oil, Gas & Mining</p>
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R645-301-300. BIOLOGY

310. INTRODUCTION

The following section ~~has been created to be submitted to the State of Utah, Division of Oil, Gas & Mining (DOG M). It~~ describes specific biological resources of the Coal Hollow Project near the town of Alton, Utah. Updates to the data sets herein will be a continuous undertaking. This chapter contains information including the following:

311. Vegetative, fish, and wildlife resources of the permit area and adjacent areas as described under R645-301-320.

312. Potential impacts to vegetative, fish and wildlife resources and methods proposed to minimize these impacts during coal mining and reclamation operations as described under R645-301-330 and R645-301-340.

313. Proposed reclamation designed to restore or enhance vegetative, fish, and wildlife resources to a condition suitable for the designated postmining land use as described under R645-301-340.

320. ENVIRONMENTAL DESCRIPTION

321. VEGETATION INFORMATION

321.100. Vegetation Mapping and Plant Community Data in the Permit Area

Coal Hollow Lease

The first vegetation map prepared for the Coal Hollow Project delineated the plant communities that existed within the original permit area. The plant communities ~~_for the permit area~~ on this early map were drafted on a USGS quadrangle map using ~~information from~~ an existing vegetation map that was prepared ~~from previous work in the area. The earlier work was accomplished~~ in the late-1980s.

A ~~new~~ flight was conducted for the Coal Hollow Project in 2006 that provided aerial photography and more detailed information ~~_than had previously been available~~. This aerial photography and photogrammetric mapping has been used in preparation of many updated maps of the project area, including a revised vegetation map where the plant communities were delineated on the new aerial photographs. Also, new quantitative data were recorded in 2006 in some of the first plant communities proposed for disturbance along with reference areas that would *not* be disturbed. This next version of the vegetation map for the Coal Hollow project also provided sample locations of these recently studied areas. This map was submitted to DOGM in ~~the last~~ MRP submittal (*dated May 25, 2007*) along with the first vegetation quadrangle map, because it continued to provide support for some of the older vegetation data also submitted in the MRP at that time.

Like the earlier vegetation mapping information, and because the area has been studied previously, existing quantitative data sets were also available for the plant communities of the Coal Hollow Project Lease area. These data were recorded in the late-1980s. The aforementioned earlier quadrangle vegetation map corresponded to this early vegetation information. The early datasets were included in the MRP provided to DOGM (*submittal date: May 25, 2007*). Although this information was valuable at that time because it provided initial baseline data for that time period, plans to re-sample the same plant communities to update the existing data were made. Consequently, new quantitative sampling was accomplished later in 2007 to provide updated information about the plant communities within the permit area. The updated data have been summarized and included in this MRP. Therefore, with the 2006 and 2007 quantitative data for the plant communities submitted in the MRP, the dataset for those plant communities proposed for disturbance in the current mine plan for the entire permit area is complete. **Therefore, the older vegetation datasets and maps created using information from the late- 1980s were replaced by the updated datasets and maps in the MRP.**

Reference areas chosen to represent future revegetation success standards were also chosen and sampled during the same sample periods in 2006 and 2007 as those areas proposed for disturbance by the mining operations. The meadow reference area and the Dame Meadow Sample Area (another potential reference area) was included into the permit boundary in 2014. Although coal is to be removed from this area by undermining only and the surface will not be disturbed, the meadow reference area will be relocated during the 2014 growing season to a representative area due south of the permit boundary that does not contain coal and will not be disturbed by mining operations.

Acreage of each plant community and map symbols shown on the revised Vegetation Map (*Drawing 3-1, dated 12/26/07*) for the Coal Hollow Project permit and adjacent areas are shown below.

Vegetation Communities of the Coal Hollow Permit Area			
MAP SYMBOL (see <i>Vegetation Map, Drawing 3-1</i>)	PLANT COMMUNITY	TOTAL ACREAGE	PERCENT OF TOTAL
S/G	Sagebrush/Grass	212.00	33.64
P	Pasture Land	192.00	30.48
P-J	Pinyon-Juniper	114.00	18.10
M	Meadow	69.00	10.95
OB	Oak Brush	40.00	6.35
RB/SB	Rabbitbrush/Sagebrush (Disturbed; previously Sagebrush/Grass)	3.00	0.48
	Total*	630.00	100.00

Color photographs of the plant communities within the Coal Hollow Project Lease permit area are shown in **PHOTOGRAPHS** section near the end of this chapter.

The above plant communities exist within the boundaries of the Coal Hollow Project Lease permit area and will be disturbed by the coal mining and related activities. Consequently, quantitative and qualitative data were recorded by sampling the plant communities in 2006 and 2007. For general, wide-angle views of the plant communities in the permit area, refer to Photographs 3-1, 3-2, 3-3 and 3-4.

[**NOTES:** 1:The rabbitbrush/sagebrush community was not sampled for baseline data information. This small area represented less than one-half of one percent of the permit area. Moreover, it was a *previously disturbed* sagebrush/grass community. Therefore, standards of revegetation success at final reclamation will be the same as those outlined for the *undisturbed* sagebrush/grass plant communities described in this document 2: Expansion of the mine has been proposed to include a new area north of the current operations. Vegetation information for that area can be found in VOLUME 12: Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah (November 2014)*.].

As mentioned other areas with similar plant communities were sampled within or near the permit area that will *not* be disturbed by mine-related activities. These native plant communities were chosen to be used as future revegetation success standards at the time of final reclamation of the mine site. Therefore, the same methods and parameters were employed in the reference areas that were used to sample the areas proposed for disturbance. The areas with like-communities sampled (the proposed disturbed area and reference area) for each community type, were compared statistically for their appropriateness as reference areas at this time. Similar comparisons (and additional comparisons) will also be conducted between the communities once the land is reclaimed. Complete results and methodologies used are shown in the final reports prepared from sampling these communities. These reports have been included in the appendices at the end of this chapter. The reports titles are: *Vegetation of the Sagebrush/Grass & Meadow Areas: 2006* (**Appendix 3-2**) and *Vegetation Sampling in the Coal Hollow Project Area: 2007* (**Appendix 3-4**). [Following is a summary of the results from sampling these communities.](#)

Proposed Disturbed Sagebrush/Grass Community

[One of the most common plant communities of the Coal Hollow permit area was sagebrush/grass \(see *Vegetation Map, Drawing 3-1* and *Photograph 3-5*\).](#)

[Sagebrush community types in the permit area can be dominated by either big sagebrush \(*Artemisia tridentata*\) or black sagebrush \(*A. nova*\). In the sagebrush/grass community that has been proposed for disturbance and sampled, both of these species were nearly equally represented. The dominant plant species as shown in the species cover table \(Table 3-1\) were big sagebrush, black sagebrush, jungrass \(*Koeleria macrantha*\), and Sandberg's bluegrass \(*Poa secunda*\).](#)

[The total living cover of this sagebrush/grass community was estimated at 54.73%, of which 52.40% of it was from understory cover and only 2.33% was from overstory \[Table 3-2 \(A\)\]. Shrubs dominated the composition here representing 64.09% of the total living understory cover, followed by grasses at 34.64%, and forbs at 1.28% \[Table 3-2 \(B\)\]. Woody species density was also measured; the total number of individuals per acre was estimated at 8,339 \(Table 3-3\).](#)

Sagebrush/Grass Reference Area

The sagebrush/grass community chosen as a reference area to be used for future revegetation success standards was located northwest of the sagebrush/grass community that was proposed for disturbance, and just outside the permit area (see *Vegetation Map, Drawing 3-1* and *Photograph 3-6*).

This plant community will remain undisturbed and is similar to the proposed disturbed area. It had been chosen to be used for future revegetation success standards and had similar cover, composition, and woody species density. Cover and frequency by species of the sagebrush/grass reference area are shown on Table 3-4. The dominant shrub plant species here were big sagebrush and black sagebrush. The most common grass species were slender wheatgrass (*Elymus trachycaulus*), cheatgrass (*Bromus tectorum*), Kentucky bluegrass, and Sandberg's bluegrass. The total living cover in the area was estimated at 60.50%, all of which was from understory cover [Table 3-5(A)]. Woody species dominated the composition at 61.48%, whereas grasses comprised 29.86%, and forbs 8.65% [Table 3-5(B)].

The total number of plants per acre in the woody species density measurements was 8,331 (Table 3-6). Big sagebrush and black sagebrush dominated the woody species in the density measurements.

Proposed Disturbed Meadow (Dry) Community

There are different meadow lands located within the permit area. These meadows have somewhat been differentiated on the *Vegetation Map (Drawing: 3-1)* which show them as "M (Dry)" compared to those that retain more soil moisture, or shown as merely as "M" on the map. The year 1 mining operations would disturb a dry meadow community on the west side of the permit area (see *Photograph 3-7*).

Quantitative sampling was conducted in this meadow. As shown on Table 3-7, the dominant species in the proposed disturbed meadow were grass and grass-like species including sedge (*Carex* sp.), wiregrass (*Juncus arcticus*) and junegrass. Broom snakeweed (*Gutierrezia sarothrae*) was the dominant shrub, whereas the dominant forbs were yarrow (*Achillea millefolium*) and Pacific aster (*Aster ascendens*).

The total living cover was estimated at 73.00% [Table 3-8 (A)]. The composition of the

understory was 75.70% grasses (and grass-likes), 13.28% forbs, and 11.01% shrubs [Table 3-8 (B)]. The total number of plants per acre in the woody species density measurements was 817 (Table 3-9). Black sagebrush was the only woody species present in the density measurements.

Meadow (Dry) Reference Area

The dry meadow reference area was chosen outside the permit area, but in close proximity to the dry meadow proposed to be disturbed by the mine (see *Vegetation Map, Drawing 3-1* and Photograph 3-8). The dominate grass and grass-like species in the dry meadow reference area were wiregrass, sedge, and junegrass (Table 3-10). The dominant forbs were yarrow, Pacific aster, and cinquefoil (*Potentilla anserina*). The only shrubs present in the sample quadrats were black sagebrush and broom snakeweed.

The total living cover of this reference area was 72.00% [Table 3-11(A)]. The understory cover composition was comprised of 71.05% grasses (and grass-likes), 22.31% forbs and 6.64% shrubs [Table 3-11 (B)]. The total woody species density of the community was 1,481 plants per acre and was comprised exclusively of black sagebrush (Table 3-12).

Proposed Disturbed Pinyon-Juniper Community

Several areas proposed for disturbance by mining activities currently support pinyon-juniper plant communities. For a representative picture of these sample areas see Photograph 3-9. Pinyon-juniper communities were sampled in two areas. One such area, shown as the “Prop. Dist. Pinyon-Juniper Sample Area (North)” on the *Vegetation Map, Drawing 3-1*, is located on the east side of the permit area and *north* of another pinyon-juniper sample area. This is a site where mining activities have been planned during the first year of mining activities. Another pinyon-juniper sample area or the “Prop. Dist. Pinyon-Juniper Sample Area (South)” on the map, is located near the south boundary of the permit area and also *south* of the other pinyon-juniper sample area. Disturbance from mining-related activities of the south sample area have been planned during the third year of mining. These two datasets have been combined to show the final results of the sample data for the proposed disturbed pinyon-juniper community as a whole, but the data could easily be separated at a later time if for some reason it is desired.

Overstory cover of the pinyon-juniper community was represented by only two species in the sample quadrats, but was dominated by Utah juniper (*Juniperus osteosperma*) and followed distantly by pinyon pine (*Pinus edulis*). Understory cover was dominated

by black sagebrush, followed by Utah juniper and pinyon pine (Table 3-13). Grasses were few and forbs were absent in the sample quadrats.

The total living cover of the pinyon-juniper community was 43.00%, of which 25.00% was from understory and 18.00% was from overstory species [Table 3-14 (A)]. The understory composition by lifeform in this community was comprised of 95.88 % woody species [Table 3-14 (B)]. Woody species density was measured at 2,657 individuals per acre (Table 3-15).

Pinyon-Juniper Reference Area

A reference area, or an area chosen to represent future revegetation success standards, was chosen and sampled in another pinyon-juniper plant community (see Photograph 3-10). This reference area will *not* be disturbed by the mining operations so it could be used for data comparisons following final reclamation at the mine site. The pinyon-juniper reference area was located near the *north* proposed disturbed pinyon-juniper community (see *Vegetation Map, Drawing 3-1*).

Like the above proposed disturbed community, the overstory cover of the reference area was dominated by Utah juniper followed by pinyon pine. Understory was also dominated by black sagebrush, Utah juniper and pinyon pine (Table 3-16). Again forbs were not present in the quadrats; grasses present were slender wheatgrass and squirreltail (*Elymus elymoides*).

The total living cover of the pinyon-juniper reference area was estimated at 39.00%, 11.50% of it was composed of overstory and 27.50% was understory cover [Table 3-17 (A)]. The composition of the understory in the pinyon-juniper reference area was calculated as 89.56% trees and shrubs and 10.44% grasses [Table 3-17 (B)]. Woody species density was dominated by black sagebrush and Utah juniper, but the total of all species was 4,215 individuals per acre (Table 3-18).

Proposed Disturbed Pasture Land Community

The areas called “pasture lands” in the text and maps of this document were plant communities that have been disturbed previously to artificially increase herbaceous cover and productivity for domestic livestock. Prior to pasture lands, these communities were probably native sagebrush/grass plant communities similar to those sampled and described in the 2006 report (*Vegetation of the Sagebrush/Grass & Meadow Areas: 2006*). Although differences occur between pastures due to grazing practices and species planted, representative pastures were sampled for this report (see Photographs 3-11 and 3-12). The sample areas were located near the center of the permit area (see *Vegetation Map, Drawing 3-1*). Again, different locations within this community were sampled, a *north* and a *south* area; and the data were combined for the summary tables

in this report. The proposed disturbed pasture land (*north*) was an area proposed for disturbance by open pit mining during the first year of mining activities. The proposed disturbed pasture land (*south*) was an area proposed for disturbance by open pit mining in the second year of mining activities. The alternate Highwall mining would reduce the proposed surface disturbance whenever this type of mining is used.

The sampling results for the north and south pasture lands indicate that the most common plant species by cover and frequency for the combined data were intermediate wheatgrass (*Elymus hispidus*), Kentucky bluegrass (*Poa pratensis*), black sagebrush (Table 3-19). The annual plant called poverty weed (*Iva axillaris*) was also common in the sample areas.

The total living cover, all of it from understory species, was 44.50% [Table 3-20 (A)]. The composition of the pasture lands consisted of 52.16% grasses, 30.19% shrubs and 17.64% forbs [Table 3-20 (B)]. Woody species density measurements show the woody species density to be 1,349 individuals per acre with the most common species being big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Chrysothamnus nauseosus*) and black sagebrush (Table 3-21).

Pasture Land Reference Area

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

Proposed Disturbed Oak Brush Community

An oak brush community has been proposed for disturbance by future mining operations (see Photograph 3-13). This community was located in the northeast region of the permit area (see *Vegetation Map, Drawing 3-1*).

Overstory of this community was greater than the understory cover. The dominant overstory species by a wide margin was Gambel's oak (*Quercus gambelii*) with a 41.25% cover and was present in 85.00% of the samples. The dominant understory species were big sagebrush, snowberry (*Symphoricarpos oreophilus*) and Gambel's oak (Table 3-22).

The total living cover in the proposed disturbed oak brush community was estimated at 66.75%, 43.00% coming from overstory and 23.75% from understory plants [Table 3-23 (A)]. Woody species comprised 97.75% of the understory composition with the remaining 2.25% coming from grass species [Table 3-23 (B)]. Forbs were not present in the sample quadrats. Woody species density was estimated at 3,743 plants per acre and, like the cover results, the most common species consisted of snowberry, Gambel's oak and big sagebrush (Table 3-24).

Oak Brush Reference Area

A oak brush reference area was chosen to represent future success standards for revegetation (see Photograph 3-14). This reference area was located on the east side of the permit area (see *Vegetation Map, Drawing 3-1*). Like the proposed disturbed area it was chosen to represent, the reference area's cover was greater for overstory than that of the understory. The dominant overstory species by far was Gambel's oak. Dominant understory species were Gambel's oak, Kentucky bluegrass, Utah juniper, big sagebrush and snowberry (Table 3-25).

Overstory cover was estimated at 53.25%, whereas understory cover was 20.00%. The total living cover of those combined was 73.25% [Table 3-26 (A)]. Understory lifeform composition was comprised of 66.92% trees and shrubs and 33.08% grasses—no forbs were present [Table 3-26 (B)]. Woody species density was estimated at 2,092 plants per acre with the most common by a wide margin being Gambel's oak, but also consisted of snowberry, big sagebrush, Rocky Mountain juniper (*Juniperus scopulorum*), pinyon pine and Utah juniper (Table 3-27).

Proposed Disturbed Meadow Community

Meadow areas in and adjacent to the project permit area have been studied (see *Vegetation Map, Drawing 3-1*). A dry meadow was mentioned above and reported in the 2006 document included in the MPR [*Vegetation of the Sagebrush/Grass & Meadow*

~~Areas: 2006 (Appendix 3-2)]. However, another meadow community that retains more soil moisture has also been proposed for disturbance due to the mining (see Photograph 3-15). The complete report for this study has been include in the appendix section of Chapter 3 [Vegetation Sampling in the Coal Hollow Project Area: 2007 (Appendix 3-4)].~~

~~The dominant plant species by cover and frequency in this community were wiregrass, Missouri iris (*Iris missouriensis*) and Wood's rose (*Rosa woodsii*). For a list of all species present in the sample quadrats refer to Table 3-28. This meadow community had a total living cover of 86.00% [Table 3-29 (A)]. Of this living cover 51.58% of it were comprised grasses or grass-like species, 32.54% were forbs and 15.88% were shrubs [Table 3-29 (B)]. Woody species density of the community was 384 individuals per acre, all of which was Wood's rose (Table 3-30).~~

Meadow Reference Area

~~The reference area, or area chosen to represent future revegetation success standards, was located just outside the permit area (*Vegetation Map, Drawing 3-1; Photograph 3-16*). Similar species dominated this community as were represented in the proposed disturbed area, namely wiregrass, Missouri iris, Kentucky bluegrass (*Poa pratensis*) and Wood's rose (Table 3-31). The total living cover in the reference area was estimated at 88.50% [Table 3-32 (A)]. Composition here was calculated to be comprised of 51.57% grass and grasslike species, 37.38% forbs and 11.04% shrubs [Table 3-32 (B)]. Woody species density in this area was estimated at 2,226 plants per acre (Table 3-33).~~

Other Meadow Communities

~~Other meadow communities were studies outside the permit area (see *Vegetation Map, Drawing 3-1*). These areas will not be disturbed by mining activities — they were studied to provide more information about the meadows in the area to provide companion studies for other studies such as alluvial valley floor determinations. Results from these studies can be found in the Chapter 3 appendices [*Vegetation Sampling in the Coal Hollow Project Area: 2007 (Appendix 3-4)*].~~

NOTE: Expansion of the mine has been proposed to include a new area north of the current operations. Vegetation information for that area can be found in the VOLUME 12: Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah* (November 2014).

**Table 3-1: Alton Coal Project, Living Cover and Frequency
by Plant Species (2006).**

Sagebrush/Grass (S/G) Proposed Disturbed	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY COVER			
<i>Juniperus osteosperma</i>	2.33	9.55	6.67
UNDERSTORY COVER			
TREES & SHRUBS			
<i>Artemisia nova</i>	14.93	17.10	50.00
<i>Artemisia tridentata</i> var. <i>tridentata</i>	15.23	20.48	26.67
<i>Chrysothamnus depressus</i>	2.07	5.90	16.67
<i>Gutierrezia sarothrae</i>	1.23	2.79	20.00
FORBS			
<i>Eriogonum racemosum</i>	0.33	1.25	6.67
<i>Gilia aggregata</i>	0.33	1.25	6.67
<i>Linum perenne</i>	0.10	0.54	3.33
GRASSES			
<i>Bouteloua gracilis</i>	2.33	8.54	10.00
<i>Bromus tectorum</i>	0.83	3.18	6.67
<i>Elymus smithii</i>	0.50	1.98	6.67
<i>Elymus trachycaulus</i>	0.50	1.98	6.67
<i>Hordeum jubatum</i>	0.83	1.86	16.67
<i>Koeleria macrantha</i>	4.17	10.25	23.33
<i>Poa pratensis</i>	3.17	7.69	16.67

<i>Poa secunda</i>	4.00	7.00	30.00
<i>Stipa hymenoides</i>	1.83	3.53	23.33

Table 3-2: Coal Hollow Project. Total Cover and Composition (2006).

Sagebrush/Grass (S/G) Proposed-Disturbed		
A. TOTAL COVER	Mean Percent	Standard Deviation
Overstory Cover (o)	2.33	9.55
Understory Cover (u)	52.40	13.67
Litter	16.17	10.90
Bareground	26.87	11.83
Rock	4.57	6.15
TOTAL LIVING (o + u)	54.73	13.52
B. % COMPOSITION (u)		
Shrubs	64.09	22.93
Forbs	1.28	3.55
Grasses	34.64	22.43

Table 3-3: Coal Hollow Project. Woody Species Density (2006).

Sagebrush/Grass (S/G) Proposed-Disturbed	
SPECIES	Individuals Per Acre
<i>Artemisia tridentata</i>	2779.73
<i>Artemisia nova</i>	4100.11
<i>Chrysothamnus depressus</i>	833.92
<i>Chrysothamnus nauseosus</i>	69.49
<i>Chrysothamnus viscidiflorus</i>	138.99
<i>Gutierrezia sarothrae</i>	277.96
<i>Juniperus osteosperma</i>	138.99
TOTAL	8339.20

**Table 3-4: Alton Coal Project- Living Cover and
Frequency by Plant Species (2006).**

Sagebrush/Grass (S/G) Reference Area	Mean Percent	Standard Deviation	Percent Frequency
TREES & SHRUBS			
<i>Artemisia nova</i>	23.85	18.18	75.00
<i>Artemisia tridentata</i>	40.90	13.39	55.00
<i>Chrysothamnus nauseosus</i>	2.10	3.78	25.00
<i>Gutierrezia sarothrae</i>	0.90	2.72	10.00
<i>Juniperus osteosperma</i>	0.25	1.09	5.00
FORBS			
<i>Achillea millefolium</i>	0.25	1.09	5.00
<i>Aster ascendens</i>	3.00	4.58	35.00
<i>Erigeron religiosus</i>	0.25	1.09	5.00
<i>Iva axillaris</i>	1.00	2.00	20.00
<i>Sphaeralcea coccinea</i>	0.25	1.09	5.00
GRASSES			
<i>Bromus tectorum</i>	4.75	6.61	45.00

<i>Elymus smithii</i>	0.50	2.18	5.00
<i>Elymus trachycaulus</i>	5.25	9.93	30.00
<i>Juncus arcticus</i>	0.75	3.27	5.00
<i>Poa pratensis</i>	3.00	7.65	15.00
<i>Poa secunda</i>	2.75	5.36	25.00
<i>Stipa hymenoides</i>	0.75	0.75	10.00

Table 3-5: Coal Hollow Project. Total Cover and Composition (2006).

Sagebrush/Grass (S/G) Reference Area		
A. TOTAL COVER	Mean Percent	Standard Deviation
Understory Cover (u)	60.50	13.03
Litter	13.05	4.81
Bareground	25.05	13.58
Rock	1.40	1.20
B. % COMPOSITION (u)		
Trees/Shrubs	61.48	17.01
Forbs	8.65	8.73
Grasses	29.86	14.18

Table 3-6: Coal Hollow Project. Woody Species Density (2006).

Sagebrush/Grass (S/G) Reference Area	
SPECIES	Individuals Per Acre
<i>Artemisia tridentata</i>	3644.87
<i>Artemisia nova</i>	3957.29
<i>Chrysothamnus nauseosus</i>	624.83
<i>Gutierrezia sarothrae</i>	208.28
TOTAL	8331.13

**Table 3-7: Alton Coal Project. Living Cover and Frequency
by Plant Species (2006).**

Meadow (M) Dry Proposed Disturbed			
	Mean Percent	Standard Deviation	Percent Frequency
TREES & SHRUBS			
<i>Artemisia nova</i>	1.00	2.00	20.00
<i>Gutierrezia sarothrae</i>	7.20	4.80	85.00
FORBS			

<i>Achillea millefolium</i>	6.40	6.42	55.00
<i>Aster ascendens</i>	2.00	4.00	25.00
<i>Eriogonum racemosum</i>	0.25	1.09	5.00
<i>Linum lewisii</i>	1.00	3.39	10.00
<i>Potentilla anserina</i>	0.25	1.09	5.00
GRASSES			
<i>Bouteloua gracilis</i>	2.25	6.80	10.00
<i>Carex</i> -sp.	27.50	19.46	75.00
<i>Elymus olymoides</i>	0.50	1.50	10.00
<i>Elymus smithii</i>	0.75	2.38	10.00
<i>Hordeum jubatum</i>	0.50	2.18	5.00
<i>Juncus arcticus</i>	10.25	13.27	70.00
<i>Koeleria macrantha</i>	8.00	10.17	55.00
<i>Muhlenbergia asperifolia</i>	0.50	2.18	5.00
<i>Poa pratensis</i>	4.65	10.62	25.00

Table 3-8: Coal Hollow Project. Total Cover and

Composition (2006).

Meadow (M) Dry Proposed Disturbed		
A. TOTAL COVER	Mean Percent	Standard Deviation
Understory Cover (u)	73.00	9.67
Litter	9.40	3.28
Bareground	16.50	9.67

Rock	4.10	0.30
B. % COMPOSITION (u)		
Shrubs	44.01	8.10
Forbs	13.28	8.74
Grasses	75.70	13.81

Table 3-9: Coal Hollow Project. Woody Species Density (2006).

Meadow (M) Dry (Proposed Disturbed)	
SPECIES	Individuals Per Acre
<i>Artemisia nova</i>	816.75
TOTAL	816.75

**Table 3-10: Alton Coal Project. Living Cover and Frequency
by Plant Species (2006).**

Meadow (M) Dry Reference Area			
	Mean Percent	Standard Deviation	Percent Frequency

TREES & SHRUBS			
<i>Artemisia-nova</i>	3.25	6.76	25.00
<i>Gutierrezia-sarothrae</i>	1.50	3.91	15.00
FORBS			
<i>Achillea-millefolium</i>	5.50	5.45	60.00
<i>Artemisia-campestris</i>	1.25	3.83	10.00
<i>Aster-ascendens</i>	5.00	6.12	50.00
<i>Eriogonum-racemosa</i>	0.25	1.09	5.00
<i>Linum-lewisii</i>	0.25	1.09	5.00
<i>Potentilla-anserina</i>	3.25	7.12	20.00
GRASSES			
<i>Bouteloua-gracilis</i>	1.75	5.76	10.00
<i>Carex-sp.</i>	16.50	12.05	80.00
<i>Elymus-elymoides</i>	0.75	3.27	5.00
<i>Elymus-smithii</i>	0.50	2.18	5.00
<i>Elymus-spicatus</i>	1.50	6.54	5.00
<i>Elymus-trachycaulus</i>	4.00	9.82	15.00
<i>Juncus-arcticus</i>	15.25	16.84	70.00
<i>Koeleria-macrantha</i>	9.50	11.06	45.00
<i>Muhlenbergia-asperifolia</i>	0.25	1.09	5.00
<i>Poa-pratensis</i>	1.75	4.26	15.00

Table 3-11: Coal Hollow Project. Total Cover and Composition

(2006).		
Meadow (M)-Dry Reference Area		
A. TOTAL COVER	Mean Percent	Standard Deviation
Understory Cover (u)	72.00	8.86
Litter	44.70	5.16
Bareground	14.70	6.65
Rock	4.60	2.18
B. % COMPOSITION (u)		
Shrubs	6.64	10.29
Forbs	22.31	12.24
Grasses	71.05	12.91

Table 3-12: Coal Hollow Project. Woody Species Density (2006).

Meadow (M)-Dry Reference Area	
SPECIES	Individuals Per Acre
<i>Artemisia nova</i>	1481.04
TOTAL	1481.04

Table 3-13: Coal Hollow Project. Living Cover and Frequency by Plant Species (2007).

Pinyon-Juniper (P-J) Proposed Disturbed			
	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
SHRUBS			
<i>Juniperus osteosperma</i>	16.75	18.66	55.00
<i>Pinus edulis</i>	1.25	5.45	5.00
UNDERSTORY			
SHRUBS			
<i>Artemisia nova</i>	17.50	14.87	70.00
<i>Juniperus osteosperma</i>	5.75	8.98	35.00
<i>Pinus edulis</i>	0.50	2.18	5.00
FORBS			
GRASSES			
<i>Elymus elymoides</i>	0.75	3.27	5.00
<i>Elymus trachycaulus</i>	0.50	1.50	10.00

Table 3-14: Coal Hollow Project. Total Cover and Composition (2007)

Pinyon-Juniper (P-J) Proposed Disturbed		
A. TOTAL COVER		
	Mean Percent	Standard Deviation
OVERSTORY (o)	18.00	18.33
UNDERSTORY (u)	25.00	11.40
Litter	22.55	19.66
Bareground	48.40	17.18
Rock	4.05	2.27
TOTAL LIVING (o + u)	43.00	15.20
B. % COMPOSITION (u)		
Trees & Shrubs	95.88	13.26
Forbs	0.00	0.00
Grasses	4.13	13.26

Table 3-15: Coal Hollow Project. Woody Species Density (2007).

Pinyon-Juniper (P-J) Proposed Disturbed	
SPECIES	Individuals Per Acre
<i>Artemisia tridentata</i>	166.03
<i>Artemisia nova</i>	1627.12
<i>Juniperus osteosperma</i>	730.55
<i>Pinus edulis</i>	132.83
TOTAL	2656.53

Table 3-16: Coal Hollow Project. Living Cover and Frequency by Plant Species (2007).

Pinyon-Juniper (P-J) Reference Area			
	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
SHRUBS			
<i>Juniperus osteosperma</i>	9.00	13.56	40.00
<i>Pinus edulis</i>	2.50	10.90	5.00
UNDERSTORY			
SHRUBS			
<i>Artemisia nova</i>	17.75	12.70	80.00
<i>Juniperus osteosperma</i>	3.75	6.68	30.00
<i>Pinus edulis</i>	2.25	5.58	15.00
FORBS			
GRASSES			
<i>Elymus olymoides</i>	2.00	4.00	20.00
<i>Elymus trachycaulus</i>	4.75	4.26	15.00

Table 3-17: Coal Hollow Project. Total Cover and Composition (2007)

Pinyon-Juniper (P-J) Reference Area		
A. TOTAL COVER	Mean Percent	Standard Deviation
OVERSTORY (o)	11.50	16.05
UNDERSTORY (u)	27.50	11.35
Litter	19.00	14.20
Bareground	46.50	19.69
Rock	7.00	2.45
TOTAL LIVING (o + u)	39.00	11.36
B. % COMPOSITION (u)		
Trees & Shrubs	89.56	14.77
Forbs	0.00	0.00
Grasses	10.44	14.77

Table 3-18: Coal Hollow Project. Woody Species Density (2007).

Pinyon-Juniper (P-J) Reference Area	
SPECIES	Individuals Per Acre
<i>Artemisia tridentata</i>	158.05
<i>Artemisia nova</i>	3213.74
<i>Juniperus osteosperma</i>	632.20
<i>Pinus edulis</i>	210.73
TOTAL	4214.70

Table 3-19: Coal Hollow Project, Living Cover and Frequency by Plant Species (2007).

Pasture Land (P) Proposed Disturbed			
	Mean	Standard	Percent
	Percent	Deviation	Frequency
SHRUBS			
<i>Artemisia tridentata</i>	3.67	9.74	20.00
<i>Artemisia nova</i>	5.67	9.37	33.33
<i>Chrysothamnus nauseosus</i>	3.17	6.77	20.00
<i>Rosa woodsii</i>	0.50	1.50	10.00
FORBS			
<i>Achillea millefolium</i>	1.00	3.27	10.00
<i>Aster sp.</i>	0.83	2.61	10.00
<i>Iris missouriensis</i>	0.83	3.67	6.67
<i>Iva axillaris</i>	4.50	8.69	26.67
GRASSES (and grass-like)			
<i>Agropyron cristatum</i>	3.83	6.28	30.00
<i>Bromus inermis</i>	1.50	7.21	6.67
<i>Bromus tectorum</i>	2.83	6.67	16.67
<i>Elymus hispidus</i>	6.50	12.12	30.00
<i>Elymus smithii</i>	3.00	8.23	20.00
<i>Elymus trachycaulus</i>	0.33	1.80	3.33
<i>Juncus arcticus</i>	0.50	1.98	6.67
<i>Poa pratensis</i>	5.83	13.85	16.67

Table 3-20: Coal Hollow Project. Total Cover and Composition (2007)

Pasture Land (P) Proposed Disturbed		
A. TOTAL COVER	Mean Percent	Standard Deviation
Understory Cover (u)	44.50	10.59
Litter	24.10	11.67
Bareground	29.63	10.53
Rock	1.77	1.48
B. % COMPOSITION (u)		
Shrubs	30.19	26.65
Forbs	17.64	22.73
Grasses	52.16	25.41

Table 3-21: Coal Hollow Project. Woody Species Density (2007).

Pasture Land (P) Proposed Disturbed	
SPECIES	Individuals Per Acre
<i>Artemisia tridentata</i>	618.30
<i>Artemisia nova</i>	348.50
<i>Chrysothamnus nauseosus</i>	303.53
<i>Gutierrezia sarothrae</i>	22.48
<i>Rosa woodsii</i>	56.21
TOTAL	1349.02

Table 3-22: Coal Hollow Project. Living Cover and Frequency by Plant Species (2007).

Oak Brush (OB) Proposed Disturbed			
	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
SHRUBS			
<i>Juniperus scopulorum</i>	1.75	7.63	5.00
<i>Quercus gambelii</i>	41.25	24.33	85.00
UNDERSTORY			
SHRUBS			
<i>Artemisia tridentata</i>	11.10	15.94	45.00
<i>Juniperus osteosperma</i>	0.50	2.18	5.00
<i>Juniperus scopulorum</i>	2.75	7.33	15.00
<i>Quercus gambelii</i>	3.40	4.91	35.00
<i>Symphoricarpos oreophilus</i>	5.50	9.99	35.00
FORBS			
GRASSES			
<i>Bromus carinatus</i>	0.25	1.09	5.00
<i>Poa pratensis</i>	0.25	1.09	5.00

Table 3-23: Coal Hollow Project. Total Cover and Composition (2007)

Oak Brush (OB) Proposed Disturbed		
A. TOTAL COVER	Mean Percent	Standard Deviation
OVERSTORY (o)	43.00	22.49
UNDERSTORY (u)	23.75	12.23
Litter	61.25	15.24
Bareground	13.25	9.51
Rock	1.75	1.41
TOTAL LIVING (o + u)	66.75	14.86
B. % COMPOSITION (u)		
Trees & Shrubs	97.75	6.80
Forbs	0.00	0.00
Grasses	2.25	6.80

Table 3-24: Coal Hollow Project. Woody Species Density (2007).

Oak Brush (OB) Proposed Disturbed	
SPECIES	Individuals Per Acre
<i>Artemisia tridentata</i>	888.89
<i>Symphoricarpos oreophilus</i>	1169.59
<i>Gutierrezia sarothrae</i>	46.78
<i>Juniperus osteosperma</i>	233.92
<i>Juniperus scopulorum</i>	374.27
<i>Quercus gambelii</i>	1029.24
TOTAL	3742.70

Table 3-25: Coal Hollow Project. Living Cover and Frequency by Plant Species (2007).

Oak Brush (OB) Reference Area			
	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
SHRUBS			
<i>Juniperus osteosperma</i>	3.75	11.28	10.00
<i>Juniperus scopulorum</i>	1.75	7.63	5.00
<i>Quercus gambelii</i>	47.75	23.21	85.00
UNDERSTORY			
SHRUBS			
<i>Artemisia tridentata</i>	2.40	6.32	15.00
<i>Juniperus osteosperma</i>	3.00	9.14	10.00
<i>Juniperus scopulorum</i>	1.75	7.63	5.00
<i>Pinus edulis</i>	0.50	2.18	5.00
<i>Quercus gambelii</i>	5.85	8.56	40.00
<i>Symphoricarpos ereophilus</i>	1.75	3.96	20.00
FORBS			
GRASSES			
<i>Poa pratensis</i>	0.75	2.38	10.00
<i>Poa secunda</i>	4.00	7.00	30.00

Table 3-26: Coal Hollow Project. Total Cover and Composition (2007)

Oak Brush (OB) Reference Area		
A. TOTAL COVER	Mean Percent	Standard Deviation
OVERSTORY (o)	53.25	13.63
UNDERSTORY (u)	20.00	8.37
Litter	66.70	21.24
Bareground	8.30	13.49
Rock	5.00	16.07
TOTAL LIVING (o + u)	73.25	12.68
B. % COMPOSITION (u)		
Trees & Shrubs	66.92	43.92
Forbs	0.00	0.00
Grasses	33.08	43.92

Table 3-27: Coal Hollow Project. Woody Species Density (2007).

Oak Brush (OB) Reference Area	
SPECIES	Individuals Per Acre
<i>Artemisia tridentata</i>	209.16
<i>Juniperus osteosperma</i>	26.14
<i>Juniperus scopulorum</i>	130.72

<i>Pinus-edulis</i>	52.29
<i>Quercus-gambellii</i>	1333.37
<i>Symphoricarpos-oreophilus</i>	339.88
TOTAL	2091.57

Table 3-28: Coal Hollow Project. Living Cover and Frequency by Plant Species (2007).

Meadow (M) Proposed Disturbed	Mean Percent	Standard Deviation	Percent Frequency
SHRUBS			
<i>Artemisia-nova</i>	1.50	6.54	5.00
<i>Rosa-woodsii</i>	11.75	12.07	60.00
FORBS			
<i>Achillea-millefolium</i>	3.50	6.73	40.00
<i>Equisetum-arvensis</i>	0.75	2.38	10.00
<i>Iris-missouriensis</i>	24.00	13.19	95.00
GRASSES (and grass-likes)			
<i>Carex-microptera</i>	7.75	10.43	30.00
<i>Elymus-lanceolatus</i>	1.25	3.11	15.00
<i>Elymus-smithii</i>	0.25	1.09	5.00
<i>Elymus-trachycaulus</i>	0.50	2.18	5.00
<i>Juncus-arcticus</i>	24.00	9.95	100.00
<i>Koeleria-nitida</i>	1.50	4.77	10.00
<i>Phleum-pratensis</i>	0.50	2.18	5.00
<i>Poa-pratensis</i>	7.50	7.66	60.00
<i>Poa-secunda</i>	1.25	3.11	15.00

Table 3-29: Coal Hollow Project. Total Cover and Composition (2007)

Meadow (M) Proposed-Disturbed		
A. TOTAL COVER	Mean Percent	Standard Deviation
Understory Cover (u)	86.00	7.18
Litter	8.25	4.69
Bareground	4.05	1.96
Rock	1.70	3.05
B. % COMPOSITION (u)		
Shrubs	15.88	15.08
Forbs	32.54	16.94
Grasses	51.58	13.82

Table 3-30: Coal Hollow Project. Woody Species Density (2007).

Meadow Proposed-Disturbed	
SPECIES	Individuals Per-Acre

Rosa woodsii

384.06

TOTAL

384.06

Table 3-31: Coal Hollow Project. Living Cover and Frequency by Plant Species (2007).

Meadow (M) Reference Area	Mean Percent	Standard Deviation	Percent Frequency
SHRUBS			
<i>Rosa woodsii</i>	9.75	9.68	65.00
FORBS			
<i>Achillea millefolium</i>	0.25	1.09	5.00
<i>Iris missouriensis</i>	32.37	12.50	100.00
GRASSES (and grass-like)			
<i>Elymus lanceolatus</i>	0.50	1.50	10.00
<i>Juncus arcticus</i>	33.00	13.55	100.00
<i>Poa pratensis</i>	11.00	14.20	60.00
<i>Poa secunda</i>	1.25	3.83	10.00

Table 3-32: Coal Hollow Project. Total Cover and Composition (2007)

Meadow (M) Reference Area		
A. TOTAL COVER	Mean Percent	Standard Deviation
Total Living Cover (u)	88.50	5.94
Litter	7.85	4.98
Bareground	2.65	2.03
Rock	1.00	0.00
B. % COMPOSITION (u)		
Shrubs	11.04	11.01
Forbs	37.38	13.75
Grasses	51.57	13.78

Table 3-33: Coal Hollow Project, Woody Species Density (2007).

Meadow (M) Reference Area	
SPECIES	Individuals Per Acre
<i>Rosa woodsii</i>	2225.69
TOTAL	2225.69

321.200. Productivity

Productivity measurements were recorded for the plant communities of the Coal Hollow Permit Area and The North Private Lease and are located in Appendix 3-2 table 3-34 and Volume 12 table 43 respectively.

_permit area during the same sample period as described in section 321.100 above. Production estimates for the communities at that time are shown in Table 3-34.

Table 3-34: Production of Plant Communities in the Coal Hollow Permit Area

(1) *Estimates* (from soil and approx. vegetation types) - Source: U.S. Department of Agriculture SCS (NRCS). July 1990. Soil Survey of Panguitch area, Utah: Parts of Garfield, Iron, Kane, and Piute Counties

(2) *Actual measurements.* - Source: Cedar Creek Associates (1986) in Mine Permit Application. 1987. Utah International, Inc., Alton Coal Project, Alton, Utah.

(*) *Estimates* - Source: Fieldwork during 2007 by Mt. Nebo Scientific, Inc.

MAP SYMBOL (see <i>Vegetation Map</i> , Drawing 3-1)	PLANT COMMUNITY	Pounds/Acre (1)	Pounds/Acre (2)
SB	Sagebrush/Grass	750	762
P	Pasture Land (*)	1100	1100
M	Meadow	2000	2121
P-J	Pinyon-Juniper	50	33
OB	Oak Brush [<i>called Mountain Brush</i> (2)]	1500	1471
RB/SB	Rabbitbrush/Sagebrush (*)	700	700

~~NOTE: Expansion of the mine has been proposed to include a new area north of the current operations. Vegetation information including cover, composition, density and production for that area can be found in the VOLUME 12: Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah* (November 2014).~~

North Private Lease

Plant communities within the North Private Lease study area were first mapped in the field in 2014. The general plant community types within the survey area are shown on Drawing 3-1. The majority of the area was comprised of rangelands that have been converted to pasture lands. As a result of several environmental studies conducted in the area, plans in the North Private Lease have been restricted to mining activities south of the road called "Farm Road" (this east-west road can be easily identified on Vegetation Map 1, south of the center-pivot field). Total acreage of the survey area including those areas north and south of Farm Road was approximately 428 acres. The size of the pasture lands was approximately 307 acres (this includes the uplands along the drainage channels). Although there were differences in plant species and composition between pastures due to: land ownership and management practices, seed mixtures planted, and soil types, the pasture lands were most often dominated by grass species such as: intermediate wheatgrass (*Elymus hispidus*), western) wheatgrass (*E. smithii*), thickspike wheatgrass (*E. lanceolatus*), smooth brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*).

There was also a fair amount of land that had been converted to croplands in the survey proper, most of which was north of Farm Road (about 87 acres). Although crops can vary from year-to-year due to rotation practices, the most common crops raised in the study area have been: alfalfa (*Medicago sativa*), wheat (*Triticum aestivum*) and silage crops (*Triticale*). The croplands, however, are currently not proposed for disturbance by mining activities.

Additionally, there was one relatively small area that supported native, mostly undisturbed vegetation (undeveloped rangelands). This area consisted of pinyon-juniper, sagebrush with minor influence of a mountain brush community (including transitional zones between these types). These types comprised nearly 25 acres of the survey area. Examples of plant species common in these communities included: pinyon-pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), Gambel's oak (*Quercus gambelii*), Moki-apple (*Peraphyllum ramosissimum*), Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*), black sagebrush (*A. nova*), alder-leaf mountain-mahogany (*Cercocarpus montanus*), corymb buckwheat (*Eriogonum corymbosum*) and snowberry (*Symphoricarpos oreophilus*).

Next, there were also channels or drainages that dissected the study area. These channels supported some riparian and wetland communities and consisted of about 9 acres of the study area. The U.S. Army Corps of Engineers (USACE) issued a nationwide permit (SPK-2011-01248) for the filling 0.0184 acre of wet meadow wetland for the relocation of County Road 136 (K3900) and the construction of a temporary haul road to access Area 1. An application, with the USACE for an individual permit was applied for on July 16, 2016 to allow for mining of coal in Area 2 that will result in

unavoidable impacts to 2.38 acres of wet meadow wetland and 0.04 acre of stock pond that are situated in an ephemeral drainage swale. In order to have mining access to Areas 2 and 3, the temporary haul road built for Area 1 must be extended to the east to cross Kanab Creek in order to separate mining equipment traffic from public traffic on County Road 136 (K3900). As proposed, the Kanab Creek crossing will require a temporary stream relocation that will impact 257 feet of existing stream channel and 0.05 acre of adjacent wet meadow wetland. Field studies indicated some differences in total living cover, species present and composition, but the plants common here were: beaded sedge (*Carex utriculata*), bluegrass (*Poa pratensis*), woolly-sedge (*Carex pellita*), Douglas' sedge (*C. douglasii*), small-wing sedge (*C. microptera*), maritime arrowgrass (*Triglochin maritima*), common threesquare (*Scirpus pungens*), longstyle rush (*Juncus longistylis*), Missouri iris (*Iris missouriensis*), willows (*Salix boothii*; and *S. exigua*), wiregrass (*Juncus arcticus*), Wood's rose (*Rosa woodsii*;) and Russian olive (*Elaeagnus angustifolia*).

In addition, there were also upland plant communities supported within the above mentioned drainage channels. Other than grazing pressure and the erosional component common in the area, these upland communities were relatively undisturbed and located on the flood plains and stream terraces bordering the riparian and wetland zones. These communities were primarily dominated by Wyoming big sagebrush and black sagebrush.

The acreage measurements of the channel uplands were not separated from the upland pasture lands, but the acreage is closer to that of the wetlands mentioned above.

See appendix 3-9 for more detailed information. Total living cover, cover by species, and composition for all sample sites are shown Tables 1 through 42. Total annual biomass production estimates for all sample sites are shown on Table 43. Woody species density values for the pasture lands that have been proposed for disturbance by mining activities are shown on Table 44. Finally, all vegetation sample site locations are shown on Drawing 3-1; color photographs of the sample sites are provided in Figures 1 through 21. A list of all data tables including community types, data classifications, sample site numbers and parameters sampled is summarized in Volume 12.

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~~322. FISH AND WILDLIFE INFORMATION~~

~~322.100. Agency Consultation Studies Conducted and Habitat Improvement~~

~~Initial consultations have been made to appropriate state and federal agencies regarding threatened, endangered, and sensitive plant and animal species and their habitats in and adjacent to the Coal Hollow permit area. A summary of this work follows.~~

- ~~• In 2005, a review of the Utah Heritage Program database for sensitive species in the proposed project and adjacent areas was accomplished.~~
- ~~• A spreadsheet has been prepared that shows applicable notes from previous biological surveys of the area.~~
- ~~• Biologists from the USDA Dixie National Forest have been contacted. Life histories and analyses of the species in their forest and in close proximity to the Coal Hollow Project area that have been listed as endangered, threatened, candidate, and management indicator species has been prepared to be used for project planning and agency consultations.~~
- ~~• Files from the offices of *Mt. Nebo Scientific, Inc.* regarding sensitive species have been consulted for the project area.~~
- ~~• A sage-grouse lek had been located in the area by biologists from the Bureau of Land Management (BLM) and the State of Utah, Division of Wildlife Resources (DWR). In the Spring of 2005 biologists from the BLM captured, collared and began monitoring 4 sage-grouse birds to study the lifecycle and migrating patterns of the local birds.~~

- In June 2005, a field survey for potential habitat of sensitive species within the project and adjacent areas was conducted by N. Duane Atwood, Ph.D. and Patrick D. Collins, Ph.D.
- In April 2006, a biologist, Steven L. Petersen, Ph.D., representing the Coal Hollow Project began independent studies and also began participating with the BLM and DWR in sage-grouse studies in the project area.
- In May 2006, a raptor survey by helicopter was conducted by Talon Resources, Mt. Nebo Scientific, Inc., and DWR of the permit area and adjacent areas.
- In August 2006 sensitive plant species surveys were conducted during quantitative sampling of specific areas proposed disturbed and reference areas for mining year one of the project.
- In 2007 the team has continued studies of the sage-grouse with biologists from DWR, the BLM, Southern Utah University (SUU), and the Coal Hollow Project by capturing, taking blood samples, and placing radio transmitters on several birds from March through May.
- In April 2007, two helicopter flights, arranged by Coal Hollow Project, were conducted to search for satellite leks of the sage-grouse.
- In May 2007, another raptor survey by helicopter was conducted by DWR that included the permit area and adjacent areas.
- In September 2007, sensitive plant species surveys were conducted during quantitative sampling of additional proposed disturbed and reference areas for mining years one through three of the project.
- In September 2007, additional quantitative sampling was conducted in meadow areas outside the permit area to be used as a companion study with other areas.
- In 2007, an excavator was used to remove over 10,000 invading juniper trees from the conservation area to reduce potential perching sites for raptors that can reduce the sage-grouse populations.
- Private land owners from Alton have been working to reestablish a migratory corridor between Hoyts Ranch and Alton by clearing juniper and Gambel oak and reseeding open areas with a seed mix consisting of perennial grasses and forbs. Preliminary monitoring results in 2009 indicate that the sage-grouse are beginning to use this corridor. This project was completed in 2011 consisting of 885 acres. Verification was documented in a letter from Director Baza addressed to Denise A. Dragoo, Esq dated May 16, 2012.
- To date, an ongoing monitoring program for radio-collared sage-grouse has been conducted with collaborations with DWR, the BLM, SUU and ACD.

- In 2012 habitat improvement work for sage-grouse was completed on 146 acres to the east of the property that included lop and scatter of pinyon/juniper and chemical treatment of Rabbitbrush.
- In 2012, two helicopter flights, arranged by Coal Hollow Mine, were conducted to search for satellite leks of the sage-grouse.
- Cronquist's phacelia (*Phacelia cronquistiana*; BLM sensitive) was identified as having potential to occur in the area of the mine. Surveys of potential habitats for this species were conducted in June 2012, and no individuals were found.
- In 2013 habitat improvement work for sage-grouse was started on 355 acres adjoining the west boundary of the Coal Hollow mine that included lop and scatter of pinyon/juniper. After assessment of the project in early 2014 by the BLM, it was decided that additional work needed to be done in the appropriate season of 2014 as per the letter dated 3/3/2014 from Lisa Church in Appendix 3-7.
- In 2014, ACD partnered with the Watershed Restoration Initiative (WRI) to complete habitat improvement work for sage-grouse on 600 acres. ACD contributed funding to complete 300 acres of the Paunsaugunt rabbit-brush removal Phase II (Project Id. 3011) and 300 acres of the UKC Thompson Creek Project (Project Id. 2701).
- In 2014, ACD funded the purchase of and monitoring of two GPS transmitters in coordination with Dr. Frey of USU. These were deployed on two sage-grouse in the Sink valley area and will provide four locations of the grouse per day.
- In 2015, expansion of the mine has been proposed to include a new area north of the current operations. Threatened, endangered, and sensitive plant and animal species information for that area can be found in VOLUME 12: Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah* (November 2014 October 2015).
- In 2015, ACD partnered with the Watershed Restoration Initiative (WRI) to complete habitat improvement work for sage-grouse on 443 acres. ACD contributed funding to complete Alton Coal Rabbit-brush Mitigation Project. This completed the required 1,700 acres of mitigation for mining disturbance within the original 635.64 acre Coal Hollow Mine.
- In October 2015, ACD Completed remaining sagebrush reduction treatments within the Sage-grouse conservation area to improve potential nesting and brood-rearing habitat.
- In October 2015, using a backpack sprayer, applied herbicide to reduce residual rabbitbrush and enhance sagebrush recovery in an area that was initially treated in 2012 to improve habitat east of the mine in Water Canyon.

Between 2015 and 2016, Cleaned-up PJ slash piles within the 355 acre habitat mitigation area located west of the mine (Sagebrush Flat area).

- Area 1 of the North Private Lease was permitted in February of 2016. Mitigation (344 acres) completed for the 2014 Incidental Boundary Change (IBC) that added the New Dame Lease (anticipated to be mined with a high-wall miner to remove coal) was never disturbed. Nonetheless, ACD was required to complete the 344 acres of sage-grouse mitigation prior the end of the year (2014) to meet requirements for the New Dame Lease. All 344 acres were completed as approved WRI Project 2701 & 3011 for mitigation of the brood rearing habitat, but no coal was removed and the land surface within the New Dame Lease remains unaltered. ACD will credit these completed mitigation acres to the proposed North Private Lease. Planned disturbance for the first year of mining is approximately 50 acres, thus 200 acres (4:1) will be credited to Area 1. The remaining 144 acres will credited to future areas mined.

322. FISH AND WILDLIFE INFORMATION

322.100.

Agency Consultation and Studies Conducted

Consultations have been made to appropriate state and federal agencies regarding threatened, endangered, and sensitive plant and animal species and their habitats in and adjacent to the Coal Hollow permit area. Species specific details are located in section 322.200. The following is a list of coordination:

Biologists from the USDA Dixie National Forest were consulted for analyses of the species in their forest and in close proximity to the Coal Hollow Project area that have been listed as endangered, threatened, candidate, and management indicator species.

Biologists from the Bureau of Land Management (BLM) and the State of Utah, Division of Wildlife Resources (DWR) located a sage-grouse lek in the area.

In the Spring of 2005 biologists from the BLM captured, collared and began monitoring 4 sage-grouse birds to study the lifecycle and migrating patterns of the local birds.

In June 2005, a field survey for potential habitat of sensitive species within the project and adjacent areas was conducted by N. Duane Atwood, Ph.D. and Patrick D. Collins, Ph.D.

In April 2006, a biologist, Steven L. Petersen, Ph.D., representing the Coal Hollow Project began independent studies and also began participating with the BLM and DWR in sage-grouse studies in the project area.

In May 2006, a raptor survey by helicopter was conducted by Talon Resources, Mt. Nebo Scientific, Inc., and DWR of the permit area and adjacent areas.

In August 2006 sensitive plant species surveys were conducted during quantitative sampling of specific areas proposed disturbed and reference areas for mining year one of the project.

In 2007 the team continued studies of the sage-grouse with biologists from DWR, the BLM, Southern Utah University (SUU), and the Coal Hollow Project by capturing, taking blood samples, and placing radio transmitters on several birds from March through May.

In April 2007, two helicopter flights, arranged by Coal Hollow Project, were conducted to search for satellite leks of the sage-grouse.

In May 2007, another raptor survey by helicopter was conducted by DWR that included the permit area and adjacent areas

In September 2007, sensitive plant species surveys were conducted during quantitative sampling of additional proposed disturbed and reference areas for mining years one through three of the project

In September 2007, additional quantitative sampling was conducted in meadow areas outside the permit area to be used as a companion study with other areas.

To date, an ongoing monitoring program for radio-collared sage-grouse has been conducted with collaborations with DWR, the BLM, SUU and ACD.

In 2012, two helicopter flights, arranged by Coal Hollow Mine, were conducted to search for satellite leks of the sage-grouse.

Cronquist's phacelia (*Phacelia cronquistiana*; BLM sensitive) was identified as having potential to occur in the area of the mine. Surveys of potential habitats for this species were conducted in June 2012, and no individuals were found.

In 2014, ACD funded the purchase of and monitoring of two GPS transmitters in coordination with Dr. Frey of USU. These were deployed on two sage-grouse in the Sink valley area and will provide four locations of the grouse per day.

Greater Sage-grouse Compensatory Mitigation Accomplishments

On June 16, 2016 the Division approved Appendix 3-8 Mitigation Plan which further describes the Greater sage-grouse mitigation plan by ACD.

The following table outlines each of these projects:

-	<u>Year</u>	<u>Treatment</u>	<u>Location</u>	<u>Program</u>	<u>Acres of Habitat Improvement</u>	<u>Completion</u>
<u>South Lease (Coal Hollow Lease)</u>	<u>2011</u>	<u>PJ/Oak removal, reseeded</u>	<u>Corridor located north of Alton</u>	<u>ACD</u>	<u>428</u>	<u>See letter f 5/16/2</u>
	<u>2009</u>	<u>PJ Removal, sagebrush thinning and seeding. The conservation area is 72 acres, 40 of which are dense sagebrush. 2.5 acres were treated by disking and planing in 2010.</u>	<u>Conservation Area</u>	<u>ACD</u>	<u>72</u>	<u>See letter f 5/16/2</u>
	<u>2012</u>	<u>lop and scatter of PJ and chemical treatment of Rabbitbrush</u>	<u>east of property</u>	<u>ACD</u>	<u>146</u>	<u>See app</u>
	<u>2013</u>	<u>lop and scatter of PJ</u>	<u>west boundary</u>	<u>BLM</u>	<u>355</u>	<u>See letter</u>
	<u>2014</u>	<u>Paunsaugunt rabbitbrush removal phase II</u>	-	<u>WRI Project ID 3011</u>	<u>300</u>	<u>See UDW</u>
	<u>2014</u>	<u>UKC Thompson Creek</u>	-	<u>WRI Project ID 2701</u>	<u>300</u>	<u>See UDW</u>
	<u>2015</u>	<u>Broad Hollow Rabbitbrush Mitigation</u>	-	<u>WRI Project 3419</u>	<u>443</u>	<u>See UDW</u>
	-	-	-	-	-	-
-	-	-	-	<u>Total Mitigation</u>	<u>2044</u>	
-	-	-	-	<u>Transfer to North Lease</u>	<u>344</u>	
-	-	-	-	<u>New Total for South Lease</u>	<u>1700</u>	

322.200. Site-Specific Resource Information

~~A review of the Utah Heritage Program database for sensitive species in the proposed mine site and adjacent areas has been accomplished. Field maps with locations of these species have been prepared and have been used for additional surveys and will continue to be used for future biological studies.~~

~~Due to the sensitivity of these species, specific location information is considered confidential and has not been submitted in this application. However, review of this information by the regulatory authorities can be arranged.~~

322.210. Threatened, Endangered, and Candidate Plant and Animal Species

A review of the Utah Heritage Program database for sensitive species in the permit and adjacent areas has been completed. Table 3-35 includes the evaluation of all species protected under the State of Utah and Kane County.

The U.S. Fish & Wildlife Service Information for Planning and Conservation website was used to generate an Official Species List of threatened and endangered species that may occur in the project area. Species on this list are evaluated in Table 3-35. Field maps with locations of these species have been prepared and have been used for additional surveys and will continue to be used for future biological studies.

Due to the sensitivity of these species, specific location information is considered confidential and has not been submitted in this application. However, review of this information by the regulatory authorities can be arranged.

Table 3-35 shows a list of the plant and animal species that are federally listed as threatened, endangered, or candidates for this designation for Kane County, Utah.

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah

This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other federally listed species likely occur in Utah Counties. This list includes both current and historic records. The list was accessed on-line June 15, 2015. Its last update was dated January 12, 2012.

Additional species were added to the list as requested by Utah State Division of Oil, Gas & Mining in June 2015 and are designated by an asterisk (*)

ENDANGERED		SITE-SPECIFIC NOTES
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	This bird has been observed in Kane, County Utah (see the attached DWR distribution map following this table) . Although it is possible that it could have occurred at some time in the project area as noted from its distribution map, it is most often observed in thick willow riparian habitats. The study area has some willow patches on Kanab Creek, but they are not common on this reach of the stream. The Kanab Creek riparian zone will not be disturbed.

		<p>It is highly unlikely this species would be impacted by mining in this area. However, after consultations with DOGM & USFWS, it seemed prudent to survey specific areas on Kanab Creek. The surveys have been conducted according to protocols by qualified biologists.</p> <p>A habitat assessment and follow up surveys were conducted as recommended by the USFWS (see Yellow-Billed Cuckoo and Southwestern Willow Flycatcher Habitat Assessment & Southwestern Willow Flycatcher Surveys Along Kanab Creek, Kane County, Utah August 2015 (refer to Appendix A). Between the marginal habitat quality at Kanab Creek and the fact that no southwestern willow flycatchers were detected during the surveys conducted, it was concluded that it is highly unlikely that this species would nest in the study area.</p>
<i>Gila cypha</i>	Humpback chub	<p>Humpback chub in Utah are now confined to a few whitewater areas in the Colorado, Green, and White Rivers. These rivers do not occur in the study area and the confluence of Kanab Creek and the Colorado River is well below the known population of this species. There will be no impact to this species from mining in the study area.</p>
<i>Gila elegans</i>	Bonytail	<p>The bonytail is a very rare minnow originally native to the Colorado River system. The known populations of the bonytail are in the Colorado River System well above the confluence of Kanab Creek and the Colorado River. There will be no impact to this species from mining in the study area.</p>
<i>Lesquerella tumulosa</i> (<i>Physaria rubicudula</i> var <i>tumulosa</i>)	Kodachrome bladderpod	<p>In Utah, this federally listed endangered species is known only in an isolated area in Kane County on semi-barren shale knolls of the Carmel Formation. This geologic formation nor the habitat of this species is found on the study area. Consequently, there will be no impact to this species from mining in the study area.</p>

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah

This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other federally listed species likely occur in Utah Counties. This list includes both current and historic records. The list was accessed on-line June 15, 2015. Its last update was dated January 12, 2012.

Additional species were added to the list as requested by Utah State Division of Oil, Gas & Mining in June 2015 and are designated by an asterisk (*)

ENDANGERED		SITE-SPECIFIC NOTES
<i>Oxyloma kanabense</i>	Kanab ambersnail	<p>Known populations of the gastropod are primarily found in 2 locations along Kanab Creek. The primary and more well-known location is in extreme south Kane County, about 6 miles north of the city of Kanab in an area called Three Lakes. The second, much smaller population, is located about 1.3 miles north of the Three Lakes population in Kanab Creek Canyon. According to DWR, however, this population, is thought to be extirpated. Upper Kanab Creek dissects the project area and will not be disturbed from the proposed mining activities. That was associated Kanab Creek will not be impacted, so the downstream habitats, like</p>

		that of the Kanab ambersnail, will not be negatively impacted by the proposed mine site.
THREATENED		SITE-SPECIFIC NOTES
<i>Asclepias welshii</i>	Welsh's milkweed	In Utah this plant is known to occur only on the Coral Pink sand dunes in Kane County. There are no dune habitats in the project area so this species will not be impacted by it.
<i>Coccyzus americanus</i> *	Yellow-billed cuckoo	The western yellow-billed cuckoo is listed as a threatened species under the Endangered Species Act. It is an obligate riparian nester, meaning that the species is restricted to more mesic habitat along rivers, streams, and other wetlands. The US historical range of this species is thought to have included all states west of the Rocky Mountains. According to DWR database information, the current range of yellow-billed cuckoo is limited to disjunct fragments of riparian habitat in northern Utah, western Colorado, southwestern Wyoming, southeastern Idaho, southern Nevada and California. That said, the distribution of this bird in Utah is poorly understood (see the attached DWR distribution map following this table), so consultations with DOGM and USFWS have been conducted. A habitat assessment was conducted as recommended by the USFWS (see Yellow-Billed Cuckoo and Southwestern Willow Flycatcher Habitat Assessment & Southwestern Willow Flycatcher Surveys Along Kanab Creek, Kane County, Utah, August 2015 (refer to Appendix A). No designated critical habitat occurs in the study area.
<i>Cycladenia humilis var jonesii</i>	Jones cycladenia	Jones cycladenia grows in gypsiferous, saline soils derived from strata much lower (older) in the geologic column than what is found in the project area such as Summerville (Jurassic), Chinle (Triassic), and Cutler (Permian) formations. The project area soils are derived mostly from Tropic Shale and Dakota formations of Cretaceous age. The geology, soils and habitat do not occur in the project area. There will be no impact to this species from mining in the study area.

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah

This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other federally listed species likely occur in Utah Counties. This list includes both current and historic records. The list was accessed on-line June 15, 2015. Its last update was dated January 12, 2012.
Additional species were added to the list as requested by Utah State Division of Oil, Gas & Mining in June 2015 and are designated by an asterisk (*)

<i>Cynomys parvidens</i>	Utah prairie-dog	Habitat for this prairie-dog does not exist in the study area. Consequently, there will be no impact to this species as a result of mining in the North Private Lease
<i>Pediocactus sileri</i>	Siler pincushion cactus	In Utah, this small footcactus is known to occur in salt desert shrub communities in Kane and Washington Counties. It tends to be found in gypsiferous, seleniferous and calciferous soils and shales of the Moenkopi formation. The geology, soils and habitat do not occur in the project area. There will be no impact to this species from mining in the study area
<i>Strix occidentalis lucida</i>	Mexican spotted owl	The primary habitats in Utah for this owl are various forest types and steep rocky canyons. DWR distribution maps suggest the project

		area is out of its range in Kane County. The required habitat and apparent distributional information indicate that the likelihood for impacts to this bird by the proposed mining is remote.
CANDIDATE		SITE-SPECIFIC NOTES
<i>Cicindela limbata albissima</i>	Coral Pink Sand Dunes tiger beetle	Like Welsh's milkweed described above, this beetle is known to occur only on the Coral Pink sand dunes of Kane County, Utah. There are no sand dune habitats in the project area so this species will not be impacted by it.
OTHER		SITE-SPECIFIC NOTES
<i>Camissonia exilis*</i>	Meager Camissonia	This is not a federally protected species, however, its conservation status is ranked as "G1" (critically imperiled). This annual plant is a Colorado Plateau endemic found only in gypsiferous strata in Moenkopi and Entrada formations. These formations and habitats are not within the North Private Lease area. Additionally, other gypsiferous substrates have not be found during geologic or soil surveys of the site. There should be no impact to this species from mining in the study area. However, because this species was noted by DWR to occur in the general area, collaborations between cooperating agencies (DWR & USFWS) regarding potential impact are currently in-progress. Results of findings between agencies will be reported to ACD by DOGM.
<i>Rana pipiens*</i>	Northern Leopard Frog	This frog is not a federally protected species and it is fairly common in Utah. Although some reports suggest numbers may be declining, the conservation status of this amphibian is ranked as "G5" (demonstrably secure). This species occurs in a variety of aquatic habitats some of which occur in the North Private Lease area, but most are in and adjacent to Kanab Creek. This creek will not be mined and a 100 ft protection buffer will be in-place during mining and reclamation periods. Although impacts to the local populations may be possible due to mining activities relatively close to the habitat, they are thought to be relatively minor. However, because this species was noted by DWR to occur in the general area, collaborations between DOGM with cooperating agencies (DWR & USFS) regarding potential impacts are currently in progress (2016). Results of these findings will be reported to ACD by DOGM.

Table 3-35: List of Threatened, Endangered, and Candidate Plant & Animal Species in Kane County, Utah

This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other federally listed species likely occur in Utah Counties. This list includes both current and historic records. The list was accessed on-line June 15, 2015. Its last update was dated January 12, 2012.

Additional species were added to the list as requested by Utah State Division of Oil, Gas & Mining in June 2015 and are designated by an asterisk (*)

		cooperating agencies (DWR & USFWS) regarding potential impact are currently in-progress. Results of findings between agencies will be reported by DOGM to ACD
<i>Centrocercus urophasianus</i>	Greater sagegrouse	Greater sage-grouse (<i>Centrocercus urophasianus</i>) habitat has been documented in the study area. DWR has mapped much of the area to be <i>occupied</i> and <i>brood-rearing</i> habitat (Wildlife Map 4). Additionally Utah's Conservation Plan for Greater Sage-grouse (February 14, 2013) shows the Alton area to be "Other Habitat"

habitat for the sage-grouse. Other habitat is defined here as sage-grouse habitat but not part of the lek, nesting or wintering areas. Impacts of mining in the North Private Lease have been addressed (see Greater Sage-grouse Management Plans, for the Coal Hollow Mine site).

Table 45 (attachments)

Southwestern Willow Flycatcher
Known Distribution in Utah



Map Source:
Utah Division of Wildlife Resources.
Access Date: 15 June 2015

Yellow-Billed Cuckoo
Utah Gap Analysis
Breeding/Wintering Habitat



In summary, based on the information provided above and studies conducted to-date, no threatened or endangered species have been located in the permit area.

NOTE: Expansion of the mine ~~has been proposed to~~ includes a new area north of the ~~current operations~~ Coal Hollow Lease. Threatened, endangered and sensitive species information ~~has been updated and incorporated into Table 3-35, including an updated table similar to the one above for that area can be found in the~~ For more information, see VOLUME 12 Appendix 3-9 and 3-10: Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah* (October 2015).

322.220. High Value Habitats

The State of Utah, Division of Wildlife Resources (DWR) geographic information system (GIS) database was consulted for high-value habitats. In 2006 DWR updated the habitat value definitions.

Crucial Value was defined as “habitat on which the local population of wildlife species depends for survival because there are not alternative ranges of habitats available. Crucial Value habitat is essential for the life history requirements of a wildlife species”.

Substantial Value was defined as “habitat that is used by a wildlife species but is not crucial for population survival. Degradation or unavailability of substantial value habitat will not lead to significant declines in carrying capacity and/or numbers of the wildlife species in question”.

The DWR database was revisited by project biologists on [August 11, 2009](#) [January 12, 2012](#). Of the species maintained on the database, important habitat of four species have been mapped by DWR within or adjacent to the Coal Hollow [Project Lease](#) area [and the North Private Lease](#). These habitats are described below.

First, areas adjacent to the permit area and a portion of it have been designated as black bear (*Ursus americanus*) habitat. This habitat has been listed as having year-long, Substantial Value habitat by DWR (Drawing 3-2).

Next, Rocky Mountain elk (*Cervus canadensis*) habitat was located in the area. Crucial Value summer and calving habitat was mapped throughout the entire area from the town of Alton south into Sink Valley, including the permit area. Additionally, year-long Substantial Value habitat was located in areas southeast of the permit area (Drawing 3-3).

Mule deer (*Odocoileus hemionus*) habitat has also been mapped in the area by DWR biologists. The habitat has been classified as “Crucial” summer and fawning habitat. This designation included the entire permit area as well as those areas adjacent to it (Drawing 3-4).

Finally, sage-grouse (*Centrocercus urophasianus*) habitat has been documented in the project area. DWR biologists have mapped much of the area to be Crucial Value brood habitat (Drawing 3-5). Sage-grouse populations continue to be monitored in the area by biologists from DWR, Bureau of Land Management (BLM), Southern Utah University (SUU), and the Coal Hollow Project. The only lek in the vicinity including those areas around Alton and Sink Valley was located west of the Swapp Ranch. This lek was within the permit area boundary. A site-specific study called reported in “*Alton Sage-Grouse Habitat Assessment and Mitigation Plan*” has been conducted for the Coal Hollow Project and has been included in this document (see **Appendix 3-1**). Follow-up studies of the sage-grouse in the area are described in a report called “*Sage-grouse Distribution and Habitat Improvement in Alton, Utah*” (see **Appendix 3-3**). Finally, for the Coal Hollow Mine a document called “*Alton Sage-Grouse Habitat Mitigation Plan*” has also been included in the MRP (see **Appendix 3-5**). With the addition of the North Private Lease, a document called “*Greater Sage-grouse Management Plan North Private Lease, Alton, Utah*” has been included in the MRP (see Appendix 3-8). From 2006 to date, biologists representing the Coal Hollow Project have been involved with a previously assembled team of biologists that have been studying the populations in the area. In 2007, the team captured, drew blood samples for DNA analyses, and placed radio collars on several birds. For more details refer to **Appendix 3-3**.

In addition to studying the sage-grouse birds as described above, techniques to improve habitat for the birds are currently being conducted. A project conducted by the U.S. Department of Interior, Bureau of Land Management (BLM) and the State of Utah, Division of Wildlife Resources (DWR) was completed that removed many of the juniper trees that have encroached the valley by grinding them up by chipping (also called bull-hogging) equipment. These areas can be easily seen on the new *Vegetation Map, Drawing: 3-1*. These areas are delineated as “SB (chipped)” on the map.

Because they provide perching structure for predatory species, single juniper trees scattered throughout sagebrush communities are known to discourage nesting by sage-grouse. To enhance sage-grouse nesting habitat within the permit area, juniper trees that have encroached some of the sagebrush communities in the valleys of the permit area have been removed by a track hoe using a large grapple claw. This equipment can pull the trees out of the ground, including the roots. To date, it has been estimated that

over 10,000 juniper trees have been removed by this technique. In doing so, the technique caused relatively minor impacts to the sagebrush component of the community.

There is a substantially larger sage-grouse lek located north of the project area. The lek, known as the Hoyt's Ranch Lek, has also been studied by state, federal and private biologists. It has been hypothesized that connectivity between the two leks, the Alton lek and the Hoyt's Ranch Lek, could greatly increase the chances of survival for the Alton birds. Therefore, intensive efforts have been made to open a corridor of these two leks by removing juniper and oak stands (see **Appendix 3-5**).

In addition to the habitat improvements mentioned above for sage-grouse, seed mixtures formulated to restore pasture lands disturbed by mining include plant species that are used by the birds for food, cover and breeding. Moreover, some areas that are currently dominated by grass species for domestic livestock use, will be seeded with plants that include species known to provide nesting habitat for sage-grouse such as big sagebrush and black sagebrush [for more detailed information see "Habitat Reclamation Plan" (Chapter 3); "Other Wildlife Enhancement Information" (Chapter 3); "Seed Mixtures" (Chapter 3); Drawing 3-7 and 3-11 (Chapter 3); "Postmining Land Use" (Chapter 4)].

Wetlands

[The NPL contains approximately 6.34 acres of palustrine emergent wet meadow wetlands, 0.04 acre of stock pond and 4,632 feet \(0.14 acre\) of the Kanab Creek stream channel that were delineated and verified by the U.S. Army Corps of Engineers \(SPK-2011-01248\). More information can be found in Volume 10](#)

~~NOTE: Expansion of the mine in 2016 has been proposed to include the North Private Lease, a new area north of the current operations. Although required information has been incorporated herein, an additional wildlife information for that area can be found in the VOLUME 12: appendix 3-9 Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah* (October 2015).~~

322.230. Other Species or Habitats

As mentioned previously, raptor surveys have been conducted in the area by Coal Hollow project and DWR biologists. The 2006 through 2008 surveys show no golden eagle (*Aquila chrysaetos*) or bald eagle (*Haliaeetus leucocephalus*) nests within ½ mile of the permit area. In fact, the most recent survey indicated that there were *no* raptor nests located within ½ mile of the permit area (see Confidential File, Drawing 3-6). There was, however, one inactive red-tailed hawk (*Buteo jamaicensis*) nest located over one mile from the permit area, three inactive golden eagle nests, one active peregrine falcon (*Falco peregrinus*) nest and another inactive falcon nest located approximately two miles from the permit area.

To date, no other species or habitats have been identified through agency consultation or field studies that require special protection under state or federal law, however, if they are found through the permitting process, they will be appropriately addressed and monitored.

A vegetation map has been prepared that delineates the plant communities in the permit area. The map also shows adjacent areas including those plant communities that will be impacted by the proposed county road realignment (Drawing: 3-1).

Migratory Bird Communities at the North Private Lease

There are six types of habitat within the North Private Lease, some of which will not be disturbed by mining activities. These types include croplands, pasturelands, wetlands, and small areas of riparian, pinyon-juniper and sagebrush. The small areas of pinyon-juniper and sagebrush offer the best avian nesting habitat. Birds likely to nest in these two habitat types within the project area include black-billed magpie (*Pica hudsonia*), mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), sage thrasher (*Oreoscoptes montanus*), Brewer's sparrow (*Spizella breweri*), black-throated sparrow (*Amphispiza bilineata*), vesper sparrow (*Pooecetes gramineus*), western meadowlark (*Sturnella neglecta*), and spotted towhee (*Pipilo maculatus*). Killdeer (*Charadrius vociferus*) and horned larks (*Eremophila alpestris*) are two species that may nest in bare areas within the croplands and pasturelands.

There is a small amount of riparian habitat within the project area, which means that some riparian bird species could nest in the project area as well. Riparian species that were detected within 1.0 mile of the project area in Kanab Creek included black-chinned hummingbird (*Archilochus alexandri*), yellow warbler (*Setophaga petechia*), MacGillivray's warbler (*Geothlypis tolmiei*), and song sparrow (*Melospiza melodia*). The riparian habitat is not substantial enough for the federally listed species southwestern willow flycatcher (*Empidonax traillii extimus*) and western yellow-billed cuckoo (*Coccyzus americanus*) to nest in the project area.

Raptors are unlikely to nest in the North Private Lease area due to the minimal amount of raptor nesting substrate and the proximity to human activity. However, raptors such as red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), and northern harriers (*Circus cyaneus*) could nest within 0.5 mile of the project area.

322.300. Fish and Wildlife Service Review

Upon request, the State of Utah, Division of Oil, Gas & Mining (DOG M) will provide the resource information required under R645-301-322 and the protection and enhancement plan required under R645-301-333 to the U.S. Fish and Wildlife Service Regional or Field Office for their review. This information will be provided within 10 days of receipt of the request from the Service.

The Division of Oil, Gas, and Mining conducted Informal Consultation with the Fish and Wildlife Service on August 9, 2016. All species identified during that consultation have been assessed in Table 3-35. See letter dated August 9, 2016 and Consultation Code:

06E23000-2016-SLR-0325 (Appendix 3-10). The Division made the determination that approval of the Coal Hollow Mine Permit would not jeopardize any species protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)

323. MAPS AND AERIAL PHOTOGRAPHS

323.100. Reference Area Maps

Several vegetation maps have been prepared for the Coal Hollow Project. A revised vegetation map has been prepared that includes all vegetation sample areas, plus other updated map information [Vegetation Map, Drawing 3-1, ~~(12/26/07)~~]. ~~The new map replaces the previous vegetation maps.~~ This new map includes reference areas, or plant communities sampled that are similar to those that have been proposed for disturbance by mining activities. These reference areas will be compared to those areas proposed for disturbance during the initial studies for the mine site and will consequently be used as revegetation success standards at the time of final reclamation of mined areas. Reclamation is planned immediately after portions of the land are mined (see Chapter 5).

323.200. Sample Area Maps

Elevations, locations of monitoring stations, proposed disturbed areas, reference areas, and other areas used to gather data for fish and wildlife, and any special habitat features, have been delineated on Drawing 3-1 ~~the aforementioned new vegetation map.~~ Due to the Dame Incidental Boundary Change, the Meadow area reference will be relocated to an area that will have no potential impacts from mining. This relocation will occur during the growing season of 2014 in consultation with DOGM.

323.300. Protection and Enhancement of Fish & Wildlife Maps

Each facility to be used to protect and enhance fish and wildlife and related environmental values have been represented on the [Drawing 3-1](#).

323.400. Plant Communities Map

An initial vegetation map was prepared that delineated the plant communities that existed within the Coal Hollow Project permit area. This **first** map was prepared by delineating the plant communities from an existing vegetation map to a permit quadrangle map (see Section 321.100 for more details). However, a new flight was conducted in 2006 that provided aerial photography with more detailed information to be used to update many maps of the project area. Consequently, a **second** vegetation map was prepared using the new aerial photography (along with groundtruthing), and submitted along with the first map to DOGM (MRP submittal dated May 25, 2007). Finally, a **third** vegetation map was prepared to reflect information and to show new sample areas within the plant communities of the permit and adjacent areas [see [See Vegetation Map, Drawing 3-1, \(12/26/07\)](#)]. This map **replaced** the first and second maps and was submitted to DOGM (MRP submittal dated January 15, 2008).

NOTE: Expansion of the mine has been proposed to include a new area north of the current operations. Additional vegetation information for that area can be found in the VOLUME 12: Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah* (November 2014).

330. OPERATION PLAN

331. MINE PLAN & RECLAMATION TIMING

In each mined segment, the mine plan includes redistributing subsoil and topsoil followed by seeding this segment with the final seed mix contemporaneously, or at the same time the mining begins in the next segment. The mine plan has been engineered to disturb the smallest practicable area at any one time. With prompt establishment and maintenance of vegetation, immediate stabilization of disturbed areas will minimize surface erosion. Details [of the plan have](#)

~~been provide are located~~ in Chapter 5 of ~~this document~~ the Mining and Reclamation Plan (MRP). One exception, the last pit (shown on Drawing 5-9 and Drawing 5-10 as Pit B-1) at the Coal Hollow Mine will be encountered incident to reclamation and borrow activities where it would not have been practical to mine otherwise. As shown on Drawing 5-16, this pit is fully contained within the greater Borrow Area and will be fully mined and immediately backfilled (to the intermediate landform shown in Drawings 5-35 and 5-36) in 2016. This backfill will then remain in place until closure of the Underground Mine and finally rehandled as backfill to Pit 10. Subsoil will be placed over the final graded mining surface to an average depth of 1.5 feet for interim reclamation after mining has been completed. Organic mulches will be incorporated into the soil to improve the fertility of the subsoil placed on the interim reclamation surface and seeded with the intermediate seed mix. Incorporation of mulch into the soil will improve the fertility of the subsoil used for interim reclamation cover. The surface foot (12) inches of amended subsoil will be salvaged as cultivated topsoil at the end of the interim reclamation period.

332. SUBSIDENCE

Mining in the Coal Hollow project area will be a combination of surface mining, either open pit or highwall mining and underground mining. Mining in the North Private Lease will be a combination of surface mining, either open pit or highwall mining. Both the highwall mining and underground mining are designed such that subsidence is not expected to occur or have a negative impact on renewable resource lands. This is further discussed in Section 525 of Chapter 5. As indicated in that Section, no subsidence is projected. ~~and no monitoring is planned.~~ As requested by the Division,

however, the company will conduct surface observations walkovers of each of the 4 developed panel areas in this proposed plan within 60 days of completion of mining in those areas. If the observations determine that no affects or voids have developed to the surface, it will be documented and forwarded to the Division. If surface cracking, sinkholes or other surface impacts are noted during the walkovers, they will be documented, located on a surface topographic map, reported to the Division, photographed and repaired after approval by the Division.

Also, based on the proposed underground mining plan, and as discussed in Appendix 7-15 (Probable Hydrologic Consequences for Underground Coal Mining at the Alton Coal Development, LLC Coal Hollow Mine) there are no likely adverse effects to the hydrologic regime in the area. However, in the event that diminution of discharge rates from seeps and springs does occur as a consequence of mining activities, any lost water will be replaced according to all applicable Utah State laws and regulations, using the water replacement source specified in R645-301-727. The quantity and quality of replacement water detailed in that Section, will be suitable for the existing premining uses and approved postmining land uses.

However, current elevation of the existing topography may be slightly altered in the mining and reclamation operations with open pit mining. The alternate Highwall mining or underground mining will have only the disturbance associated with the trench for placement of the highwall miner or portals and will have no impact on the surface above the highwall panels

Reclamation has been planned to minimize the impact to the renewable resources identified in this section by promptly reclaiming each mine segment contemporaneously by controlling erosion and re-seeding with a mixture of native plant species that will re-establish the plant communities to vegetative cover that will be diverse, effective, permanent, and consistent with the postmining land use. More details regarding postmining land and topography have been provided in Chapter 4 and Chapter 5 of this document, respectively.

The mine plan is not expected to negatively impact the plants and wildlife in the Coal Hollow Project Lease and North Private Lease areas. Onsite revegetation research and sage-grouse mitigation plans have been designed and incorporated as Appendix 3-8. Details of this work have been made available to DOGM specialists for their comments and participation in the process.

333. PROCEDURES TO MINIMIZE ADVERSE IMPACTS TO FISH & WILDLIFE

Section Preface

In addition to the language in the main body of the MRP regarding sensitive species, four appendices (Appendix 3-1, Appendix 3-3, Appendix 3-5 and Appendix 3-8) were prepared separately and have been included to address the sage-grouse in the Alton area. Each of these appendices was submitted in different submittals to the State of Utah,

Division of Oil, Gas & Mining (DOGM). After each submittal, they were reviewed by the DOGM and other agencies, which provided comments. Accordingly, the comments were addressed and the next sage-grouse appendix was then written. In other words, the appendices were written in chronological order and each subsequent appendix was a result of comments from the previous one. Therefore, the last appendices written (Appendix 3-5 and 3-8) explains ACD's final mitigation plan for the sage-grouse in the Alton area. However, the previous Appendices (Appendix 3-1 and 3-3) remain in the MRP because they continue to provide valuable information regarding the natural history, previous work and process of addressing the sage-grouse issues in the Alton area. [In summary, ACD has committed to compensatory mitigation at a rate of 1,700 acres for the disturbance associated with the Coal Hollow Lease and 4:1 \(habitat improvement : disturbance\) for the North Private Lease.](#)

Greater- Sage-Grouse Work Mitigation

The Coal Hollow Project will minimize disturbances and adverse impacts to fish and wildlife and related environmental values during coal mining and reclamation operations. The project will comply with the Endangered Species Act of 1973 during coal mining and reclamation operations. The location and operation of haul and access roads and support facilities will be placed to avoid or minimize impacts on important fish and wildlife species or other species protected by state or federal law. The implementation of the highwall miner provides an additional method of recovering the coal resource while minimizing disturbance to the surface and associated wildlife species. Enhancement of such resources will be achieved, where practicable. An example is provided below for sage-grouse habitat.

After consultation with appropriate agencies and biologists regarding habitats and sensitive species, the Greater Sage-grouse and its habitat were of greatest concern in the area. There has been a decreasing trend in the populations of this species since 1964 (see Appendix 3.1 and Appendix 3-3 for more details). There was a general consensus among the biologists and agencies consulted that due to the marginal habitat in the Alton Amphitheater area, the loss of habitat in recent years for nesting and brood-rearing and the relatively low population numbers in the area, that the local

population of sage-grouse is vulnerable to elimination, regardless of mining activities proposed by the Coal Hollow Project. ~~Accordingly, the following measures to minimize impacts and enhance habitat for this species have been proposed and are subject to further consideration by the operator and regulatory agencies.~~

On March 15, 2012 the Stipulated Settlement reached before the Board established 1,700 acres of compensatory mitigation for the 635.64 acres of disturbance at the Coal Hollow Mine. As of June 2016, the **1,700 acres** of habitat improvement required for the original Coal Hollow Lease have been completed. Compensatory Sage-grouse mitigation for the North Private Lease has been set in line with the State of Utah's Conservation Plan for Greater Sage-grouse using an offsite mitigation treatment ratio of 4 acres of land treated to every 1 acre disturbed (4:1 mitigation ratio).

North Private Lease ACD plans to mine 224.8 acres of the North Private Lease (including areas 1, 2, and 3) and consequently commits to 1,000 acres of habitat improvement in accordance with Appendix 3-8, the Greater Sage-grouse Management Plan and Utah's Conservation Plan for Greater Sage-grouse. Habitat improvement treatments will be completed prior to mining disturbance. The location and type of mitigation project will be determined from input and recommendations provided by ACD, UDOGM, UDWR, CCARM, FWS, and BLM which ~~will be~~ was formalized in a mitigation agreement (Appendix 3-8) between WRI (manages the mitigation project) and ACD (funds the project). ACD's commitment is complete once the project is paid for. WRI completes, maintains, and monitors the project into the future. See Appendix 3-8 for details on the Greater Sage-grouse Management Plan and ACH commitments for mitigation.

Other aspects of ACD's sage-grouse mitigation plan can be found in Appendix 3-5 and 3-8.

~~Biologists representing the regulatory agencies, land managers, academia and the coal mine operator, the primary goals for the Alton sage-grouse population includes:~~

- Enhance current sage-grouse habitat by reducing juniper trees in the area and restoring desirable perennial plant species.
- Create a conservation area for the sage-grouse that will never be mined.
- Provide a corridor between north (Hoyt's Ranch) and south (Alton Sink Valley) populations to promote gene transfer and increase population numbers.
- Use decoys to shift breeding activities to alternate lek sites in Sink Valley.
- Restore the Alton lek site to its original ecological structure and function.
- Monitor sage-grouse distribution patterns at both Alton and Hoyts Ranch.
- Restore sagebrush communities disturbed by mining activities to enhance sage-grouse habitat.
- Control predators through cooperation with official state and/or federal predator control agencies and organizations
- Prior to the implementation of the highwall miner, ACD will measure and record noise level both during active operations and inactivity at the mine. Once the highwall miner is in operation, noise levels will again be measured and recorded in the same locations. The locations will be the area currently being utilized for lekking and two locations within the 85.88-acre Dame Lease.

Sage-Grouse Short-Term Mitigation Plan

The following information was taken directly from the "*Alton Sage-Grouse Habitat Assessment and Mitigation Plan*" (Appendix 3-1) and the follow-up document called "*Alton Sage-Grouse Habitat and Mitigation Plan*" (Appendix 3-5).

In addition to ensuring the protection of nearby grassland and shrubland for alternate breeding and nesting areas, mining activities will be minimized so that the lowest disturbance will be created during the breeding season at areas adjacent to the original lek. A lek area will be disturbed during mining activities that could potentially displace birds from typical mating activities. To encourage mating behavior during the breeding season, decoys and mating calls will be used to lure birds to nearby alternative sites positioned away from the disturbed area. Research has shown that birds will shift mating activities toward decoys and recorded bird calls. Both silhouette and 3-dimensional decoys (with bright white coloration) will be used to encourage sage-grouse mating activity (see Appendix 3-5).

After mining has been completed, reclamation specialists will return the original grade and valley form to pre-disturbance conditions. Reclamation will include seeding

similar plant species with comparable plant composition, structure and function as those of the original plant community. In sites used by sage-grouse for breeding and roosting that had previous livestock grazing, livestock will be used post-reclamation to maintain similar vegetation characteristics as pre-mining conditions.

Intact sagebrush stands will be avoided for storing mined subsoil and topsoil piles when possible. Intact sagebrush sites will be cleared of all young juniper trees with the use of a compact excavator with a grappling claw or hand tools such as chainsaws. Trees will be removed from these stands. Juniper woodlands surrounding intact stands can be cut back to increase patch size and increase the amount of area that has the potential for nest site selection by hens.

Sage-Grouse Long-Term Mitigation Plan

The following information was taken directly from the "*Alton Sage-Grouse Habitat Assessment and Mitigation Plan*" (Appendix 3-1), "*Sage-grouse Distribution and Habitat Improvement in Alton, Utah*" (Appendix 3-3) and "*Alton Sage-Grouse Habitat and Mitigation Plan*" (Appendix 3-5).

Juniper Removal

A significant contribution that mining can provide for enhanced sage-grouse habitat is the removal of juniper from the Alton valley. The removal of trees during mining operations with subsequent reclamation activities will create conditions that promote grass, forb and eventually sagebrush establishment. Two years after juniper was removed from plots located in eastern Oregon, Bates et al. (2000) recorded a 200-300% increase in percent cover and production of herbaceous vegetation. Increased plant community vigor results from decreased competition with juniper for subsurface resources (water, nutrients) and space. As a result, transpiration rates and soil surface evaporation rates will decrease and higher soil moisture will be available for plant growth and survival. Based on anecdotal evidence, it is also possible that spring discharge will increase and seeps and springs may emerge that were lost with initial encroachment. This would provide more sites where birds would be able to obtain water during the summer and fall months.

Research continues to emphasize the importance of intact sagebrush habitats in providing the resources sage-grouse require throughout their life cycle. This includes the necessity of sagebrush (*Artemisia* spp.) as the primary source of cover, food, and breeding (Crawford et al. 2004, Connelly et al. 2004, Gregg et al. 1994). Connelly et al. (2004) suggest that productive sage-grouse nesting habitat includes sagebrush that has both horizontal and structural diversity with an understory dominated by native grasses and forbs which provide a food source of insects and forbs as well as concealment from predation (Connelly et al. 2000, Connelly et al. 2004). With an increase in juniper, sagebrush steppe communities rapidly decline (Miller et al. 2000, Connelly 2004). Pinyon—Juniper forests have increased within sage-grouse habitat by as much as 18.9 million acres and continue to expand in the absence of fire (Miller et al. 2000).

In the Alton area, evidence of widespread juniper impacts on the sagebrush—grassland ecosystem can be observed (Figure 6). cursory assessments of sage-grouse habitat conditions within the valley indicate that the cover, density and biomass of living sagebrush and herbaceous plants occurring in the intercanopy of these juniper woodlands is lower than in open sagebrush stands (Figure 7). Data collected from radio-collared birds confirms that these birds do not rely on juniper-encroached sites for nesting and brood rearing (Frey 2008).



—Figure 6. Intact sagebrush community being encroached by Utah juniper.



Figure 7. Juniper and pinyon dominated plant communities located 50m west of the country road between Alton and Sink Valley.

Follow up quantitative sampling was conducted in the pinyon-juniper and sagebrush communities of the Alton area (Collins, 2007a; Collins, 2007b). When comparing reference areas of these two communities (reference areas are those areas chosen to represent future revegetation success standards), the total living understory cover of the sagebrush area was 60.50% compared to 27.50% for the pinyon-juniper community. Additionally, the sagebrush understory cover was comprised of 38.51% forbs and grasses as opposed to only 10.44% in the pinyon-juniper community. Finally, woody species density in the sagebrush community consisted of 8,331 individuals per acre, of which over 90% were sagebrush plants. In the pinyon-juniper community the woody species density was estimated at 4,215 individuals per acre, many of which were pinyon pine and Utah juniper trees.

Within the past few years, sage-grouse habitat was improved within the Alton region by removing juniper and pinyon pine trees using bullhogging technology. Following tree removal, radio-collared birds were observed the next year utilizing these stands where they had not been found before (personal communication with Nicki Frey 2007). The primary benefit of this work was a reduction in trees that compete with sagebrush and

herbaceous plant species while maintaining trees that could be used for roosting (primarily during hot summer months). Over time, shrub and herbaceous biomass production and plant cover will likely increase compared to pretreatment levels, even though recovery of perennial plants has been slow. To improve nesting habitat, tree removal has been important for returning disturbed communities to sagebrush dominated sites recommended for sage-grouse habitat (Connelly 2004). Juniper provides perching sites for predatorial birds, obstructs the ability to observe predators from a distance, and impairs intercanopy and understory plant community structure. Furthermore, remaining trees provide a seed source for more rapid reinvasion in the intercanopy space which can lead to a more rapid exclusion of sage-grouse habitat in that area.

In southeast Oregon and northwest Nevada, over 1,200 nest sites were located from 1995 to 2003. The majority of sage-grouse nest sites occur in intact sagebrush and bitterbrush/sagebrush stands which lacked juniper trees. Western juniper occurs throughout the region and within 10 km of both leks, however, birds have never been observed nesting within juniper woodlands. In Canada, 90% of all identified nest sites occurred under sagebrush plants (Aldridge and Bingham 2002). In Colorado, birds nested 94% of the time under sagebrush (Peterson 1980). Other plant species that provided nest sites included greasewood, bitterbrush, rabbitbrush, horsebrush, snowberry, shadscale, mountain mahogany, and basin wildrye. While sage-grouse nesting under juniper limbs or near juniper has been reported (i.e. Colorado), it is generally agreed that sage-grouse nest away from juniper stands, in particular closed or nearly closed canopy woodlands (Miller 2005). At a recent sage-grouse conference held in Mammoth Lakes, California (July 2008), a group of 4-5 sage-grouse biologists were questioned on their attitude about nesting habitat and juniper. The group unanimously stated that optimal nest site habitat is void of juniper trees. Complete juniper removal from sage-grouse habitat was identified as a primary objective for improving sage-grouse nesting habitat throughout the range of the species. Holloran (2008) also agreed that optimal habitat would include large scale removal of juniper. In addition to nesting habitat, brood rearing habitat is also impacted as plant structure and forage availability are reduced and the potential for predation is increased with juniper encroachment.

According to Crawford et al. (2004), sage-grouse managers should understand that without purposeful habitat management such as juniper removal, sage-grouse habitat quality may decline. To improve habitat conditions in the Alton area, and to increase connectivity with the neighboring Hoyts Ranch population, large-scale juniper removal is recommended. With aggressive revegetation of native shrub species (e.g. *Artemisia* spp, *Purshia tridentata*), including the use of transplants to increase more rapid sagebrush establishment and establishment of herbaceous species (in particular sage-grouse forage species), habitat conditions can be improved to ensure greater habitat availability for nesting and brood-rearing. Tree removal increases resources available for shrub and herbaceous plant establishment and growth. In the Alton area, it is likely that birds will identify adequate sites for roosting following tree removal, using sagebrush plants or juniper trees at the juniper woodland fringe. More significant is the long-term benefit from having greater area for hens to nest and raise their brood. While research is needed to provide further evidence of the impacts of juniper on sage-grouse habitat, an assessment from sage-grouse biologists and wildlife habitat biologists have concluded that juniper impacts are detrimental to sage-grouse nesting and brood rearing habitat.

Any future tree removal treatments will be completed outside the avian nesting season. This does not include any tree removal that will occur during the mining process.

Removing trees from extensive areas creates greater connectivity of suitable habitat. In 2005, the BLM cleared portions of the land to increase sagebrush habitat. This improvement was beneficial for improving relatively small site conditions, however, the amount of land treated was minimal compared to the level needed to sustain the sage-grouse population in the Alton area. In 2007, the Coal Hollow Project removed over 10,000 juniper trees that had encroached the sagebrush open areas. Other than during the mining process itself, any future tree removal treatments within the permit area will be completed outside the area's avian nesting season. Current plans have been designed to provide a corridor for the sage-grouse in the Alton to intermix with the larger population located to the north, called the Heut's Ranch Lek (see below). This

~~landscape-level operation could greatly enhance sagebrush restoration objectives by the BLM that is currently limited by constrained budgets and manpower.~~

Other compensatory mitigation

Reestablishing Connectivity Between Alton and Hoyt's Ranch

Over time, juniper encroachment has likely been the primary factor in isolating the Alton sage-grouse population from nearby populations. There is a larger sage-grouse population located approximately 6 miles north of Alton. It is likely that migration once occurred between these populations allowing an exchange of individuals and genes between the two populations. Fragmentation of the landscape by juniper has likely resulted in minimal or no movement of birds between the two populations. Similarly, two populations that once occurred further south (near Kanab) have become locally extinct, likely due to the lack of connectivity with more northern populations. According to Fuhlendorf (2001), small populations of prairie chickens became disconnected from other larger populations with increased croplands and juniper invasion. These small populations became locally extinct due to the lack of migration and gene flow potential. Therefore, by reducing the degree of fragmentation caused by expanding juniper, the potential for migration and population sustainability is increased.

A plan has been made to establish connectivity by removing juniper and scrub oak trees from private land between the Alton and Hoyts Ranch populations. An area that is approximately 1,700 acres has been delineated that, with treatment, could provide connectivity between the two populations (Appendix 3-5). Funds have been earmarked by ACD to work with DWR and/or the landowners (Heaton Brothers, LLC) to provide technical and financial support to establish a migration corridor through the 1,700 acres. It is anticipated that this habitat improvement will create easier access for birds to travel more freely between the two populations.

Although ongoing, much of the corridor development work has been accomplished. A field visit that included a Division biologist, representatives from Heaton Brothers and ACD, and other independent biologists to this area to observe the progress of the project was conducted in late September 2009. Additionally, preliminary field monitoring

data from radio-collared sage-grouse suggest that the corridor is beginning to be used by the birds.

Establishment of a Core Sage-Grouse Conservation Area

The east end of the valley maintains one of the few remaining intact sagebrush stands in the valley. This area is located northeast of the lek and provides sites for roosting during the mating season (Drawing 3-1 and Drawing 3-5). This area will not be mined, rather, it will be preserved to create a harbor area for bird breeding, nesting, and brood rearing (Figure 3-1). Within this “Conservation Area”, habitat will be protected for sheltering displaced sage-grouse, especially during the breeding and brood-rearing seasons. Most of the juniper trees that encroached into sagebrush communities within the permit area have been removed. This has been accomplished by felling and removing individual juniper trees while minimizing the impacts to the sagebrush community (see “Juniper Removal” above). In addition to juniper, some Gambel oak (*Quercus gambelii*) trees have also been removed to expand the sagebrush community and provide greater suitable habitat for sage-grouse.

In addition to juniper and oak removal, sagebrush treatments (mechanical) will be applied to reduce shrub cover and density in small areas (patches) if quantitative sampling in that area suggests that these parameters exceed optimal sage-grouse habitat requirements. Forb species that are known to be important sage-grouse forage will then be seeded to provide an additional food source for hens and chicks, primarily during the brood rearing period. Grasses will also be seeded to provide additional hiding cover and a potential source of insects for chick foraging. These treatments could initially be done in a few, relatively small areas to determine whether forb and grass densities actually do increase and if birds are observed using these areas for foraging. If successful, these treatments can then be used in other areas where benefits are expected. Conversely, if the results from preliminary vegetation sampling, along with the current research literature regarding sage-grouse habitat requirements, indicate that widespread treatments should be made to the existing sagebrush community, then this will be the course of action.

Maintaining optimal shrub cover for nesting, brood rearing, predator avoidance, roosting, and as a source of shelter will remain the highest priority for these sites.

Predator Control Plan

Several species that prey on sage-grouse eggs, chicks and adults live in the Alton region including common ravens (*Corvus corax*), American crows (*Corvus brachyrhynchos*) and coyotes (*Canus latrans*). ACD will coordinate with the appropriate government agency to help implement a predator control program to enhance survival of the sage-grouse in the area. The operator will not conduct the predator control measures but will assist the appropriate agency with developing technical expertise to formulate a plan to implement such a program through the appropriate government agency.

Restoration of Sagebrush Habitat (on-site mitigation)

After mining has been completed, reclamation specialists will return the original grade and valley form to approximate pre-disturbance conditions. An emphasis will be placed on restoring sagebrush ecosystems. Reclamation will include seeding similar plant species with comparable plant composition, structure and function as those of the original plant community. Final reclamation seed mixtures have been formulated to include forb species critical for survival of hens and their chicks.

Seed mixes that are used for reclamation will consist of native shrub, grass and forb species that provide cover and food. In order to accelerate shrub re-establishment, bareroot or containerize sagebrush and bitterbrush transplants can be planted (in addition to sage-grouse preferred forb species) to enhance sagebrush ecosystem restoration (see Coal Hollow Project, Mining & Reclamation Plan, Chapter 3, Revegetation Seed Mixtures). Cursory surveys conducted on April 30, 2006 found that there is a low probability that a dominant invasive species (i.e. cheatgrass, medusahead) could establish on reclaimed sites. However, post-reclamation surveys will be conducted for undesirable invasive plants. If a breakout does occur, mechanical and/or chemical treatments will be applied.

Primary brood-rearing habitat in the Alton valley is associated with alfalfa fields near the town of Alton. Birds likely utilize these areas due to the availability of forbs, insects, and water. To reduce the dependency of the birds on these areas, areas that are currently pasture lands will be returned to sagebrush/grass/forb communities. Seed mixtures for final reclamation have been created with this goal in mind.

Seeding and planting will occur in the fall season following the growing season and into dormancy, or in the spring if timing and conditions appear more favorable. During the following growing season, vegetation sampling will be conducted to monitor reclamation success. Measurements will be continued each year until the reclamation goals have been achieved. Additional seeding can be applied during subsequent years if the minimum standards of acceptance have not been achieved. Juniper seedlings found in reclaimed areas will be removed.

Restoration of Lekking Habitat

The current lek is located in a low-growing pasture in the south end of the **proposed** mining area. The lek is dominated by perennial grasses and forbs. Following mining, this site will be seeded with similar perennial species occurring at the lek prior to disturbance. Several studies demonstrate the plant structure of greater sage-grouse leks. They are described as occurring in sparsely vegetated areas (surrounded by sagebrush communities) that provide escape and protection from predators (Gill 1965, Connelly et al. 1981, Connelly et al. 2000, Call and Maser 1985, Crawford et al. 2004). After mining, the Alton lek will be restored to resemble pre-disturbance conditions. Plant species will be seeded to most closely represent the original lekking environment. Depending on post-mining soil water conditions and the presence of dominated perennial grass species, vegetation growth of seeded species may exceed the height tolerated by displaying sage-grouse during the lekking period. Additionally, weedy species may occur that grow taller than conditions typical of sage-grouse lekking

habitat. With excessive plant growth, sage-grouse may choose not to attend the lek for display.

If needed, the reduction of plant growth may be required to create “sparsely vegetated conditions” (Figure 8) within the lekking area, by reducing both living and decadent plant materials. In cases where grass growth at the restored lek exceeds this maximum height requirement, ACD will work with the DWR prior to any vegetation treatments to identify optimal methods for vegetation management on the lek.



Figure 7. Sage-grouse males displaying on the Sink Valley lek on March 30, 2006.

Wildlife Awareness Program

A Wildlife Awareness Program will be implemented during the active phases of mining for the Coal Hollow Project. The objectives of the program will be to provide protection of the resident wildlife, decrease collisions by heavy equipment and other vehicles, as well as minimize impact to the wildlife during the mining operations. During this program, qualified biologist will provide employees specific training on sage-grouse identification, seasonal patterns in sage-grouse development and movement, and deer and elk observations and migratory patterns in the Alton area. Annual refresher training for all ACD employees occurs in January, UDWR and UDOGM are invited to participate in the Wildlife Awareness training.

The coal operations will, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts on fish, wildlife, and related environmental values and will achieve enhancement of such resources where practicable. In doing so, the following procedures will be implemented.

- Speed limits of all vehicles will be posted at 25 mph inside the permit area.
- The safety meetings conducted on the mine site to all employees will include information regarding awareness of important wildlife species in the area.
- No coal mining and reclamation operations will be conducted that would likely jeopardize the continued existence of federally listed endangered or threatened or which is likely to result in the destruction or adverse modification of designated critical habitats of such species in violation of the Endangered Species Act of 1973.
- As mentioned above and in following sections, extensive measures for protecting, enhancing and mitigating habitat for the sensitive bird species, sage-grouse, have been conducted. Mitigation plans for this species have also begun and continue through operations (see Appendix 3-5 and Appendix 3-8).
- The mining operator will promptly report to the State of Utah, Division of Oil, Gas & Mining any state- or federally-listed endangered or threatened species within the permit area of which the operator becomes aware. Upon notification, the Division will consult with appropriate state and federal fish and wildlife agencies and, after consultation, will identify whether, and under what conditions, the operator may proceed.
- The mining operator keep log records of any road kill of deer, elk, sage-grouse and domestic livestock from coal haul and associated vehicles from the mine site to highway 89.
- The operator will ensure that electric powerlines and other transmission facilities used for, or incidental to, coal mining and reclamation operations on the permit area are designed and constructed to minimize electrocution hazards to raptors, except where the Division determines that such requirements are unnecessary.
- The operator will design fences, overland conveyers, and other potential barriers to permit passage for large mammals, except where the Division determines that such requirements are unnecessary.

The following table outlines each of compensatory mitigation projects to date (June 2016):

	<u>Year</u>	<u>Treatment</u>	<u>Location</u>	<u>Program</u>	<u>Acres of Habitat Improvement</u>	<u>Completion documentation</u>
<u>South Lease (Coal Hollow Lease)</u>	<u>2011</u>	<u>PJ/Oak removal, reseeded</u>	<u>Corridor located north of Alton</u>	<u>ACD</u>	<u>428</u>	<u>See letter from DOGM dated 5/16/2016, task 3987</u>
	<u>2009</u>	<u>PJ Removal, sagebrush thinning and seeding</u> <u>The conservation area is 72 acres, 40 of which are dense sagebrush. 2.5 acres were treated by disking and planing in 2010.</u>	<u>Conservation Area</u>	<u>ACD</u>	<u>72</u>	<u>See letter from DOGM dated 5/16/2016, task 3987</u>
	<u>2012</u>	<u>lop and scatter of PJ and chemical treatment of Rabbitbrush</u>	<u>east of property</u>	<u>ACD</u>	<u>146</u>	<u>See appendix 3-6 part 2</u>
	<u>2013</u>	<u>lop and scatter of PJ</u>	<u>west boundary</u>	<u>BLM</u>	<u>355</u>	<u>See letter from BLM dated 1/26/16</u>
	<u>2014</u>	<u>Paunsaugunt rabbitbrush removal phase II</u>	-	<u>WRI Project ID 3011</u>	<u>300</u>	<u>See UDWR Contract dated 8/18/14</u>
	<u>2014</u>	<u>UKC Thompson Creek</u>	-	<u>WRI Project ID 2701</u>	<u>300</u>	<u>See UDWR Contract dated 8/18/14</u>
	<u>2015</u>	<u>Broad Hollow Rabbitbrush Mitigation</u>	-	<u>WRI Project 3419</u>	<u>443</u>	<u>See UDWR Contract dated 2/23/16</u>
	-	-	-	-	-	-
-	-	-	-	<u>Total Mitigation</u>	<u>2044</u>	-

-	-	-	-	<u>Transfer to North Lease</u>	<u>344</u>	-
-	-	-	-	<u>New Total for South Lease</u>	<u>1700</u>	-

Minimization of Impacts to Migratory Birds

Potential impacts to migratory birds include both indirect and direct impacts. Indirect impacts include the displacement of the birds due to human activity. Direct impacts include the loss of habitat, both nesting and foraging, as well as the potential "take" of active nests. However, as described below, steps will be taken to avoid the take of any migratory birds.

Loss of Habitat. In all, about 310 acres of potential foraging and nesting habitat could be lost to the local bird communities. However, the habitat type being lost in the lease area is prevalent in the surrounding area, and therefore, this loss would be expected to have no negative impact on the local bird populations.

Potential Take. The Migratory Bird Treaty Act (MBTA) prohibits the take of migratory birds, their parts, nests, eggs, and nestlings. To ensure that ground-disturbing activities do not result in the "take" of an active nest or a migratory bird protected under the MBTA, mitigation steps will be taken.

Mitigation Efforts

Passerines - The U.S. Fish and Wildlife Service (USFWS) recommends that ground-disturbing activities or vegetation treatments should begin before the migratory bird-nesting season begins or after any nests have fledged (USFWS 2015(1)). However, if activities that would remove potential nesting vegetation are scheduled to begin during the breeding season, which starts after March 1 (see Bird Nesting Seasons below), steps will be taken to keep birds from nesting in the area (It should be noted that once nests are established, they cannot be harassed). Nest surveys will be completed no more than 2 weeks before the start of activities. All active passerine nests that are detected during the nest survey will be protected by a 100-foot buffer between the nest and any activities. The buffer must remain in place until the nest fledges or fails.

Raptors - Nesting raptors can be negatively impacted by human activity even if their nest is not within the lease area itself. If activities are scheduled to begin during the raptor nesting season (see Bird Nesting Seasons below), a raptor nest survey will be conducted within 0.5 mile of the lease area to avoid any potential take. Any raptor nests that are detected within 0.5 mile of the lease area must be afforded the appropriate buffer, as listed in Romin and Muck 2002(2). Depending on the topography of the area and other variables, the USFWS may be inclined to reduce the size of the buffer if the given activities are not deemed a threat to the active nest.

NESTING SEASONS												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Raptors												
General Passerines												

340. RECLAMATION PLAN

341. REVEGETATION

This document contains the revegetation plan for final reclamation of all lands disturbed by coal mining and reclamation operations, except water areas and the surface of roads approved as part of the postmining land use, as required in R645-301-353 through R645-301-357. It also shows how the Coal Hollow Project will comply with the biological protection performance standards of the State Program.

341.100. Reclamation Timetable

A detailed schedule and timetable for the completion of each major step in the mine plan has been included in Chapter 5 of the MRP ~~and on~~ Drawing 5-38 [shows the schedule for the Coal Hollow Lease Area and Drawing 5-76 shows the schedule for the North Private Lease](#). Briefly, the mine will conduct operations in one area (segment) at a time. Initial mine development will involve removal and storage of topsoil from mine infrastructure locations. Facilities for equipment maintenance/warehouse, coal handling, and offices will be constructed. During the development and initial mining period, facilities temporary in nature may be used until permanent facilities can be built. Construction of sedimentation ponds, diversion ditches, and mine roads accessing the initial mining areas will also be ongoing.

Mining ~~will~~ employ typical open pit methods using truck/loader type equipment to remove overburden and recover the coal. Mining will advance across the property in successive cuts approximately 250 ft. in width and 800 to 1,300 ft. long (generally equal to the width of the property less property barriers). Layout of these pits can be viewed on Drawings ~~5~~ 5-10 and 5-53. In practice, these overburden lifts are mined in a stairstep fashion ahead of the coal removal operation to provide adequate working room for the equipment and stable advancing slopes. Once mining is complete, excavated overburden (spoil) from a successive cut is used to backfill the excavation. General cross sections of this process can be viewed on Drawings 5-11 and 5-12. For the highwall miner method, mining of the trench will be in successive cuts approximately 150 ft. in width and 550 to 600 ft. long. Layout of these trenches can be viewed on Drawing 5-10 and 5-53. Otherwise, mining and reclamation will proceed as described for the typical open pit method.

Prior to beginning mining, the area will be cleared of vegetation, and the topsoil will be recovered and either stockpiled or live hauled to regraded areas. Overburden will then be removed using large hydraulic excavator(s) or front end loaders and off-road trucks which will haul the spoil and place it in parts of the pit where the coal has been removed, or in the excess spoil area shown on Drawings 5-3, 5-37 and 5-37A for the Coal Hollow Mine and Drawing 5-47 for the North Private Lease. Overburden is removed in successively deeper benches until the coal seam is exposed. Some overburden in lower lifts may be moved by direct dozing into the mined out pit by large bulldozers.

Once the coal is removed, the pit will be backfilled by spoil from adjacent mine pits. Once the pit is backfilled to the planned final surface contour, suitable topsoil and subsoil will be replaced, and the area reseeded. Revegetation work will proceed seasonally as appropriate for planting. The mine plan has been engineered to disturb the smallest practicable area at any one time. The Alternate highwall mining will reduce the practicable area to be reclaimed. With prompt establishment and maintenance of vegetation, immediate stabilization of disturbed areas will minimize surface erosion. Details of the plan has been included in Chapter 5, Section 540 of [this document.the MRP](#). One exception, the last pit (shown on Drawing 5-9 and Drawing 5-10 as Pit B-1) at the Coal Hollow Mine will be encountered incident to reclamation and borrow activities where it would not have been practical to mine otherwise. As shown on Drawing 5-16, this pit is fully contained within the greater Borrow Area and will be fully mined and immediately backfilled (to the intermediate landform shown in Drawings 5-35 and 5-36) in 2016. This backfill will then remain in place until closure of the Underground Mine and finally rehandled as backfill to Pit 10. Subsoil will be placed over the final graded mining surface to an average depth of 1.5 feet for interim reclamation after mining has been completed. Organic mulches will be incorporated into the soil to improve the fertility of the subsoil placed on the interim reclamation surface and seeded with the intermediate seed mix. Incorporation of mulch into the soil will improve the fertility of the subsoil used for interim reclamation cover. The surface foot (12) inches of amended subsoil will be salvaged as cultivated topsoil at the end of the interim reclamation period.

341.200. Reclamation Description

The Coal Hollow Projects will be reclaimed and revegetated to meet the appropriate postmining land use. Most areas will be reclaimed to the native plant communities that existed prior to mining conditions. Other areas will be reclaimed to enhance habitat for sage-grouse or other wildlife species. Finally, in those areas where the landowner requests a change in the plant community to increase productivity for domestic livestock, they will be reclaimed accordingly. [Exhibit 4-1 and 4-2 in Chapter 4 show the land use for the Coal Hollow Mine and the North Private Lease respectively.](#)

341.210. Seed Mixtures

Revegetation seed mixtures for each plant community disturbed by mining activities in the Coal Hollow Project area are given in this section. Table 3-36 shows the plant communities that may eventually be disturbed by mining operations at the Coal Hollow Project area.

Table 3-36: Vegetation Communities of the Coal Hollow Permit Area Proposed for Disturbance

MINE AREA	MAP SYMBOL (see <i>Vegetation Map, Drawing 3-1</i> , and <i>Volume 12 Vegetation Map 4</i>)	PLANT COMMUNITY	<u>Post Mining Land Use</u>
<u>Coal Hollow Lease</u>	S/G	Sagebrush/Grass	<u>Primarily domestic grazing/limited wildlife</u>
	P	Pasture Land	<u>Domestic grazing</u>
	P-J	Pinyon-Juniper	<u>Primarily domestic grazing/limited wildlife</u>
	M	Meadow	<u>Primarily domestic grazing/limited wildlife</u>
	OB	Oak Brush	<u>Primarily domestic grazing/limited wildlife</u>
	RB/SB	Rabbitbrush/Sagebrush (Disturbed; previously Sagebrush/Grass)	<u>Primarily domestic grazing/limited wildlife</u>
North Private Lease	P	Pasture Land	<u>Domestic grazing</u>
	P-J	Pinyon-Juniper/Sagebrush	
	<u>CU</u>	<u>Channel Uplands</u>	<u>Domestic grazing</u>
	W	Wetlands	<u>Domestic grazing</u>

Seed mixtures for each disturbance type are shown on Tables 3-37 *through* 3-43. These rates have been based on drill seeding methods described in this document. When broadcast seeding is employed these rates will be doubled. ACD may add or remove plant species if requested by the landowner.

Table 3-37: Revegetation Seed Mixture for the Sagebrush/Grass Community at the Coal Hollow Project

	Rate** (# PLS/Ac)	Seeds/ft2
SHRUBS		
<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
FORBS***		
<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
GRASSES		
<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
TOTALS	22.23	62.66

* This species could also to be planted by containerized seedlings at a rate of 200 plants per acre to enhance sage-grouse habitat.

** Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse enhancement include: *Achillea millefolium*, *Agoseris glauca*, *Crepis acuminata*, *Gayophytum* spp., *Lomatium* spp., *Tragopogon dubius*, *Trifolium* spp.

Table 3-38: Revegetation Seed Mixture for the Pasture Lands at the Coal Hollow Project

(Final determination to be made by landowners)	Rate* (# PLS/Ac)	Seeds/ft2
SHRUBS		
FORBS **		
<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
GRASSES		
<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
TOTALS	22.04	40.78

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse enhancement include: *Achillea millefolium*, *Agoseris glauca*, *Crepis acuminata*, *Gayophytum* spp., *Lomatium* spp., *Tragopogon dubius*, *Trifolium* spp.

Table 3-39: Revegetation Seed Mixture for the Pinyon-Juniper Community at the Coal Hollow Project

	Rate** (# PLS/Ac)	Seeds/ft2
SHRUBS		
<i>Amelanchier Utahensis</i>	5.00	2.96
<i>Artemisia nova</i>	0.20	4.16
<i>Artemisia tridentata vaseyana</i>	0.07	4.02
<i>Ceratoides lanata</i>	3.00	3.79
<i>Purshia tridentata</i>	12.00	4.13
<i>Symphoricarpos oreophilus</i>	2.50	4.30
FORBS		
<i>Artemisia ludoviciana</i>	0.04	4.13
<i>Eriogonum umbellatum</i>	1.00	4.80
<i>Hedysarum boreale</i>	5.00	3.86
<i>Lupinus argenteus</i>	15.00	4.30
<i>Sphaeralcea coccinea</i>	0.50	5.74
<i>Viguiera multiflora</i>	0.20	4.84
GRASSES		
<i>Elymus spicatus</i>	1.00	3.21
<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

TOTALS	59.81	82.25
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* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

Table 3-40: Revegetation Seed Mixture for the Meadow Community at the Coal Hollow Project

	Rate* (# PLS/Ac)	Seeds/ft2
SHRUBS		
FORBS **		
<i>Iris missouriensis</i>	2	0.96
<i>Achillea millefolium var. occidentalis</i>	0.1	6.37
GRASSES		
<i>Carex microptera</i>	0.2	3.89
<i>Carex nebrascensis</i>	0.5	6.13
<i>Elymus trachycaulus ssp. trachycaulus</i>	2	7.35
<i>Phleum pretense</i>	0.2	5.97
<i>Poa pratensis</i>	0.1	5.00
<i>Poa secunda ssp. sandbergii</i>	0.3	6.38
<i>Schoenoplectus americanus</i>	1	4.13
<i>Sporobolus airoides</i>	0.2	8.03
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	16.60	58.79

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse

enhancement include: *Achillea millefolium*,
Agoseris glauca, *Crepis acuminata*,
Gayophytum spp., *Lomatium* spp.,
Tragopogon dubius, *Trifolium* spp.

Table 3-41: Revegetation Seed Mixture for the Oak Brush Community at the Coal Hollow Project

	Rate* (# PLS/Ac)	Seeds/ft2
SHRUBS		
<i>Amelanchier utahensis</i>	1	0.59
<i>Artemisia nova</i>	0.2	4.16
<i>Artemisia tridentate ssp. vaseyana</i>	0.07	4.02
<i>Cercocarpus montanus</i>	1	1.35
<i>Purshia tridentate</i>	2	0.69
<i>Symphoricarpos oreophilus</i>	1	1.72
<i>Ephedra viridis</i>	2	1.15
FORBS		
<i>Artemisia ludoviciana</i>	0.04	4.13
<i>Sphaeralcea coccine</i>	0.2	2.30
<i>Hedysarum boreale</i>	1	0.77
<i>Heliomeris multiflora</i>	0.2	4.84
GRASSES		
<i>Bromus marginatus</i>	2	4.90
<i>Pseudoroegneria spicata ssp. spicata</i>	1.5	4.82
<i>Elymus trachycaulus ssp. trachycaulus</i>	1.5	3.96
<i>Poa pratensis</i>	0.1	5.00
<i>Poa secunda ssp. sandbergii</i>	0.2	4.25
<i>Achnatherum hymenoides</i>	1	4.32
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	25.01	57.56

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

Table 3-42: Revegetation Seed Mixture for the Rabbitbrush/Sagebrush Community (disturbed Sagebrush/Grass Community) at the Coal Hollow Project

	Rate** (# PLS/Ac)	Seeds/ft2
SHRUBS		
<i>Artemisia nova</i> *	0.2	4.16
<i>Artemisia tridentate ssp. Tridentate</i> *	0.1	5.74
<i>Krascheninnikovia lanata</i>	1	1.26
<i>Purshia tridentate</i>	2	0.69
<i>Symphoricarpos oreophilus</i>	1	1.72
FORBS ***		
<i>Achillea millefolium var. occidentalis</i>	0.03	1.91
<i>Hedysarum boreale</i>	1	0.77
<i>Linum perenne</i>	0.7	4.47
<i>Lupinus argenteus ssp. rubricaulis</i>	1	0.29
<i>Penstemon palmeri</i>	0.3	4.20
<i>Sphaeralcea grossulariifolia</i>	0.4	4.59
<i>Heliomeris multiflora</i>	0.2	4.84
GRASSES		
<i>Pascopyrum smithii</i>	1.5	4.34
<i>Elymus trachycaulus ssp. trachycaulus</i>	1.5	5.51
<i>Poa pratensis</i>	0.1	5.00
<i>Poa secunda ssp. sandbergii</i>	0.2	4.25
<i>Achnatherum hymenoides</i>	1	4.32
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	22.23	62.66

* This species could also to be planted by containerized seedlings at a rate of 200 plants per acre to enhance sage-grouse habitat.

** Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse enhancement include: *Achillea millefolium*, *Agoseris glauca*, *Crepis acuminata*, *Gayophytum* spp., *Lomatium* spp., *Tragopogon dubius*, *Trifolium* spp.

Table 3-43: Revegetation Seed Mixture for the Wetland Community in the North Lease Area of the Coal Hollow Project

	Rate* (# PLS/Ac)	Seeds/ft2
SHRUBS		
<i>Rosa woodsii</i>	5.00	5.20
FORBS ***		
<i>Iris missouriensis</i>	10.00	4.82
GRASSES/GRASS-LIKE		
<i>Agrostis stolonifera</i>	0.05	7.35
<i>Carex microptera</i>	0.40	7.78
<i>Carex nebrascensis</i>	0.50	6.13
<i>Carex pellita</i>	1.00	7.16
<i>Carex utriculata</i>	0.50	5.10
<i>Juncus arcticus</i>	0.05	6.89
<i>Poa pratensis</i>	0.07	3.50
<i>Scipus americanus</i>	2.00	8.26
<i>Triglochin maritima</i>	0.50	5.17
TOTALS	20.07	67.34

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

** Seeds used may be based on commercial availability. Other substitute species could include: *Carex aquatilis*, *Carex obnupta*, *Carex praegracilis*, *Juncus tenuis*, *Juncus torrevi*

341.220. Planting & Seeding Methods

Seedbed Preparation & Analyses

The final seedbed of the reclaimed areas will be prepared following the procedures found in section 243 of Chapter 2.~~by first replacing the subsoil and topsoil in the same order it existed prior to removal by the mining activities. Next, a basic topsoil (top 8 inches of reclamation profile) sampling regime will be implemented prior to seeding that should identify fertility problems and will provide a basis for determining necessary soil amendments. The parameters analyzed will be:~~

- ~~• Available phosphorus (P)~~
- ~~• Soluble Potassium (K)~~
- ~~• Nitrate-Nitrogen~~

~~One composite sample will be collected from approximately every 2 to 5 acres based on soil types and variability. Each composite will be comprised of at least 4 samples.~~

~~Pre-testing of the soils has been conducted as part of the soils survey. Results from the pre-testing of topsoil and subsoil can be viewed in Table C-1 of Appendix 2-1 (native topsoil and subsoil) and Table C-2 (samples from core hole/overburden pits) of Appendix 2-1.~~

If heavy equipment operation results in excessive soil compaction at the surface of the reclaimed areas, they will then be ripped, disked, or harrowed to loosen the seedbed prior to seeding. Excessive compaction that could impact seeding success will be determined by observation and judgment of an environmental professional. In other areas where less compaction has occurred, the areas will be disked and harrowed. The disking and harrowing of all areas will be done parallel with the contour wherever possible to decrease the potential for water erosion downslope. In other areas where compaction is not a problem, dozer tracking can be used to roughen the surface, and to trap seed, fertilizer, mulch, and other amendments as well as decrease erosion by wind and water. In such cases, seeding will be done immediately after this treatment,

whereas soil amendments, where required, would be applied over the surface during seedbed preparations. Seeding will mainly occur in the early spring and late fall.

Seeding & Transplanting

Seeding will be accomplished using different methods depending on the area to be seeded. In the more flat areas such as the meadows and existing pasture lands, a typical farmland drill will be used for seeding. In other areas where the surface may be more rough, a modified rangeland drill or “rough terrain seeder” will be used. Finally, in the areas where access is more difficult to reach by heavy equipment due to slope steepness or other limiting factors, broadcast seeding or hydro-seeding will be employed. For a list of plant species to be seeded refer to Tables 3-37 *through* 3-43.

Containerized plants can be planted in those areas proposed for sage-grouse habitat enhancement. These plants will be planted from containers at least 10 cubic inches in size and inoculated with appropriate site-specific or commercial mycorrhizal inocula at specified infection rates. The containerized plants will be planted at a rate that totals at least 400 individuals per acre. For a list of the species to be planted, refer to Table 3-37. Containerized plants should be dormant when they arrive at the site in the spring or fall and will be planted as soon after delivery as possible. Plants will be planted in a fashion to simulate a natural habitat. If competing vegetation is present at the time of planting, this vegetation will be removed by scalping the area or herbicide application beforehand that provide a time period ample as to not affect the containerized seedling. A small depression will be created in the seedbed around the seedling at the time of planting to increase survivability by harvesting and holding water. The plants will be “wateredin” when they are planted by adding water to the depression. If possible, the plants will be watered during dry periods for the first growing season.

341.230. Mulching Techniques

Mulch will be placed on the seedbed surface once soil amendments have been incorporated and seeding has been accomplished. Mulching will occur by one of the following methods:

- Certified noxious weed free straw applied at a rate of 1 ton/acre anchored by crimping or a chemical binder.
- Wood fiber hydromulch at a rate of $\frac{3}{4}$ ton per acre for slopes flatter than 3:1 and 1 ton per acre for slopes at 3:1 which is the steepest slope planned at the project. This hydromulch would be anchored with a chemical binder at the manufacturer’s suggested rate.
- Live mulch by use of quick growing sterile nurse crop such as “Quick Guard” with recommended rates of 5-10 lbs. /acre.

The mulch should control erosion by wind and water, decrease evaporation and seed predation, and increase survivability of the seeded species. Since there is only one post mining land use, mulching will follow one of the above described methods for all reclaim areas.

341.240. Irrigation

Irrigation has not been planned for the reclaimed area with the exception of watering the containerized plants as mentioned above.

341.250. Revegetation Monitoring

Vegetation of the reclaimed areas will be monitored regularly to measure the success of plant establishment and to determine if problem areas exist. Qualitative data will be recorded every year and quantitative data will be recorded in years 2, 4, 6, 9, and 10 post seeding. at regular intervals. The qualitative data will include: site location, sample date, observers, slope, exposure, acreage, animal disturbance, erosion damage, dominant plant species observed, rainfall and other pertinent notes. Quantitative data recorded will include: total cover (living cover, rock, litter, bare ground), cover by species, composition, frequency, and woody species density.

~~Methods for quantitative monitoring will be as follows. The Division's "Vegetation Information Guidelines, Appendix A" will be used to determine specific sampling techniques for data collection. Transect lines will be placed randomly on each of the revegetation sites. Random sample locations will then be placed from these transect lines and the aforementioned data will be recorded. Ocular methods with square meter quadrat will be used to provide cover and frequency data, whereas, point quarter and/or belt transects will be used to estimate woody species densities.~~

Weed control through chemical means will follow the current Weed Control Handbook (published annually or biannually by the Utah State University Cooperative Extension Service) and herbicide labels.

Weed surveys will also be conducted on the reclaimed areas on a yearly basis or during the revegetation monitoring studies. If undesirable, exotic or "weedy" plant species are present at a density that ~~they~~ could impede revegetation or out-compete desirable plant species, ~~a certified or trained specialist will spray herbicide, kill or remove the weeds mechanically (roguing, grubbing and mowing)-chemical, mechanical, or biological treatment will be used in accordance with R645-301-357.320.~~

341.300. Mining, Reclamation & Revegetation Research

~~Mining, reclamation & revegetation research has been planned and is in the process of being submitted to DOGM. Additionally, DOGM may require greenhouse studies, field trials, or equivalent methods of testing proposed or potential revegetation materials and methods to demonstrate that revegetation is feasible pursuant to R645-300-133.710.~~

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342. FISH AND WILDLIFE ENHANCEMENT

This ~~application section~~ includes a fish and wildlife plan for the reclamation and postmining phase of the operation consistent with R645-301-330, ~~and~~ the performance standards of R645-301-358, ~~and include the following~~ (for ~~specific~~ details see section 330, OPERATION PLAN).

342.100. Measures for Enhancement of Habitat

Enhancement measures that will be used during the reclamation and postmining phase of the operation to develop aquatic and terrestrial habitat. Such measures may include restoration of streams and other wetlands, retention of ponds and impoundments, establishment of vegetation for wildlife food and cover, and the replacement of perches and nest boxes (see also section 330, **OPERATION PLAN**).

The NPL contains approximately 6.34 acres of palustrine emergent wet meadow wetlands, 0.04 acre of stock pond and 4,632 feet (0.14 acre) of the Kanab Creek stream channel that were delineated and verified by the U.S. Army Corps of Engineers (SPK-2011-01248). Of the 6.34 acres, mining would only impact approximately 2.5 acres of waters of the United States, including wetlands. Wetlands along Kanab Creek will not be disturbed. Only the wet meadow and stockpond in area 2 will be disturbed and they will not be reconstructed. Therefore, ACD through an individual permit, will provide for offsite mitigation for the loss of this habitat. ACD has proposed to mitigate wetland and stream losses within the North Private Lease Area with a project approximately 1.5 miles downstream of the project area on Kanab Creek. The mitigation proposal involves restoring approximately 2,760 feet of stream channel that has been degraded by headcutting and erosion to create conditions that would allow the lost adjacent wetland/riparian areas to redevelop. ACD has proposed to enhance/rehabilitate an additional 1,800 foot long stretch of stream and its adjacent wetland/riparian located just upstream of the stretch to be restored.

342.200. Reclamation Plants for Enhancement

Where fish and wildlife habitat is to be a postmining land use, the plant species to be used on reclaimed areas have been selected on the basis of the criteria described below.

342.210. Nutritional Values of Plant Species

Among other qualities (e.g. erosion control qualities, establishment capabilities, and seed availability), plant species for revegetation of the Coal Hollow Project have been chosen for their proven nutritional value for wildlife (see Table 3-37 *through* 3-43).

342.220. Cover Quality of Plant Species

Among other qualities (e.g. erosion control qualities, establishment capabilities, and seed availability), plant species for revegetation of the Coal Hollow Project have been chosen for their cover qualities for wildlife (see Table 3-37 *through* 3-43).

342.230. Habitat Enhancement & Plant Species

Among other qualities, plant species for revegetation of the Coal Hollow Project have been chosen for their proven habitat enhancement qualities for wildlife (see Table 3-37 through 3-43). The plants have also been chosen for their ability to support and enhance fish or wildlife habitat after the release of performance bonds. At final revegetation, the selected plants will be grouped and distributed in a manner which optimizes edge effect, cover, and other benefits to fish and wildlife.

After consultation with ~~appropriate agencies~~ [responsible for the administration of forestry and wildlife programs and biologists](#) regarding habitats and sensitive species, the sage-grouse and its habitat were of greatest concern in the area. ~~There has been a decreasing trend in the populations of this species since 1964 (see Appendix 3-1 and Appendix 3-3 for more details). There was a general consensus among the biologists and agencies consulted that due to the: 1) marginal habitat in the Alton Amphitheater area, 2) loss of habitat in recent years for nesting and brood-rearing and 3) relatively low population numbers in the area, that the local population of sage-grouse is vulnerable to elimination, regardless of mining activities proposed by the Coal Hollow Project.~~ Accordingly, the several measures to minimize impacts and enhance habitat for this species have been ~~proposed and are subject to further consideration~~ by the operator and regulatory agencies ~~and incorporated into the MRP as Appendix 3-5 and 3-8~~ (see Section 333 above).

342.300. Cropland & Revegetation

Where cropland is to be the postmining land use, where appropriate for wildlife- and crop-management practices, and with approval from the private landowners, the Coal Hollow Project will intersperse the fields with trees, hedges, or fence rows throughout the harvested area to break up large blocks of monoculture and to diversify habitat types for birds and other animals. [Pursuant to R645-301-356.220, the requirements of R645-302-310 and R645-302-317 apply for areas identified as prime farmland. In 2016, the Natural Resources Conservation Service \(NRCS\) established specifications for prime farmland soil removal, storage, replacement, and reconstruction. See Chapter 2 Section R645-302-317 for additional information regarding soil management.](#)

342.400. Residential & Industrial Reclamation

~~Where residential, public service, or industrial uses are to be the postmining land use, and where consistent with the approved postmining land use, the Coal Hollow Project will intersperse reclaimed lands with greenbelts utilizing species of grass, shrubs, and trees useful as food and cover for wildlife.~~ No residential or industrial areas have been planned at this time.

350. PERFORMANCE STANDARDS

351. GENERAL REQUIREMENTS

All coal mining and reclamation operations will be carried out according to plans provided under R645-301-330 *through* R645-301-340.

352. CONTEMPORANEOUS RECLAMATION

Revegetation on all land that is disturbed by coal mining and reclamation operations, will occur as contemporaneously as practicable with mining operations, except when such mining operations are conducted in accordance with a variance for combined Surface and Underground Coal Mining and Reclamation Activities issued under R645-302-280. See Section 341.100 for the reclamation timetable. DOGM may establish schedules that define contemporaneous reclamation. One exception, the last pit (shown on Drawing 5-9 and Drawing 5-10 as Pit B-1) at the Coal Hollow Mine will be encountered incident to reclamation and borrow activities where it would not have been practical to mine otherwise. As shown on Drawing 5-16, this pit is fully contained within the greater Borrow Area and will be fully mined and immediately backfilled (to the intermediate landform shown in Drawings 5-35 and 5-36) in 2016. This backfill will then remain in place until closure of the Underground Mine and finally rehandled as backfill to Pit 10.

353. REVEGETATION: GENERAL REQUIREMENTS

~~Operators of the Coal Hollow Project~~ACD will establish on re-graded areas and on all other disturbed areas, except water areas and surface areas of roads that are approved as part of the postmining land use, a vegetative cover that is in accordance with the mine permit and reclamation plan.

353.100. Vegetative Plant Cover Qualities

353.110. Diverse, Effective, & Permanent

The vegetation cover established at final reclamation will be diverse, effective and permanent.

353.120. Native Plant Species

The cover will be comprised of species native to the area, or of introduced species where desirable and necessary to achieve the approved postmining land use and approved by the DOGM (see Table 3-37 *through* 3-43).

353.130. Final Vegetation Cover & Quantities

The final cover will be at least equal in extent of cover to the natural vegetation of the area, or those standards set for final revegetation success.

353.140. Vegetation Cover and Soil Stabilization

The cover will be capable of stabilizing the soil surface from erosion.

353.200. The reestablished plant species will also contain the qualities listed below.

353.210. (a) Be compatible with the approved postmining land use.

353.220. (b) Have the same seasonal characteristics of growth as the original vegetation.

353.230. (c) Be capable of self-regeneration and plant succession.

353.240. (d) Be compatible with the plant and animal species of the area.

353.250. (e) Meet the requirements of applicable Utah and federal seed, poisonous and noxious plant; and introduced species laws or regulations.

353.300. Vegetative Cover Exceptions

DOGM may grant exception to the requirements of R645-301-353.220 and R645-301-353.230 when the species are necessary to achieve a quick-growing, temporary, stabilizing cover, and measures to establish permanent vegetation are included in the approved permit and reclamation plan.

353.400. Cropland Exceptions

When the approved postmining land use is cropland, DOGM may grant exceptions to the requirements of R645-301-353.110, R645-301-353.130, R645-301-353.220 and R645-301-353.230.

354. **TIMING OF REVEGETATION**

Disturbed areas will be planted during the first normal period for favorable planting conditions after replacement of the plant-growth medium. The normal period for favorable planting is that planting time generally accepted locally for the type of plant materials selected (see section 341.100, Reclamation Timetable).

355. **MULCHING & OTHER SOIL STABILIZING PRACTICES FOR REVEGETATION**

Suitable mulch and other soil stabilizing practices will be used on all areas that have been re-graded and covered by topsoil or topsoil substitutes (see section 340, RECLAMATION PLAN).

356. **STANDARDS FOR REVEGETATION SUCCESS**

356.100. Success Criteria

Success of revegetation will be judged on the effectiveness of the vegetation for the approved postmining land use, the extent of cover compared to the extent of cover of the reference area or other approved success standard, and the general requirements of R645-301-353.

356.110. Vegetation Information Guidelines

Standards for success, statistically valid sampling techniques for measuring success, and approved methods are identified in the DOGM's "Vegetation Information Guidelines, Appendix A." The approved techniques in that document will be used for ~~the Coal Hollow Project measuring reclamation success. As stated above, the reclaimed plant communities at the site will be diverse, permanent, capable of stabilizing the soil surface for erosion, and will be compatible with the postmining land use.~~ The reclaimed areas will

be compared to the reference areas identified on Drawing 3-1. ~~Methods to be employed to determine that the standards have been met follow:~~ GPS coordinates in UTM NAD 27 are provided on Drawing 3-1 to assist in navigation to each reference location.

Cover _____ Ocular methods by meter square quadrats.

Shrub Density _____ Point quarter method and/or belt transects

Frequency _____ Relative number of times that it occurred in the square meter quadrats.

Production _____ Total annual biomass production will be estimated by clipping, drying and weighing current annual growth. Herbaceous and woody species will be summarized separately. "Double sampling" using four quadrats will be estimated around the clipped plots.

Diversity _____ Diversity will be measured by several methods. The average number of vascular species per meter square quadrat will be obtained by summing the frequency of all species in an area and dividing by 100.

Another diversity measurement will be species richness or simply the total number of species encountered in the quadrats for each area.

Finally, total diversity will be measured by using the MacArthur and Wilson's (1967) formula where the proportion of the sum frequency of each species of an area was calculated. The proportion of each species will be squared and the values for all species in the area are to be summed. This index integrates the number of species encountered and the degree to which frequency of occurrence is equitably distributed among these species. The formula is given below:

$$\text{Total Diversity} = \frac{1}{\sum P_i^2}$$

where,

P_i = the proportion of the sum frequency for a community contributed by the i^{th} species.

356.120. Revegetation Success Standards

Standards for revegetation success will include comparisons of unmined lands (reference areas), or other success standards approved by the Division, with the areas

being reclaimed to evaluate ~~the appropriate vegetation parameters of~~ ground cover, production, or stocking. Ground cover, production, or stocking will be considered equal to the approved success standard when they are not less than 90 percent of the success standard. The sampling techniques for measuring success will use a 90-percent statistical confidence interval (i.e., one-sided test with a 0.10 alpha error).

The standards recommended for revegetation success at the Coal Hollow Mine are the result of consultations and collaborations with DWR, DOGM, ACD, consulting biologists and the private landowners of the mine area. The landowners generally prefer that their land be returned to vegetation with the primary focus on grazing for domestic livestock. Some, but not all, of the landowners are not opposed to re-seeding with some plant species, both woody and herbaceous, that could also benefit wildlife habitat (see Chapter 4). The rationale for the success standards is that those areas reclaimed to include woody and herbaceous plants to enhance wildlife will model ecological secondary succession and the dynamics that follow reestablishment of plant communities that have been severely disturbed by forces such as floods, wildfires, severe winds or man-caused disturbances like surface mining. With that concept in mind, the consensus for the standards for future revegetation success along with the postmining land uses for the Coal Hollow Lease and the North Lease Area are summarized on the table below.

Revegetation success standards and postmining land uses at the Coal Hollow Mine, Utah

COAL HOLLOW LEASE

<u>RECLAIMED AREA</u>	<u>TOTAL LIVING COVER</u>	<u>WOODY SPECIES DENSITY</u>	<u>PRODUCTION</u>	<u>DIVERSITY</u>
<u>Sagebrush/Grass</u> ⁽⁶⁾	<u>Sagebrush/Grass Reference Area</u>	<u>10% of the total value in the Sagebrush/Grass Reference Area</u> ⁽¹⁾	<u>Sagebrush/Grass Reference Area</u>	<u>Forbs</u> ⁽²⁾ - must be at least equal to the Sagebrush/Grass Reference Area. <u>Grasses</u> ⁽³⁾ - must be at least equal to the Sagebrush/Grass Reference Area.
<u>Pasture Land</u> ⁽⁷⁾	<u>64.50%</u> ⁽⁵⁾	<u>No woody species density standard</u>	<u>1,100 lbs/ac</u> ⁽⁸⁾	<u>A minimum of 3 native perennial grasses must be present with a frequency value of at least 20%.</u>
<u>Pinyon-Juniper</u> ⁽⁶⁾	<u>Pinyon-Juniper Reference Area</u> ⁽⁴⁾	<u>10% of the total value in the Pinyon-Juniper Reference Area</u> ⁽¹⁾	<u>Pinyon-Juniper Reference Area</u>	<u>Forbs</u> ⁽²⁾ - must be at least equal to the Pinyon-Juniper Reference Area. <u>Grasses</u> ⁽³⁾ - must be at least equal to the Pinyon-Juniper Reference Area.
<u>Meadow</u> ⁽⁶⁾	<u>Meadow Reference Area</u>	<u>10% of the total value in the Meadow Reference Area</u> ⁽¹⁾	<u>Meadow Reference Area</u>	<u>Forbs</u> ⁽²⁾ - must be at least equal to the Meadow Reference Area. <u>Grasses</u> ⁽³⁾ - must be at least equal to the Meadow Reference Area
<u>Oak Brush</u> ⁽⁶⁾	<u>Oak Brush Reference Area</u>	<u>10% of the total value in the Oak Brush Reference Area</u> ⁽¹⁾	<u>Oak Brush Reference Area</u>	<u>Forbs</u> ⁽²⁾ - must be at least equal to the Oak Brush Reference Area. <u>Grasses</u> ⁽³⁾ - must be at least equal to the Oak Brush Reference Area.
<u>Meadow (Dry)</u> ⁽⁶⁾	<u>Meadow (Dry) Reference Area</u>	<u>10% of the total value in the Meadow (Dry) Reference Area</u> ⁽¹⁾	<u>Meadow (Dry) Reference Area</u>	<u>Forbs</u> ⁽²⁾ - must be at least equal to the Meadow (Dry) Reference Area <u>Grasses</u> ⁽³⁾ - must be at least equal to the Meadow (Dry) Reference Area.

NORTH PRIVATE LEASE

<u>Pasture Land</u> ⁽⁷⁾	<u>64.50%</u> ⁽⁵⁾	<u>No woody species density standard</u>	<u>1,100 lbs/ac</u> ⁽⁸⁾	<u>A minimum of 3 native perennial grasses must be present with a frequency value of at least 20%.</u>
<u>Sagebrush Drainage</u> ⁽⁷⁾ <u>Sagebrush within the incised channels west of Kanab Creek channel (i.e. Sample Site: V-07)</u>	<u>Sagebrush Drainage Reference Area (Sample Site: V-03)</u>	<u>10% of the total value Sagebrush Drainage Reference Area</u> ⁽¹⁾ <u>(Sample Site: V-03)</u>	<u>Sagebrush Drainage Reference Area (Sample Site: V-03)</u>	<u>Forbs</u> ⁽²⁾ - must be at least equal to the Sagebrush Drainage Reference Area ⁽¹⁾ (Sample Site: V-03). <u>Grasses</u> ⁽³⁾ - must be at least equal to the Sagebrush Drainage Reference Area.
<u>Wetlands</u> ⁽⁷⁾	<u>U.S. Army COE standards</u>	<u>U.S. Army COE standards</u>	<u>U.S. Army COE standards</u>	<u>U.S. Army COE standards</u>

⁽¹⁾ Can include shrubs and subshrubs. Rabbitbrush (*Chrysothamnus nauseosus*) cannot account for more than 10% of the total density.

⁽²⁾ Recommended index: MacArthur=s Diversity Index for forbs.

⁽³⁾ Recommended index: MacArthur=s Diversity Index for grasses.

⁽⁴⁾ Total living cover includes overstory and understory combined.

⁽⁵⁾ This is the average total living cover measured for all Pasture Lands sampled (see Appendix 3-4 and Volume 12 for Pasture Land cover data).

⁽⁶⁾ Postmining land use is primarily domestic grazing with limited wildlife use.

⁽⁷⁾ Postmining Land use is domestic grazing.

⁽⁸⁾ Refer to Volume 12, Table 43 for production information.

(2) Recommended index: MacArthur=s Diversity Index for forbs.

(3) Recommended index: MacArthur=s Diversity Index for grasses.

(4) Total living cover includes overstory and understory combined.

(7) Postmining Land use is domestic grazing

356.200. Postmining Land Use

Standards for success will be applied in accordance with the approved postmining land uses (see Chapter 4 [Exhibit 4-1](#)).

356.210. Grazing or Pasture Land

~~Some areas will be~~ Areas to be reclaimed as pasture and grazing land (see *Vegetation Map, Drawing 3-1 and Volume 12, Vegetation Map 1*). ~~For these and other areas determined by the landowners,~~ the ground cover and production of living plants on the revegetated area will be at least equal to that of a reference area or other success standards approved by DOGM.

356.220. Cropland

For areas developed for use as cropland, crop production on the revegetated area will be at least equal to that of a reference area or such other success standards approved by DOGM. The requirements of R645-302-310 through R645-302-317 apply to areas identified as prime farmland. ~~(no areas have been identified as prime farmland in the Coal Hollow Project Area).~~

356.221. Wetlands

Portions of the North Private Lease supports wetland communities, some of which could be disturbed by proposed mining in that area. ~~For revegetation success standards of these communities, refer to Volume 12: Supplemental Report section of the MRP in the report called: *Vegetation & Wildlife Habitat of the North Private Lease Area, Coal Hollow Project Kane County, Utah (November 2014)*.~~

356.230. Wildlife Habitat

Several areas will be returned to wildlife habitat. For these areas success of vegetation will be determined on the basis of tree and shrub stocking and vegetative ground cover (see also section 356.100, Success Criteria).

356.231. Consultation & Approval

~~Minimum stocking and planting arrangements will be specified by DOGM on the basis of local and regional conditions and after consultation with and approval by Utah agencies responsible for the administration of forestry and wildlife programs. Consultation and approval will be on a permit specific basis. In 2016, ACD consulted with the DOGM and Utah Division of Wildlife and all parties agreed a shrub (and half-shrub) stocking density of 10% compared to the reference site would be adequate success measures for stocking density. See consultation letter, Appendix 10.~~

356.232. Woody Species Success Criteria

Trees and shrubs that will be used in determining the success of stocking and the adequacy of plant arrangement will have utility for the approved postmining land use. At the time of bond release, such trees and shrubs will be healthy, and at least 80 percent will have been in place for at least 60 percent of the applicable minimum period of responsibility. No trees and shrubs in place for less than two growing seasons will be counted in determining stocking adequacy.

356.233. General Vegetative Cover

Vegetative ground cover will not be less than that required to achieve the approved postmining land use.

356.240. Industrial, Commercial or Residential Success Criteria

~~For areas to be developed for industrial, commercial, or residential use less than two years after regrading is completed, the vegetative ground cover will not be less than that required to control erosion. At this time, n~~No areas have been proposed to be reclaimed as industrial, commercial or residential for the Coal Hollow Project or the North Private Lease.

356.250. Previous Disturbed Areas Success Criteria

~~For areas previously disturbed by mining that were not reclaimed to the requirements of R645-200 through R645-203 and R645-301 through R645-302 and that are re-mined or otherwise redisturbed by coal mining and reclamation operations, at a minimum, the vegetative ground cover will be not less than the ground cover existing before redisturbance and will be adequate to control erosion.~~ Other than those lands where the native plant communities have been disturbed for rangeland improvements or pasture lands, no areas would be considered “previously disturbed” in the project area.

356.300. Sediment Control Structures

Siltation structures will be maintained until removal is authorized by the DOGM and the disturbed area has been stabilized and revegetated. In no case will the structure be removed sooner than two years after the last augmented seeding.

356.400. Removal of Sediment Control Structures

When a siltation structure is removed, the land on which the siltation structure was located will be revegetated in accordance with the reclamation plan and R645-301-353 through R645-301-357.

357. REVEGETATION RESPONSIBILITY PERIODS

357.100. Beginning Date

The period of extended responsibility for successful vegetation will begin after the last year of augmented seeding, fertilization, irrigation, or other work, excluding husbandry practices that are approved by DOGM in accordance with ~~paragraph~~ R645-301-357.300.

357.200. Duration

Vegetation parameters identified in R645-301-356.200 will equal or exceed the approved success standard during the growing seasons for the last two years of the responsibility period. The period of extended responsibility will continue for five or ten years based on precipitation data reported pursuant to R645-301-724.411 ~~based on~~ and the following conditions.

357.210. (a). In areas of more than 26.0 inches average annual precipitation, the period of responsibility will continue for a period of not less than five full years.

357.220. (b). In areas of 26.0 inches or less average annual precipitation, the period of responsibility will continue for a period of not less than ten full years.

357.300. Husbandry Practices

357.301. Approval Information

DOGM may approve certain selective husbandry practices without lengthening the extended responsibility period. Practices that may be approved are identified in R645-301-357.310 *through* R645-301-357.365. The operator may propose to use additional practices, but they would need to be approved as part of the Utah Program in accordance with 30 CFR 732.17. Any practices used will first be incorporated into the mining and reclamation plan and approved in writing by DOGM. Approved practices are normal conservation practices for unmined lands within the region which have land uses similar to the approved postmining land use of the disturbed area. Approved practices may continue as part of the postmining land use, but discontinuance of the practices after the end of the bond liability period will not jeopardize permanent revegetation success. Augmented seeding, fertilization, or irrigation will not be approved without extending the period of responsibility for revegetation success and bond liability for the areas affected by said activities and in accordance with R645-301-820.330.

357.302. Demonstration of Appropriate Reclamation Techniques

The Coal Hollow Project will demonstrate that husbandry practices proposed for a reclaimed area are not necessitated by inadequate grading practices, adverse soil conditions, or poor reclamation procedures.

357.303. Bonded Area & Husbandry Practices

DOGM will consider the entire area that is bonded within the same increment, as defined in R645-301- 820.110, when calculating the extent of area that may be treated by husbandry practices.

357.304. Separate Responsibility Periods

If it is necessary to seed or plant in excess of the limits set forth under R645-301-357.300, DOGM may allow a separate extended responsibility period for these reseeded or replanted areas in accordance with R645-301-820.330.

357.310. Reestablishing Trees and Shrubs

357.311. Planting Within the Responsibility Period

Trees or shrubs may be replanted or reseeded at a rate of up to a cumulative total of 20% of the required stocking rate through 40% of the extended responsibility period.

357.312. **Planting Shrubs in Established Vegetation** If shrubs are to be established by seed in areas of established vegetation, small areas will be scalped (see section 341.220, Planting & Seeding Methods). The number of shrubs to be counted toward the tree and shrub density standard for success from each scalped area will be limited to one.

357.320. Weed Control and Associated Revegetation

Weed control through chemical, mechanical, and biological means discussed in R645-301-357.321 *through* R645-301-357.323 may be conducted through the entire extended responsibility period for noxious weeds and through the first 20% of the responsibility period for other weeds.

Any revegetation necessitated by the following weed control methods will be performed according to the seeding and transplanting parameters set forth in R645-301-357.324.

357.321. Chemical Weed Control

Weed control through chemical means will follow the current Weed Control Handbook (published annually or biannually by the Utah State University Cooperative Extension Service) and herbicide labels.

Weed surveys will also be conducted on the reclaimed areas on a yearly basis or during the revegetation monitoring studies. If undesirable, exotic or “weedy” plant species are present at a density that they could impede revegetation or out-compete desirable plant species, a certified or trained specialist will spray ~~herbacide~~herbicide, kill or remove the weeds mechanically (see below).

357.322. Mechanical Weed Control

Mechanical practices that may be approved include hand roguing, grubbing and mowing.

357.323. Biological Weed Control

Selective grazing by domestic livestock may be used by the Coal Hollow Project. Biological control of weeds through disease, insects, or other biological weed control agents is allowed but will be approved on a case-by-case basis by DOGM, and other

appropriate agency or agencies which have the authority to regulate the introduction and/or use of biological control agents.

357.324. Weed Control & Desirable Species Damage

Where weed control practices damage desirable vegetation, areas treated to control weeds may be reseeded or replanted according to the following limitations. Up to a cumulative total of 15% of a reclaimed area may be reseeded or replanted during the first 20% of the extended responsibility period without restarting the responsibility period. After the first 20% of the responsibility period, no more than 3% of the reclaimed area may be reseeded in any single year without restarting the responsibility period, and no continuous reseeded area may be larger than one acre. Furthermore, no seeding will be done after the first 60% of the responsibility period or Phase II bond release, whichever comes first. Any seeding outside these parameters will be considered to be "augmentative seeding," and will restart the extended responsibility period.

357.330. Control of Other Pests

357.331. Big Game

Control of big game (deer, elk, moose, antelope) may be used only during the first 60% of the extended responsibility period or until Phase II bond release, whichever comes first. Any methods used will first be approved by DOGM and, as appropriate, the land management agency and the State of Utah Division of Wildlife Resources (DWR). Methods that may be used include fencing and other barriers, repellents, scaring, shooting, and trapping and relocation. Trapping and special hunts or shooting will be approved by DWR. Other control techniques may be allowed but will be considered on a case-by-case basis by the DOGM and by DWR. Appendix C of the DOGM's "Vegetation Information Guidelines" includes a non-exhaustive list of publications containing big game control methods.

357.332. Small Mammal & Insects

Control of small mammals and insects will be approved on a case-by-case basis by DWR and/or the Utah Department of Agriculture. The recommendations of these agencies will also be approved by the appropriate land management agency or agencies. Small mammal control will be allowed only during the first 60% of the extended responsibility period or until Phase II bond release, whichever comes first.

Insect control will be allowed through the entire extended responsibility period if it is determined, through consultation with the Utah Department of Agriculture or Cooperative Extension Service, that a specific practice is being performed on adjacent unmined lands.

357.340. Natural Disasters and Illegal Activities Occurring After Phase II Bond Release

~~Where necessitated by a natural disaster, excluding climatic variation, or illegal activities, such as vandalism, not caused by any lack of planning, design, or implementation of the mining and reclamation plan on the part of the Coal Hollow Project, the seeding and planting of the entire area which is significantly affected by the disaster or illegal activities will be allowed as an accepted husbandry practice and thus will not restart the extended responsibility period. Appendix C of the Division's "Vegetation Information Guidelines" references publications that show methods used to revegetate damaged land. Examples of natural disasters that may necessitate reseeding which will not restart the extended responsibility period include wildfires, earthquakes, and mass movements originating outside the disturbed area.~~

357.341. Extent of Area

~~The extent of the area where seeding and planting will be allowed will be determined by the DOGM in cooperation with the Coal Hollow Project.~~

357.342. Standards of Success

~~All applicable revegetation success standards will be achieved on areas reseeded following a disaster, including R645-301-356.232 for areas with a designated postmining land use of forestry or wildlife.~~

357.343. Seeding & Planting in Phase II Areas

~~Seeding and planting after natural disasters or illegal activities will only be allowed in areas where Phase II bond release has been granted.~~

357.350. Irrigation

~~The irrigation of transplanted trees and shrubs, but not of general areas, is allowed by DOGM through the first 20% of the extended responsibility period. Irrigation may be by such methods as, but not limited to, drip irrigation, hand watering, or sprinkling.~~

357.360. Highly Erodible Area and Rill and Gully Repair

~~The repair of highly erodible areas and rills and gullies will not be considered an augmentative practice, and will thus not restart the extended responsibility period, if the affected area as defined in R645-301-357.363 comprises no more than 15% of the~~

~~disturbed area for the first 20% of the extended responsibility period and if no continuous area to be repaired is larger than one acre.~~

~~357.361. Highly Erodible Areas Responsibility Period~~

~~After the first 20% of the extended responsibility period but prior to the end of the first 60% of the responsibility period or until Phase II bond release, whichever comes first, highly erodible area and rill and gully repair will be considered augmentative, and will thus restart the responsibility period, if the area to be repaired is greater than 3% of the total disturbed area or if a continuous area is larger than one acre.~~

~~357.362. Extent of Area Affected~~

~~The extent of the affected area will be determined by the DOGM in cooperation with the Coal Hollow Project [ACD](#).~~

~~357.363. Definition of Highly Erodible Areas~~

~~The area affected by the repair of highly erodible areas and rills and gullies is defined as any area that is reseeded as a result of the repair. Also included in the affected areas are interspatial areas of thirty feet or less between repaired rills and gullies. Highly erodible areas are those areas which cannot usually be stabilized by ordinary conservation treatments and if left untreated can cause severe erosion or sediment damage.~~

~~357.364. Erodible Areas & Sediment Control~~

~~The repair and/or treatment of rills and gullies which result from a deficient surface water control or grading plan, as defined by the recurrence of rills and gullies, will be considered an augmentative practice and will thus restart the extended responsibility period.~~

357.365. Erodible Area Designs & Repairs

~~The Coal Hollow Project shall demonstrate by specific plans and designs the methods to be used for the treatment of highly erodible areas and rills and gullies. These will be based on a combination of treatments recommended in the Soil Conservation Service Critical Area Planting recommendations, literature recommendations including those found in Appendix C of the Division's "Vegetation Information Guidelines", and other successful practices used at other reclamation sites in the State of Utah. Any treatment practices used will be approved by the Division.~~

358. PROTECTION OF FISH, WILDLIFE AND RELATED ENVIRONMENTAL VALUES

~~The Coal Hollow Project will, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts on fish, wildlife, and related environmental values and will achieve enhancement of such resources where practicable.~~

358.100. Threatened & Endangered Species

~~A review of the Utah Heritage Program database for sensitive species in the proposed mine site and adjacent areas has been accomplished. Field maps with locations of these species have been prepared and have been used for additional surveys and will continue to be used in future biological studies or when disturbance by mining in specific areas is proposed.~~

~~Due to the sensitivity of these species, specific location information is considered confidential and has not been submitted in this application. However, review of this information can be arranged by the regulatory authorities (see section 322.200, Site-Specific Resource Information).~~

~~No coal mining and reclamation operation will be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Secretary or which is likely to result in the destruction or adverse modification of designated critical habitats of such species in violation of the Endangered Species Act of 1973. The Coal~~

~~Hollow Project will promptly report to the DOGM any state or federally listed endangered or threatened species within the permit area of which the operator becomes aware. Upon notification, DOGM will consult with appropriate state and federal fish and wildlife agencies and, after consultation, will identify whether, and under what conditions, the operator may proceed.~~

~~358.200. Eagles~~

~~The coal mining and reclamation operations at the Coal Hollow Project will not be conducted in a manner which would result in the unlawful taking of a bald or golden eagle, its nest, or any of its eggs. The operator of the Coal Hollow Project will promptly report to the DOGM any golden or bald eagle nest within the permit area of which the operator becomes aware. Upon notification, the DOGM will consult with the U.S. Fish and Wildlife Service (USFWS) and DWR and, after consultation, will identify whether, and under what conditions, the mining operations may proceed.~~

~~358.300. Removal of a Threatened & Endangered Species~~

~~No regulations in the R645 Rules authorizes the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973 or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq.~~

~~358.400. Riparian & Wetland Areas~~

There are some riparian and wetland areas associated with springs and seeps in the Coal Hollow ~~permit~~ Lease area. These areas include ~~(including~~ the 85.88-acre Dame Lease IBC area) (see Chapter 7). The habitat in the vicinity of springs SP-8, SP-14, SP-20, SP-22, and SP-40, and wells C4, C2, C3, C5, and Y-61 will be protected through the use of highwall mining techniques in the 85.88-acre Dame Lease IBC. Unlike coal mining using conventional mine pit surface mining techniques (utilized elsewhere at the Coal Hollow Mine), mining using highwall mining techniques does not result in disturbance to the land surface above coal extraction areas (the coal is extracted through a series of excavated horizontal holes, with sufficient coal left in place between holes to fully support the overlying land surface). The highwall mining plan for the 85.88-acre Dame Lease IBC, including the spacing and dimensions of the excavated holes, has been engineered to prevent subsidence of the land surface. The highwall mining will occur in the Smirl coal seam, which is separated from overlying shallow alluvial groundwater systems by a thickness of soft, low-permeability Tropic Shale bedrock. The presence of the Tropic Shale bedrock between the coal seam and the

overlying alluvium minimizes the potential for downward migration of alluvial groundwaters into the excavated coal holes. Accordingly, impacts to water quantity in the overlying and adjacent shallow alluvial groundwater systems are not anticipated (Appendix 7-14). Similarly, as no surface disturbance is anticipated over highwall mined areas, impacts to water quality in the overlying alluvial groundwater systems are not anticipated. For these reasons, impacts to ecosystems in and around the monitoring sites mentioned above are not anticipated and the habitat will be protected.

In the event that diminution of discharge rates from seeps and springs does occur as a consequence of mining and reclamation activities, any lost water will be replaced according to all applicable Utah State laws and regulations using the water replacement source specified in R645-301-727. The quantity and quality of replacement water detailed in R645-301-727 will be suitable for the existing premining uses and approved postmining land uses. The methodology for restoring possible diminution of discharge from a spring would include piping from ACD's current water replacement well to the approximate location of the impacted water source. Implementation will occur after consultation with all parties (DOGM, ACD and Richard Dame).

Vegetation will be monitored in the 85.88 acre Dame Lease by monitoring the existing meadow reference transect and one additional random transects within the lease area. Monitoring will begin with the first appropriate season and will continue until the first appropriate season following highwall mining within the Dame lease.

There are also some riparian and wetland areas associated with the North Private Lease (refer to [Volumes 10 and 12 Appendix 3-9 and 404 Permit SPK-2001-01248](#):

~~Additionally, the coal mining and reclamation operations at the Coal Hollow Project will avoid disturbances to, enhance where practicable, or restore, habitats of unusually high value for fish and wildlife (see Section 333, Procedures to Minimize Adverse Impacts to Fish & Wildlife in this document).~~

358.500. Best Technology Available

~~The Coal Hollow Project~~ ACD will apply the best technology currently available in all disciplines of the coal mining and reclamation activities.

358.510. Powerline & Transmission Facilities

~~The Coal Hollow Project~~ ACD will ensure that electric powerlines and other transmission facilities used for, or incidental to, coal mining and reclamation operations on the permit area are designed and constructed to minimize electrocution hazards to raptors, except where DOGM determines that such requirements are unnecessary.

358.520. Fences & Conveyers

~~The Coal Hollow Project~~ ACD will design fences, overland conveyers, and other potential barriers to permit passage for large mammals, except where the DOGM determines that such requirements are unnecessary.

358.530. Toxic-Forming Areas

~~The Coal Hollow Project~~ ACD has no plans for ponds that contain hazardous concentrations of toxic-forming materials.

Woodland Planning Worksheet

5-May-05

USDA - NRCS

Field Sheet for Determining Yields on Woodlands

Cooperator: P/T reference site

Ecological Site Name: _____

1/4 Section ____ Section ____ T ____ R ____

Planner: Zac Orton

Plot Size: _____

Worksheet Number: _____

Plot Shape: Rectangle ___; circle ___; Square ___;

Date: 7-28-16

Zigzag

Site Index: _____

Tree Species: Pinon & Juniper

Tree Species: _____

1	2	3	4	5	6	7	8	9	10	11
No.	Distance Between Trees	Tree Height	Age of Tree	DBH Taken at 1 ft. 4.5 ft.	Average Crown Width	Foliage Density	Basal Area	Volume in Cords	Number of Posts	Pounds Airdry
1	18	18		8"	5'					H
2	4	7		3"	2'					H
3	9	15		6"	8'					H
4	21	17		8"	3'					H
5	8	17		6"	6'					H
6	2	20		10"	7'					H
7	20	8		8"	4'					H
8	7	7		3"	2'					H
9	30	3		2"	1'					H
10	4	9		3"	4'					H
11	8	25'		24"	15'					H
12	4	5		2"	2"					P
13	20	10'		6"	7'					H
14	12	15'		6"	4'					H
15	22	15'		12"	10'					H
16	50'	4'		1"	2'					P
17	10'	4'		2"	2'					J
18	25'	8'		4"	5'					P
19	10'	7'		5"	4'					H
20	24'	1'		1"	1'					J
Total	304									
Aver.	15.2									
Total /Acre	188									

1	2	3	4	5	6	7	8	9	10	11
No.	Distance Between Trees	Tree Height	Age of Tree	DBH Taken at 1 ft. 4.5 ft.	Average Crown Width	Foliage Density	Basal Area	Volume in Cords	Number of Posts	Pounds Airdry
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
Total										
Aver.										
Total /Acre										

Volume in Cords per Acre	
Volume in Cords per Acre per Year	
Number of Posts per Acre	
Estimated Number of Posts per Acre per Year	
Reproduction on plot under 4 1/2 feet	
% Under 4 1/2 feet of Crown	

Volume in Cords per Acre	
Volume in Cords per Acre per Year	
Number of Posts per Acre	
Estimated Number of Posts per Acre per Year	
Reproduction on plot under 4 1/2 feet	
% Under 4 1/2 feet of Crown	

APPENDIX 3-11

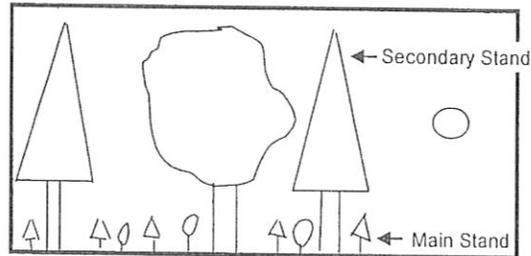
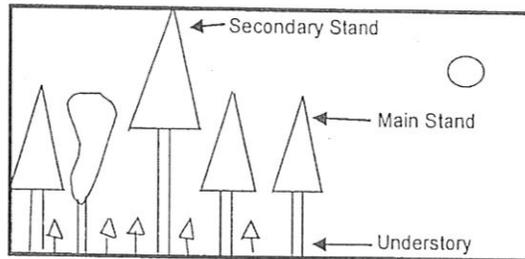
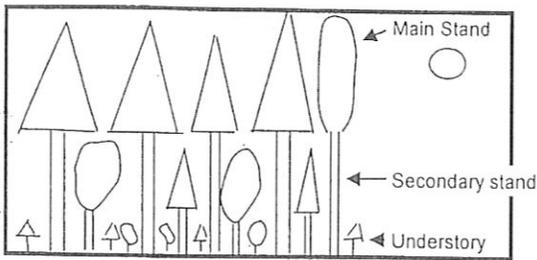
2016 NRCS Range Site Evaluations

APPENDIX 3-11

2016 NRCS Range Site Evaluations

Type of Stand

Select the type of stand that is being inventoried
Place a mark in the appropriate circle



Columns

- 2- Measure the distance between trees and record to the nearest 1/10 foot.
- 3- Measure height of tree and record to the nearest 1/2 foot
- 4- Get ages of enough trees in the transect to get average age of each stand and the age spread of the community
- 5- Measure the diameter of each tree and record to the nearest 1/10 inch. For Junipre and Pinion this measurement is taken at 1 foot from the ground. For all other trees this measurement is taken 4/5 feet from the ground (=Breast Height). Mark at top of column where measurement was taken.
- 6- Measure the average crown spread of each tree and record it to the nearest 1/2 foot. If the trees are not uniform in shape, measure the tree in two directions at right angles to each other and determine the average
- 7- Determine whether the foliage is Dense; Medium; or Sparce and record D; M or S for each tree.
- 8- Get the Basal area from the Woodland Management book page W-117.
- 9- Get the Volume in Cords from the Woodland Management book page W-113
- 10- Record the number of posts that can be taken from each tree. Posts should be at least 8 ft. long and 3 inches minium top diameter and reasonably straight.
- 11- Look up pounds of air dry production on yield tables.

Plot Sizes

Zigzag -	Number of trees per acre = $43560 / \text{The average tree spacing squared. Example } 43560 / (12 \times 12) = 303 \text{ trees per acre}$
Rectangle -	$1000 \text{ ft.} \times 4 \text{ ft. } 4 \frac{1}{4} \text{ inches} = 1/10 \text{ ac.}$ $500 \text{ ft.} \times 4 \text{ ft. } 4 \frac{1}{4} \text{ inches} = 1/20 \text{ ac.}$
Square -	$66 \text{ ft.} \times 66 \text{ ft.} = 1/10 \text{ ac.}$ $20 \text{ ft. } 1 \frac{1}{2} \text{ in.} \times 20 \text{ ft. } 1 \frac{1}{2} \text{ in.} = 1/100 \text{ ac.}$
Circular -	Radius of circle = 11.78 ft. = 1/100 ac. Radius of circle = 37.23 ft. = 1/10 ac.

Worksheet # Sagebrush/grass Pasture _____
 Ecological Site _____ Ranch/Landowner Mine
 Rangeland Management Specialist: Zac Orton Date: 7-28-16

1	2	3	4	5	6	7	8	9	10	11																																																								
Plant Group	Plant Name or Symbol	Green Wt. lbs/ac	% Dry Wt	Lbs/ac Dry Wt	Reconstruction Factor	Reconstructed Dry Wt lbs/ac	Lbs/ac Forage	Proper Use Factor	Lbs/ac Climax (from ESD)	Lbs/ac Allowable for Similarity Index	circle one: CLIPPED or OCULAR ESTIMATE																																																							
Grasses and grass likes	<u>Needle Thread</u>	<u>30</u>									LOCATION Section: _____ Township: _____ Range: _____ MLRA: _____ Office: _____ Soil: _____ Slope: _____ Exposure: _____ Elev. _____ GPS Coordinates NAD83: N: _____ E: _____ (P)% of Normal Production: _____ APPARENT TREND Circle One: Rangeland or Planned <table border="1"> <tr> <th>Indicators</th> <th>+</th> <th>0</th> <th>-</th> </tr> <tr> <td>Plant Vigor</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Reproduction</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Composition Change</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Litter & Mulch</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Soil Surface Cond</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>App Trend:</td> <td>UP</td> <td>N/A</td> <td>DOWN</td> </tr> </table> GROUND COVER <table border="1"> <tr> <th>100 points dot count</th> <th>1st Raindrop Impact</th> <th>Sub Canopy</th> </tr> <tr> <td>Bare</td> <td><u>34</u></td> <td></td> </tr> <tr> <td>Rock</td> <td></td> <td></td> </tr> <tr> <td>Bio Crust</td> <td></td> <td></td> </tr> <tr> <td>Litter</td> <td><u>6</u></td> <td></td> </tr> <tr> <td>Grass</td> <td><u>10</u></td> <td></td> </tr> <tr> <td>Forb</td> <td><u>2</u></td> <td></td> </tr> <tr> <td>Shrub</td> <td><u>44</u></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> </tr> </table>	Indicators	+	0	-	Plant Vigor			X	Reproduction		X		Composition Change			X	Litter & Mulch		X		Soil Surface Cond		X		App Trend:	UP	N/A	DOWN	100 points dot count	1st Raindrop Impact	Sub Canopy	Bare	<u>34</u>		Rock			Bio Crust			Litter	<u>6</u>		Grass	<u>10</u>		Forb	<u>2</u>		Shrub	<u>44</u>		Total		
	Indicators	+	0	-																																																														
	Plant Vigor			X																																																														
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Forb	<u>2</u>																																																																	
Shrub	<u>44</u>																																																																	
Total																																																																		
	<u>Fescue</u>	<u>120</u>																																																																
	<u>wire grass</u>	<u>30</u>																																																																
	<u>cheatgrass</u>	<u>10</u>																																																																
Forbs																																																																		
Shrubs	<u>Sage brush</u>	<u>3500</u>																																																																
	<u>Rabbit brush</u>	<u>500</u>																																																																
	<u>Sage wood</u>	<u>100</u>																																																																
		<u>100</u>																																																																
TOTALS		100%																																																																

(15) Similarity Index ((12/14) * 100) (14) Production for this site from ESD (13) Total Annual Production (8) Total Forage Production (12) Total allowable lbs

Notes: SB = weight unit = 25g production x 14 units x 10 = 3500 good reference
 Fescue = weight unit = 3g production x 4 units x 10 = 120 good maybe high
 - Note: ~~grass~~ cover could be as high as 50.
 Shrub

Worksheet # Meadow - wet

Pasture _____

Ecological Site _____

Ranch/Landowner _____

Rangeland Management Specialist: Joe Orton

Date: 7-28-16

1	2	3	4	5	6	7	8	9	10	11																																																								
Plant Group	Plant Name or Symbol	Green Wt. lbs/ac	% Dry Wt	Lbs/ac Dry Wt	Reconstruction Factor	Reconstructed Dry Wt lbs/ac	lbs/ac Forage	Proper Use Factor	lbs/ac Climax (from ESD)	lbs/ac Allowable for Similarity Index																																																								
Grasses and grass likes	<u>Kent. Blue</u>	<u>2,000</u>									<p>circle one: CLIPPED or OCULAR ESTIMATE</p> <p>LOCATION</p> <p>Section: _____ Township: _____ Range: _____ MLRA: _____ Office: _____ Soil: _____ Slope: _____ Exposure: _____ Elev. _____ GPS Coordinates NAD83: N: _____ E: _____ (P)% of Normal Production: _____</p> <p>APPARENT TREND</p> <p>Circle One: Rangeland or Planned</p> <table border="1"> <tr> <th>Indicators</th> <th>+</th> <th>0</th> <th>-</th> </tr> <tr> <td>Plant Vigor</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Reproduction</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Composition Change</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Litter & Mulch</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Soil Surface Cond</td> <td></td> <td></td> <td></td> </tr> <tr> <td>App Trend:</td> <td>UP</td> <td>N/A</td> <td>DOWN</td> </tr> </table> <p>GROUND COVER</p> <table border="1"> <tr> <th>100 points dot count</th> <th>1st Raindrop Impact</th> <th>Sub Canopy</th> </tr> <tr> <td>Bare</td> <td></td> <td></td> </tr> <tr> <td>Rock</td> <td></td> <td></td> </tr> <tr> <td>Bio Crust</td> <td></td> <td></td> </tr> <tr> <td>Litter</td> <td></td> <td></td> </tr> <tr> <td>Grass</td> <td></td> <td></td> </tr> <tr> <td>Forb</td> <td></td> <td></td> </tr> <tr> <td>Shrub</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> </tr> </table> <p>USE HISTORY</p> <p>Kind and Class of Animal: _____ Season of Use: _____ Burning History: _____ Present Utilization: _____ % of Key Species Key Species: _____ Estimate Harvest Efficiency: _____ %</p> <p>LANDSCAPE DATA</p> <p>Topography (Terrain): Broken: ___ Rolling: ___ Flat: ___ Miles to food: ___ cover: ___ water: ___</p>	Indicators	+	0	-	Plant Vigor				Reproduction				Composition Change				Litter & Mulch				Soil Surface Cond				App Trend:	UP	N/A	DOWN	100 points dot count	1st Raindrop Impact	Sub Canopy	Bare			Rock			Bio Crust			Litter			Grass			Forb			Shrub			Total		
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Shrub																																																																		
Total																																																																		
	<u>Roughs</u>	<u>500</u>																																																																
	<u>Sedges</u>	<u>580</u>																																																																
Forbs	<u>Sunflower</u>	<u>100</u>																																																																
	<u>Bull Thistle</u>	<u>10</u>																																																																
	<u>Other Forbs</u>	<u>100</u>																																																																
Shrubs	<u>None</u>																																																																	
TOTALS		100%																																																																

(15) Similarity Index ((12/14) * 100) (14) Production for this site from ESD (13) Total Annual Production (8) Total Forage Production (12) Total lbs allowable

Notes: Folbed in half hoop = 154g x 20 = 3,080 - good estimate
- Meadow area. No sense in doing transect. Dense grass meadow

Worksheet # Meadow-dry Pasture _____
 Ecological Site _____ Ranch/Landowner Mint
 Rangeland Management Specialist: Zac Orton Date: 7-28-16

1	2	3	4	5	6	7	8	9	10	11	
Plant Group	Plant Name or Symbol	Green Wt. lbs/ac	% Dry Wt	Lbs/ac Dry Wt	Reconstruction Factor	Reconstructed Dry Wt lbs/ac	Lbs/ac Forage	Proper Use Factor	Lbs/ac Climax (from ESD)	Lbs/ac Allowable for Similarity Index	
Grasses and grass likes	<u>kuhn</u>	<u>300</u>									circle one: <u>CLIPPED</u> or OCULAR ESTIMATE LOCATION Section: _____ Township: _____ Range: _____ MLRA: _____ Office: _____ Soil: _____ Slope: _____ Exposure: _____ Elev. _____ GPS Coordinates NAD83: N: _____ E: _____ (P)% of Normal Production: _____ APPARENT TREND Circle One: Rangeland or Planned Indicators + 0 - Plant Vigor _____ Reproduction _____ Composition Change _____ Litter & Mulch _____ Soil Surface Cond _____ App Trend: UP N/A DOWN GROUND COVER 100 points dot count 1st Raindrop Impact Sub Canopy Bare _____ Rock _____ Bio Crust _____ Litter _____ Grass _____ Forb _____ Shrub _____ Total _____ USE HISTORY Kind and Class of Animal: _____ Season of Use: _____ Burning History: _____ Present Utilization: _____ % of Key Species Key Species: _____ Estimate Harvest Efficiency: _____ % LANDSCAPE DATA Topography(Terrain): Broken: _____ Rolling: _____ Flat: _____ Miles to food: _____ cover: _____ water: _____
	<u>sedal</u>	<u>250</u>									
	<u>Kent Blue</u>	<u>50</u>									
Forbs	<u>Yarrow</u>	<u>10</u>									Indicators + 0 - Plant Vigor _____ Reproduction _____ Composition Change _____ Litter & Mulch _____ Soil Surface Cond _____ App Trend: UP N/A DOWN GROUND COVER 100 points dot count 1st Raindrop Impact Sub Canopy Bare _____ Rock _____ Bio Crust _____ Litter _____ Grass _____ Forb _____ Shrub _____ Total _____ USE HISTORY Kind and Class of Animal: _____ Season of Use: _____ Burning History: _____ Present Utilization: _____ % of Key Species Key Species: _____ Estimate Harvest Efficiency: _____ % LANDSCAPE DATA Topography(Terrain): Broken: _____ Rolling: _____ Flat: _____ Miles to food: _____ cover: _____ water: _____
	<u>Other forbs</u>	<u>50</u>									
	<u>fruit etc</u>	<u>20</u>									
Shrubs	<u>Yucca brush</u>	<u>20</u>									Indicators + 0 - Plant Vigor _____ Reproduction _____ Composition Change _____ Litter & Mulch _____ Soil Surface Cond _____ App Trend: UP N/A DOWN GROUND COVER 100 points dot count 1st Raindrop Impact Sub Canopy Bare _____ Rock _____ Bio Crust _____ Litter _____ Grass _____ Forb _____ Shrub _____ Total _____ USE HISTORY Kind and Class of Animal: _____ Season of Use: _____ Burning History: _____ Present Utilization: _____ % of Key Species Key Species: _____ Estimate Harvest Efficiency: _____ % LANDSCAPE DATA Topography(Terrain): Broken: _____ Rolling: _____ Flat: _____ Miles to food: _____ cover: _____ water: _____
	<u>Rabbit brush</u>	<u>20</u>									
TOTALS		100%									
(15) Similarity Index ((12/14) * 100)		(14) Production for this site from ESD	(13) Total Annual Production	(8) Total Forage Production	(12) Total allowable						

Notes: half hoop = weight = 30 x 20 = 600 - good estimate - higher is some spots.
little brush species. Encroaching on meadow area

Departure from Expected	Code	Instructions for Evaluation Sheet, Page 2
None to Slight	N-S	(1) Assign 17 indicator ratings. If indicator not present, rate None to Slight.
Slight to Moderate	S-M	(2) In the tree grids below, write the indicator number in the appropriate column for each indicator that is applicable to the attribute.
Moderate	M	(3) Assign overall rating for each attribute based on preponderance of evidence.
Moderate to Extreme	M-E	(4) Justify each attribute rating in writing.
Extreme to Total	E-T	

Indicator	Rating	Comments
1. Rills	S H N-S	
2. Water-flow Patterns	S H N-S	
3. Pedestals and/or Terracettes	S H N-S	
4. Bare ground <u>< 15%</u>	S H N-S	
5. Gullies	S H N-S	
6. Wind-scoured, blowouts, and/or deposition areas	S N-S	
7. Litter movement	S N-S	
8. Soil Surface resistance to erosion	S H B N-S	
9. Soil Surface loss or degradation	S H B N-S	
10. Plant community composition and distribution relative to infiltration	H N-S	
11. Compaction layer	S H B N-S	
12. Functional/structural groups	B N-S	Some Rabbit brush / sage encroaching
13. Plant mortality/decadence	B N-S	
14. Litter amount	H B N-S	
15. Annual production	B N-S	
16. Invasive plants	B N-S	Some Rabbit brush / sage encroaching
17. Reproductive capability of perennial plants	B N-S	

E-T	M-E	M	S-M	N-S	

S (10 indicators):
Soil & Site Stability
Rating: _____

E-T	M-E	M	S-M	N-S	

H (10 indicators):
Hydric Function
Rating: _____

E-T	M-E	M	S-M	N-S	

B (10 indicators):
Biotic Integrity
Rating: _____

Note: Overall N-S departure from ESD. Good reference site for dry meadow. Some rabbit brush encroaching.

Worksheet # V-03-(50)

Pasture _____

Ecological Site _____

Ranch/Landowner Mine

Rangeland Management Specialist: Zac Orton

Date: 2-28-16

1	2	3	4	5	6	7	8	9	10	11																																																								
Plant Group	Plant Name or Symbol	Green Wt. lbs/ac	% Dry Wt	Lbs/ac Dry Wt	Reconstruction Factor	Reconstructed Dry Wt lbs/ac	lbs/ac Forage	Proper Use Factor	lbs/ac Climax (from ESD)	lbs/ac Allowable for Similarity Index	circle one: CLIPPED or OCULAR ESTIMATE																																																							
Grasses and grass likes	<u>Crooked</u>	<u>50</u>									LOCATION Section: _____ Township: _____ Range: _____ MLRA: _____ Office: _____ Soil: _____ Slope: _____ Exposure: _____ Elev. _____ GPS Coordinates NAD83: N: _____ E: _____ (P)% of Normal Production: _____ APPARENT TREND Circle One: Rangeland or Planned <table border="1"> <tr> <th>Indicators</th> <th>+</th> <th>0</th> <th>-</th> </tr> <tr> <td>Plant Vigor</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Reproduction</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Composition Change</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Litter & Mulch</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Soil Surface Cond</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>App Trend:</td> <td>UP</td> <td>N/A</td> <td>DOWN</td> </tr> </table> GROUND COVER <table border="1"> <tr> <th>100 points dot count</th> <th>1st Raindrop Impact</th> <th>Sub Canopy</th> </tr> <tr> <td>Bare</td> <td></td> <td></td> </tr> <tr> <td>Rock</td> <td></td> <td></td> </tr> <tr> <td>Bio Crust</td> <td></td> <td></td> </tr> <tr> <td>Litter</td> <td></td> <td></td> </tr> <tr> <td>Grass</td> <td></td> <td></td> </tr> <tr> <td>Forb</td> <td></td> <td></td> </tr> <tr> <td>Shrub</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> </tr> </table>	Indicators	+	0	-	Plant Vigor		X		Reproduction		X		Composition Change		X		Litter & Mulch		X		Soil Surface Cond		X		App Trend:	UP	N/A	DOWN	100 points dot count	1st Raindrop Impact	Sub Canopy	Bare			Rock			Bio Crust			Litter			Grass			Forb			Shrub			Total		
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Shrub																																																																		
Total																																																																		
	<u>Kent. Blue</u>	<u>50</u>																																																																
	<u>Fescue</u>	<u>50</u>																																																																
	<u>Brome</u>	<u>20</u>																																																																
Forbs																																																																		
Shrubs	<u>Sagebrush (black)</u>	<u>1000</u>									USE HISTORY Kind and Class of Animal: _____ Season of Use: _____ Burning History: _____ Present Utilization: _____ % of Key Species Key Species: _____ Estimate Harvest Efficiency: _____ % LANDSCAPE DATA Topography(Terrain): Broken:___ Rolling:___ Flat:___ Miles to food:___ cover:___ water:___																																																							
	<u>Wingwing</u>	<u>500</u>																																																																
	<u>Rabbit brush</u>	<u>100</u>																																																																
TOTALS		100%																																																																

(15) Similarity Index ((12/14) * 100)

(14) Production for this site from ESD

(13) Total Annual Production

(8) Total Forage Production

(12) Total allowable lbs

Notes: Ocular estimated. GPS point was a small section. Not enough to do a transect. more grass species & production than other SB site & less sage.

Worksheet # U-06-wet

Pasture _____

Ecological Site _____

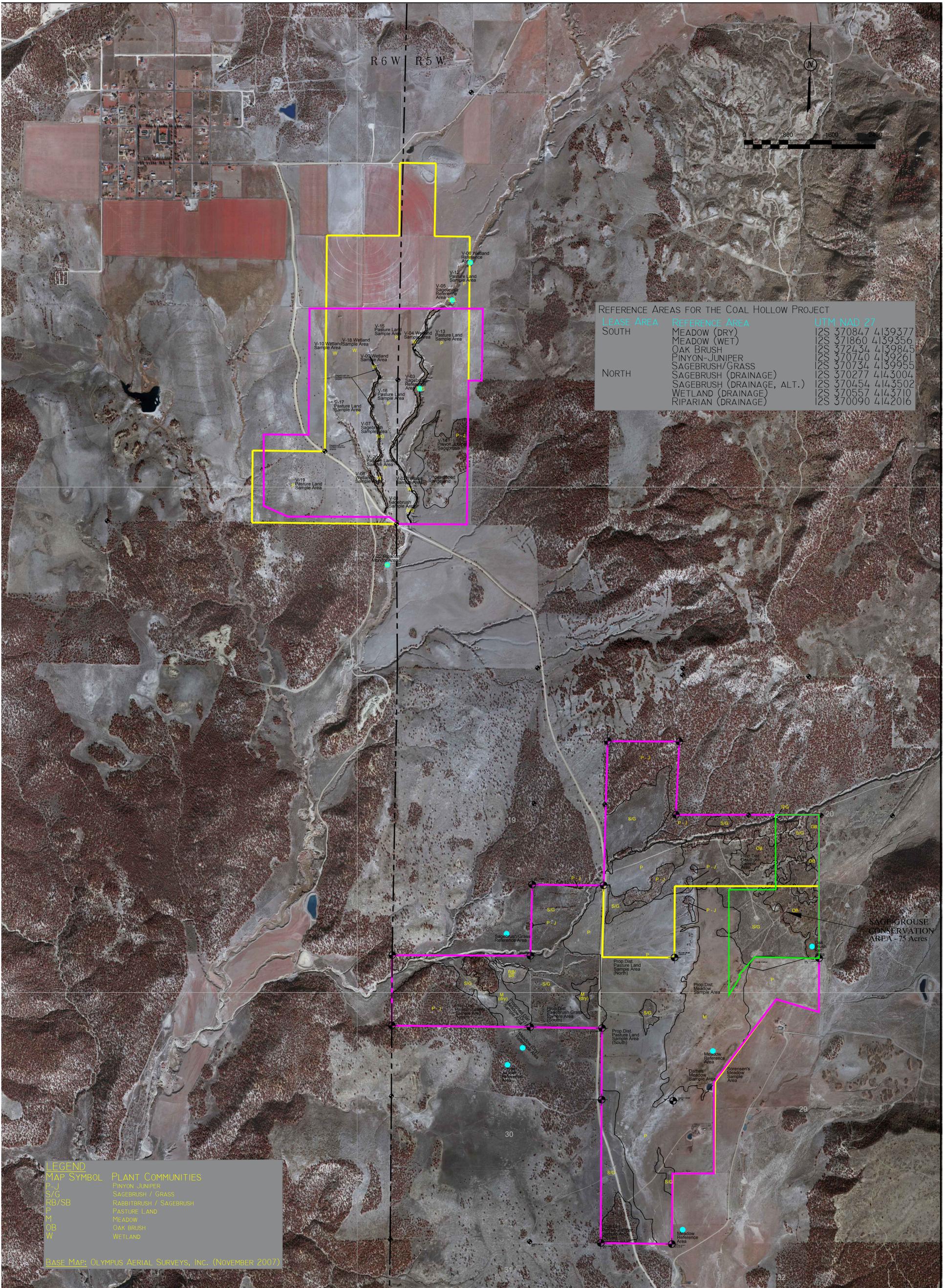
Ranch/Landowner Mine

Rangeland Management Specialist: Zac Orton

Date: 7-28-16

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Grasses and grass likes	<u>Western Wheat</u>	<u>1500</u>									LOCATION Section: _____ Township: _____ Range: _____ MLRA: _____ Office: _____ Soil: _____ Slope: _____ Exposure: _____ Elev. _____ GPS Coordinates NAD83: N: _____ E: _____ (P)% of Normal Production: _____ APPARENT TREND Circle One: Rangeland or Planned <table border="1"> <tr> <th>Indicators</th> <th>+</th> <th>0</th> <th>-</th> </tr> <tr> <td>Plant Vigor</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Reproduction</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Composition Change</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Litter & Mulch</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Soil Surface Cond</td> <td></td> <td></td> <td></td> </tr> <tr> <td>App Trend:</td> <td>UP</td> <td>N/A</td> <td>DOWN</td> </tr> </table> GROUND COVER <table border="1"> <tr> <th>100 points dot count</th> <th>1st Raindrop Impact</th> <th>Sub Canopy</th> </tr> <tr> <td>Bare</td> <td></td> <td></td> </tr> <tr> <td>Rock</td> <td></td> <td></td> </tr> <tr> <td>Bio Crust</td> <td></td> <td></td> </tr> <tr> <td>Litter</td> <td></td> <td></td> </tr> <tr> <td>Grass</td> <td></td> <td></td> </tr> <tr> <td>Forb</td> <td></td> <td></td> </tr> <tr> <td>Shrub</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> </tr> </table>	Indicators	+	0	-	Plant Vigor				Reproduction				Composition Change				Litter & Mulch				Soil Surface Cond				App Trend:	UP	N/A	DOWN	100 points dot count	1st Raindrop Impact	Sub Canopy	Bare			Rock			Bio Crust			Litter			Grass			Forb			Shrub			Total		
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Forb																																																																		
Shrub																																																																		
Total																																																																		
	<u>Kentucky Blue</u>	<u>100</u>																																																																
	<u>Bunch</u>	<u>200</u>																																																																
	<u>Sedge</u>	<u>200</u>																																																																
Forbs	<u>Forbs</u>	<u>10</u>																																																																
Shrubs	<u>Rabbit brush</u>	<u>50</u>																																																																
	<u>Passion olive</u>	<u>200</u>																																																																
	<u>Willow</u>	<u>100</u>																																																																
TOTALS		100%																																																																
(15) Similarity Index ((12/14) * 100)		(14) Production for this site from ESD	(13) Total Annual Production	(8) Total Forage Production	(12) Total allowable																																																													

Notes: Grass load = 104 x 20 = 2,080 lbs/ac
Encroaching FB on this site.



REFERENCE AREAS FOR THE COAL HOLLOW PROJECT

LEASE AREA	REFERENCE AREA	UTM NAD 27
SOUTH	MEADOW (DRY)	12S 370847 4139377
	MEADOW (WET)	12S 371860 4139356
	OAK BRUSH	12S 372434 4139845
	PINYON-JUNIPER	12S 370740 4139261
NORTH	SAGEBRUSH/GRASS	12S 370734 4139955
	SAGEBRUSH (DRAINAGE)	12S 370277 4143004
	SAGEBRUSH (DRAINAGE, ALT.)	12S 370454 4143502
	WETLAND (DRAINAGE)	12S 370557 4143710
	RIPARIAN (DRAINAGE)	12S 370090 4142016

LEGEND

MAP SYMBOL	PLANT COMMUNITIES
P-J	PINYON JUNIPER
S/G	SAGEBRUSH / GRASS
RB/SB	RABBITBRUSH / SAGEBRUSH
P	PASTURE LAND
M	MEADOW
OB	OAK BRUSH
W	WETLAND

BASE MAP: OLYMPUS AERIAL SURVEYS, INC. (NOVEMBER 2007)

LEGEND:

	PERMIT AREA
	PRIVATE COAL
	FOUND SECTION CORNER
	FOUND PROPERTY CORNER
	REFERENCE AREA

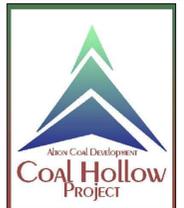
DRAWN BY: K.NICHOLS	CHECKED BY: LWJ
DRAWING: 3-1	DATE: 8/22/16
JOB NUMBER:	SCALE: 1" = 800'
	SHEET

REVISIONS	
DATE:	BY:
09/30/16	KN
10/12/16	KN

VEGETATION MAP

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 3-1



463 North 100 West, Suite 1
Cedar City, Utah 84721
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CHAPTER 4

R645-301-400. LAND USE

410. REGIONAL LAND USE

Land use and agricultural production in the Coal Hollow Project region centers around livestock production. Rangeland use for cattle grazing is the predominant land use in the area, but the land is also used as watershed, recreational hunting, and wildlife habitat.

The majority of the land in the current Coal Hollow Mine area is classified as unimproved rangeland. Some farming is done within the surrounding lands but crop choice and production levels are severely restricted by climate, soil, and water availability. Alton and Sink Valley incur frequent early spring frost conditions as a result of cold air drainage into these low-lying valleys. These conditions and the resultant short growing season restrict crop choice to the more hardy wheat and small grain crops and alfalfa hay.

The North Private Lease area, located less than a mile from the current Coal Hollow Mine permit, consists mostly of rangelands that have been converted to pasture lands. Although there are differences in the vegetation between pastures due to management practices, seed mixtures planted and soils, the pasture lands are primarily dominated by grass species. Additionally, in the North Private Lease there is also a fair amount of land that has been converted to croplands, most of which lie outside the area to be mined. Although crops can vary from year-to-year due to rotation practices, the most common crops raised are alfalfa, wheat and silage crops. Like the current mine area, there are other areas that support native, relatively undisturbed, plant communities (or undeveloped rangelands). These areas consist of pinyon-juniper, sagebrush and mountain brush communities -- including transitional zones between these types. Finally, there are also drainage channels that dissect the North Private Lease area. Some of these channels support riparian and wetland communities along with native upland plant communities adjacent to them.

411. ENVIRONMENTAL DESCRIPTION

The Coal Hollow Project area lies within elevations 6,840 feet and 7,000 feet above sea level. It incorporates valley floors and hills, and is cradled between the Dixie National Forest. Climate is largely determined by local topography and the location of the area relative to the principal sources of moisture, the Pacific Ocean and the Gulf of Mexico. The existence of barriers between southern Utah and these moisture sources produces the dry temperature climate for which this area is renowned. A weather station was constructed in the summer of 2005 to monitor monthly precipitation, temperature, wind direction and speed; it is shown in Photographs 4-1 and 4-2.

Winter season Pacific storms reaching the Utah area must first cross the Sierra Nevada and Cascade Ranges to the west. Lifting of the air masses during storm passage over

these barriers result in the majority of the moisture in the air condensing and falling out as precipitation. Thus, air mass reaching southern Utah from the west is generally dry and the associated precipitation is light. A similar barrier to moisture from the Gulf of Mexico can be found in the Rocky Mountains east of southeast Utah. During the summer, moist air masses do move into the southern part of Utah from the Gulf of California. Precipitation usually falls as thundershowers associated with these air masses. Precipitation for the area generally averages 16 inches per year. Temperature varies from a mean maximum temperature of 92 degrees Fahrenheit during the summer months to a mean minimum temperature of 18 degrees during the winter months. Maximum snow depths average about 12” but usually melt fairly rapidly.

The predominant wind direction of south-central Utah ranges from southwest through west, with secondary peaks from the southeast and northwest. Surface winds near the permit area average about eight miles per hour. Higher wind speeds are usually associated with the passage of frontal systems or thunderstorms, generally during the springtime.

411.100 Premining Land Use Information

The premining use of the land within the permit boundaries is grazing and wildlife habitat. Rangeland use for cattle grazing is the predominant land use in the Alton area. Together with lands too steep or unproductive for cattle grazing, these two land types account for 90% of land uses.

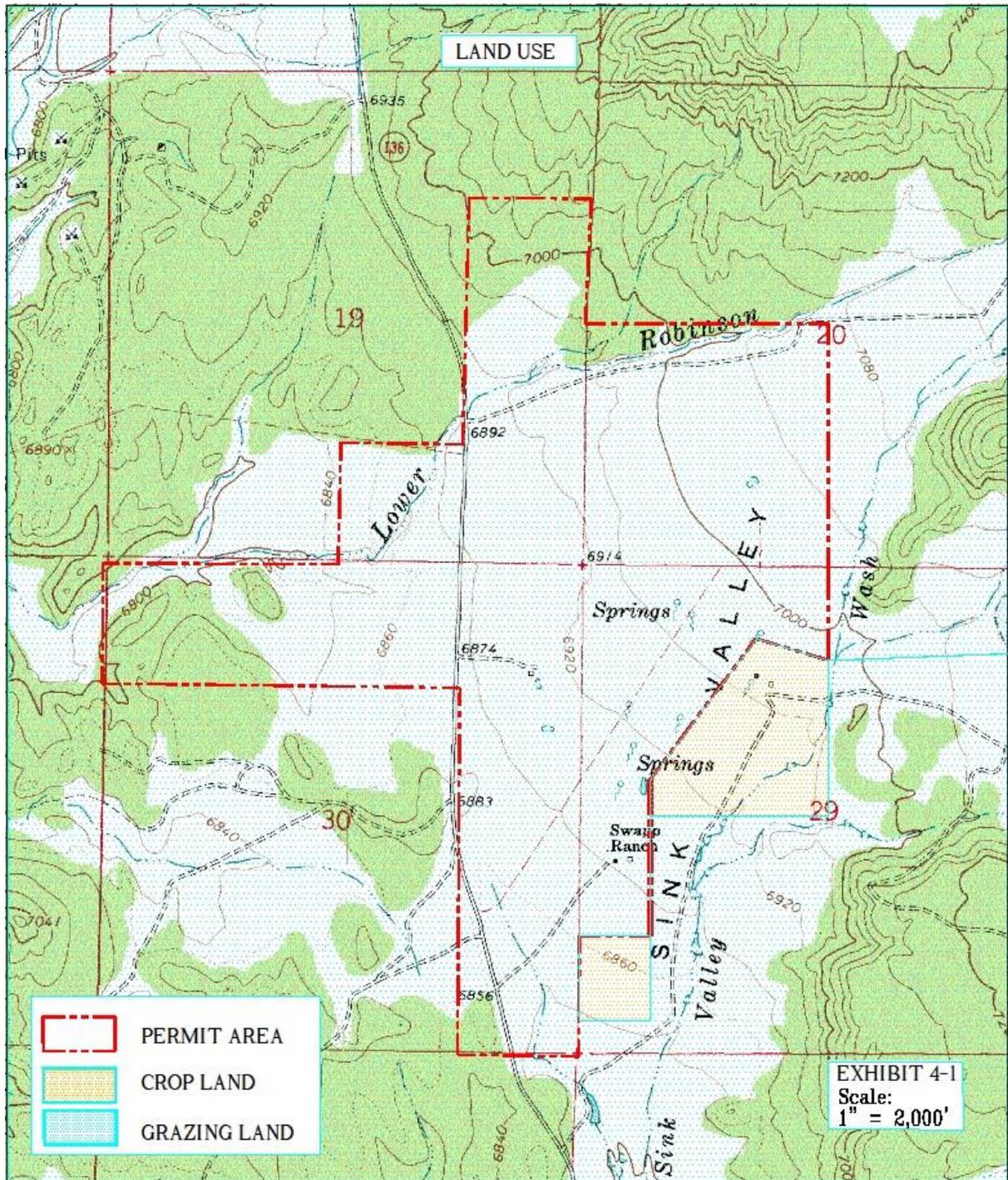
The land within the permit area consists of managed and unmanaged expanses of rolling to steep pinyon-juniper, sagebrush, mountain brush, meadows, wetlands, riparian zones and pasture lands. Some horse and cattle grazing occurs within the pasture land, but is limited due to the short growing season.

Agricultural crop production is sustained on some land east of the current permit area. 85% to 90% of this crop is not harvested, but is used for cattle grazing. Croplands located north of the permit area and south of the town of Alton (i.e. the North Private Lease) are devoted to hay, wheat and silage production for on-ranch winter cattle feed. Exhibit 4-1 and 4-2 reflect land use within and around the permit areas. Photographs 4-3 and 4-4 show actual layout of cropland and grazing land.

Wildlife habitats within the current mine area are reflected on Drawings 3-2 *through* 3-5. Wildlife habitats for the North Private Lease area are shown on Wildlife Maps 1 *through* 4 in [VOLUME 12 Appendix 3-9 \(Supplemental Report: Vegetation & Wildlife Habitat of the North Private Lease Area\)](#). Black bear, Rocky Mountain elk, mule deer, and greater sage-grouse are some of the wildlife species that use the lands within the permit area. Land use maps of the current Coal Hollow Mine area and North Private Lease have been provided below.

After reclamation, the mining area [and borrow area](#) will be restored to support uses it was capable of supporting prior to mining. Vegetation will be restored to provide habitat and a

food source for wildlife. Access roads, fence lines, and supporting structures will be reconstructed pursuant to the wishes of the surface landowners.



Acreage of crop land under production:

Sorensen: 90 acres (approximate)
 Johnson: None currently
 Dame: None currently
 Pugh: None currently

Insert Exhibit 4-2

Utility Corridors and Other Right-of-Ways

Kane County maintains a county road, County Road 136, which runs north-south through the western part of the permit areas. This is reflected on Drawing 1-1. Alton Coal Development, under the direction and in corporation with Kane County, plans to temporarily relocate County Road 136 east while mining operations commence to the west. This is reflected on Drawing 5-1 and 5-45. After mining is completed below the now existing road bed, the county road will be moved to its original location and constructed as required by Kane County Road Department.

411.110 Surface Land Status/Mine Plan Area

Ownership of the surface rights within and contiguous to the mine plan and permit area is shown on Drawing 1-3. The surface within the permit area is privately owned and leased by Alton Coal Development, LLC. The contiguous lands, outside the permit area, are administered by Bureau of Land Management, along with other private owners, as reflected on Drawing 1-3.

Alton Coal Development believes that the mining of the permit area will enhance the postmining use of the land. Some gullies and rills will be eliminated. Drainages will be enhanced allowing a better use of land. Wildlife habitat will benefit from the planting and reclamation of lands for that purpose. Reclamation will be constructed to the final landform shown on Drawings 5-375 and 5-37A6 for the current mine and borrow areas. Reclamation will be constructed to the final landform shown on Drawing 5-74 and 5-75 for the North Private Lease. The alternative highwall mining will reduce surface disturbance. Mining disturbance to the surface will be reduced along with reclamation needs. Surface areas that will not be affected by any mining will remain in the existing pre-mining state.

411.120 Land Capability

The Coal Hollow Project area has several land uses ranging from wildlife habitat to pasture land. Vegetative cover and productivity of the plant communities in the current mine area are shown in Chapter 3 (sections 321.100 *through* 321.200). Vegetative cover and productivity estimates for the North Private Lease are shown in Tables 1 *through* 43 of ~~VOLUME 12 Appendix 3-9 (Supplemental Report: Vegetation & Wildlife Habitat of the North Private Lease Area)~~. Soil resources information of the permit area is provided in Chapter 2 (sections 222.100 *through* 222.400). Soils information for the North Private Lease can be found in VOLUME 11 (Supplemental Report: *Order 2 Soil Survey for the Proposed North Private Lease Expansion of the Coal Hollow Mine*). Topography of the area is described in several chapters, but specifically in Chapter 6. Current hydrologic conditions of the permit and adjacent areas to the project are provided in Chapter 7.

411.130 Existing Land Uses/Land Use Classifications

Kane County has zoned the area within the permit boundaries and surrounding area as Agriculture.

411.140 Cultural and Historic Resource Information

CURRENT COAL HOLLOW MINE AREA

The current Coal Hollow Mine Area has seen a number of cultural resource inventories and associated projects over the years that have been completed for coal mining and related exploration activities. The first inventory was completed in 1977 by K.K. Pelli under state project number U77-KA-0258b. The project covered a portion of the current Coal Hollow Mine area with no cultural sites reported (Pierson & Pierson 1977).

Table 4-1. Cultural resource projects completed within the current Coal Hollow Mine area

Project Name	Project Number	Author & Year
Cultural Resource Management Investigations in Kane and Carbon Counties for Proposed Coal Leasing on Federal Lands	U77-KA-0258b	Pierson & Pierson 1977
An Archaeological Survey of Proposed Drill Holes, Access Roads and a Sample Test Pit in the Alton Coal Field	U79-NI-0406b	Dosh 1979
An Archaeological Survey and Evaluation of 7325 Acres in the Alton Leasehold, Kane County, Utah	U81-NI-0254b	Halbirt & Gualtieri 1981
Archaeological Survey of 23 Proposed Drill Holes and Access Roads in the Alton Coal Field, Kane County, Utah	U85-NI-0587b	Keller 1985
Archaeological Investigations, Utah International, San Francisco Alton Coal Field Project, Bureau of Land Management Land, Cedar City District, and Private Land, Kane County, Utah	U86-NI-0297b,p	Weaver 1986a
An Archaeological Survey of Auger Borings and Backhoe Test Pits for Utah International, Inc., Alton Coal Field, Kane County, Utah	U87-NI-0856b	Weaver & Hurley 1987
Cultural Resource Inventory of the Coal Hollow Project Coal Seam Drill Sites in the Alton Amphitheater, Kane County, Utah.	U05-MQ-0346b,p	Thornton & Montgomery 2005
Cultural Resource Inventory of Alton Coal Development's Sink Valley-Alton Amphitheater Project Area, Kane County, Utah.	U05-MQ-1567	Stavish 2006
Cultural Resource Inventory of Alton Coal Development's Project Area, Kane County, Utah	U05-MQ-1568b,p	Stavish 2007a
Data Recovery and Research Design for Sites 42KA2068, 42KA6104, 42KA6105, 42KA6106, 42KA6107, and 42KA6108, Kane County, Utah	N/A	Stavish 2007b
Cultural Resource Inventory of Alton Coal Development's Additional Survey of 440 Acres in the Alton Coal Amphitheater, Kane County, Utah	U08-MQ-0539	Stavish 2008a
Data Recovery Plan and Research Design for Site 42KA2044, Kane County, Utah	N/A	Stavish 2008b
Archaeological Data Recovery at Sites 42KA2042, 42KA2044, 42KA2068, 42KA6104, 42KA6105, 42KA6106, 42KA6107, and 42KA6108, Kane County, Utah	U10-MQ-0504(e)	Stavish 2010
Alton Coal Development's Phase I Cultural Resources Treatment Plan for Data Recovery at 42KA6093 and 42KA6505, and Avoidance at 42KA1313, 42KA2041, 42KA2043, 42KA6109, 42KA6110, and 42KA6126, Kane County, Utah	N/A	Clark & Creer 2010
Alton Coal Development's Coal Hollow Mine Project Phase I: Data Recovery Report for 42KA2060 and 42KA6093, Kane County, Utah	U10-ST-0886p(e)	Clark 2011

Treatment Plan for the Portion of 42KA2041 Located on the Coal Hollow Mine	N/A	Cannon & Fenner 2013
Preliminary Report on the Phase I Testing of a Portion of Site 42KA2041, Kane County, Utah	N/A	Gourley 2013
Archaeological Testing of a Portion of Site 42KA2041 within the Coal Hollow Mine in the South Private Lease Area, Kane County, Utah	U13-HO-0650p,(e)	Gourley 2016

In 1979 MNA completed an inventory of 31 exploratory drill holes, 19 access corridors, and a test pit location within the Alton Coal Field under state project number U79-NI-0406. Two of these exploratory sites were located within the current Coal Hollow Mine project area. No cultural sites were reported for those locations (Dosh 1979).

In 1979-1980, MNA completed a survey covering all of the current Coal Hollow Mine project area under state project number U81-NI-0254b. Results of the inventory included documentation of five eligible prehistoric sites (42KA2041-42KA2044 & 42KA2060) and one eligible prehistoric/historic site (42KA2068) within the project area with one additional eligible prehistoric/historic site (42KA2058) recorded immediately adjacent to the mine (Halbirt & Gualtieri 1981).

In 1985, MNA completed a survey of 23 exploratory drill holes and associated access corridors within the Alton Coal Field under state project number U85-NI-0587b. One of these drill holes was within the current Coal Hollow Mine project area. No cultural sites were reported for that location (Keller 1985).

MNA completed another inventory in 1986 for 43 exploratory drill holes and associated access corridors as part of the Alton Coal Project under state project number U86-NI-0297. Six of these exploratory sites were within the current Coal Hollow Mine project area. No cultural sites were reported for those locations (Weaver 1986).

The following year, in 1987, MNA completed another inventory of 22 exploratory auger bores and 27 backhoe test pits within the Alton Coal Field under state project number U87-NI-0856b. Two of these exploratory sites were within the current Coal Hollow Mine project area. No cultural sites were reported for those locations (Weaver & Hurley 1987).

In June and July of 2005, Montgomery Archaeological Consultants, Inc. (MOAC) conducted a cultural resource inventory for Alton Coal Development, LLC that covered most of the permit area totaling approximately 433 acres of private property under state project number U05-MQ-1567p. The additional 85.88 acres of surface, Dame Property (plot 9-5-29-2), added as part of this permit will not be impacted by operations and will not be affected by mining (See Drawing 1-3). This inventory resulted in the identification and documentation of seven new eligible prehistoric sites (42KA6104-42KA6109 & 42KA6126) within the current Coal Hollow Mine area, and updating the recording on five eligible previously recorded prehistoric sites (42KA1313, 42KA2041-42KA2044 & 42KA2068). One additional new eligible prehistoric site (42KA6110) was documented immediately adjacent to the mine (Stavish 2006).

In August 2005, exploration activities resumed with an inventory of six drill sites within the current Coal Hollow Mine project area by MOAC under state project number U05-MQ-0346b,p. No cultural sites were reported for those locations (Thornton & Montgomery 2005).

Later that same year, MOAC completed yet another inventory in 2005 that covered a portion of the current Coal Hollow Mine project area under state project number U05-MQ-1568b,p. One eligible previously recorded historic/prehistoric site (42KA2058) was present just beyond the mine project area and an updated recording was completed (Stavish 2007a).

In 2008, MOAC completed an inventory that covered a portion of the current Coal Hollow Mine project area under state project number U08-MQ-0539. One eligible previously recorded prehistoric site (42KA2060/42KA6505) was present within the mine project area and an updated recording was completed (Stavish 2008a).

Mitigation of adverse effects has been carried out on 11 of the sites within the current Coal Hollow Mine project area through development of several archaeological treatment plans ~~and one additional site will have mitigation work completed inside the borrow area as part of the mine reclamation portion of the project.~~ The first eight sites (42KA2042, 42KA2044, 42KA2068 & 42KA6104-42KA6108) were mitigated in 2010 under two separate treatment plans developed by MOAC (Stavish 2007b & Stavish 2008b) and reported on in 2010 (Stavish 2010). This was followed by mitigation work on two sites (42KA2060 & 42KA6093) in 2010 under a treatment plan developed by SWCA (Clark & Creer 2010) and reported on in 2011 (Clark 2011). A portion of another one other site ~~Finally, one additional site~~ (42KA2041) had limited mitigation work carried out on it in 2013 under a treatment plan prepared by SWCA in 2013 (Cannon & Fenner 2013). Reporting on this site included a preliminary letter report (Gourley 2013) and for this site has been produced (Gourley 2013) and a final report is forthcoming in 2016 (Gourley 2016a). Finally, one additional site (42KA2043) will have mitigation work carried out inside the borrow area as part of the mine reclamation work was recommended Eligible for the National Record of Historic Places (NRHP) in a 2005 re-inventory report. A treatment plan for this site has been prepared by Bighorn (Gourley 2016b), and will be followed by mitigation fieldwork and reporting. In a letter dated July 19, 2016 DOGM with concurrence of SHPO, determined No Historic Properties Affected with regard to site 42KA2043. Therefore, as per the treatment plan, only site 42KA1313 will be barricaded and monitored to prevent adverse effect when the Pit 10 borrow plan is implemented. ~~An additional six-five~~ eligible cultural sites within the current Coal Hollow Mine area and two immediately adjacent to the mine have been avoided. Should mining designs change and adverse effects be necessitated, then development of an appropriate treatment plan will be completed. All new surface disturbances within the mine area have also been monitored per guidelines set forth in the Cultural Resource Management Plan developed by MOAC (Stavish 2008) and the Cultural Resource Discovery Plan developed by SWCA (Bollong & Johnson 2010).

Insert Exhibit 4-3

NORTH PRIVATE LEASE AREA

Six cultural resource inventories have been conducted within the North Private Lease area. The first such project was completed in 1985 by MNA for 23 exploratory drill holes and associated access routes within the Alton Coal Field under state project number U85-NI-0587b. One of these drill holes was within the North Private Lease area. No cultural sites were reported for that location (Keller 1985).

Table 4-2. Cultural resource projects completed within the North Private Lease area

Project Name	Project Number	Author & Year
Archaeological Survey of 23 Proposed Drill Holes and Access Roads in the Alton Coal Field, Kane County, Utah	U85-NI-0587b	Keller 1985
Archaeological Investigations, Utah International, San Francisco Alton Coal Field Project, Bureau of Land Management Land, Cedar City District, and Private Land, Kane County, Utah	U86-NI-0297b,p	Weaver 1986
Alton Coal Project Survey	U86-NI-0487b,s	Keller 1987
Survey and Monitoring, Nine Backhoe Test Pits	U86-NI-0864b	Weaver 1986
Cultural Resource Inventory of Alton Coal Development's Project Area, Kane County, Utah.	U05-MQ-1568b,p	Stavish 2007
A Cultural Resource Inventory of the Alton Town Bypass Route, Kane County, Utah	U11-HO-0623p	Gourley 2011

The following year, in 1986, MNA completed another inventory for 43 exploratory drill holes and associated access corridors as part of the Alton Coal Project under state project number U86-NI-0297. One of these exploratory sites was within the North Private Lease area. No cultural sites were reported for this location (Weaver 1986).

Later that same year, in 1986, MNA completed an inventory that covered most of the North Private Lease area as part of the Alton Coal Project Survey under state project number U86-NI-0487b,s. One eligible prehistoric site (42KA3077) and one eligible prehistoric/historic site (42KA3097) were documented within the North Private Lease area (Keller 1987).

An inventory and monitoring of nine backhoe test pits was also completed by MNA in 1986 under state project number U86-NI-0864b. One of these test pits was within the North Private Lease area. No cultural sites were reported for that location (Weaver 1986).

In June and July of 2005, a cultural resource inventory was conducted by MOAC under state project number U-05-1568-b,p that covered both private and BLM lands. The survey covered all of the North Private Lease and adjacent LBA. Updated documentation was completed for one eligible previously recorded prehistoric site (42KA3077) and for one eligible prehistoric/historic site (42KA3097). One new eligible prehistoric site (42KA6080) was also recorded along the southern edge of lease area within what was originally an expanded boundary for site 42KA3077 (Stavish 2007). Appendix 4-1, Cultural Resource Inventory of Alton Coal Developments Sink Valley-Alton Amphitheater Project Area, Kane County, Utah, reflects maps, photographs, and results of the inventory.

In August 2011, one final inventory was completed by Bighorn Archaeological Consultants, LLC as part of the proposed Alton bypass road under state project number U11-HO-0623p. This survey covered a small portion of the North Private Lease area. Site 42KA3097 was present within the corridor but no updated site recording was required.

Based on these previous inventories, planned mining operations within the North Private Lease area will result in an adverse effect to two eligible cultural sites, 42KA3077 and 42KA3097. One additional site, 42KA6080 is present along the southern edge of the lease area and can be avoided. . A draft data recovery treatment plan discussing testing and avoidance/monitoring methods has been prepared for these three sites (Gourley 2015) and has been included in Appendix 4-7. In this plan it is proposed to complete testing and possibly data recovery excavations on the two sites to be adversely effected by the mining operations (42KA3077 and 42KA3097). The third site (42KA6080) that is to be avoided will include avoidance barricading and monitoring to ensure no adverse effect.

Insert Exhibit 4-4

Procedures for ground disturbing operations form surface and underground mining activities as described in section 521 and 523 and shown on drawing's 5-10 and 5-53 will follow the "Cultural Resources Discovery Plan for the Alton Coal LLC, Coal Hollow Project in Kane County found in Appendix 4-8.

411.141 Cultural and Historic Resources Maps

Cultural and Historic Resource Maps are included in Appendix 4-1 for the Current Coal Hollow Project and Appendix 4-7 for the North Private Lease expansion.

411.141.1 Boundaries of Public Parks

There are no public parks in the permit area. There are known archeological sites as reflected in the Montgomery survey, Appendix 4-1.

411.141.2 Cemeteries Located within 100 feet

No cemeteries exist within the permit area or within 100 feet of the permit area or within any adjacent area subject to potential impacts.

411.141.3 Trails, Wild and Scenic Rivers System

No trails or wild and scenic rivers or study area rivers exist within the permit area or areas of potential impact.

411.142 Coordination with the State Historic Preservation Officer

Coordination with the State Historic Preservation Officer (SHPO) will take place prior to any mining. Clearances will be obtained through SHPO by means of Phase Testing, a data recovery treatment plan, or other appropriate mitigation processes.

CURRENT COAL HOLLOW MINE AREA

DOGM issued a Notice to Proceed with mining activities on a portion of site 42KA2041 on 4 September 2013. This was provided after completion of formal consultation with

PLPCO and SHPO who provided concurrence on such action following Tier I data recovery on the site earlier that year.

NORTH PRIVATE LEASE AREA

DOGM initiated eligibility and effects consultation with SHPO in a letter dated 23 July 2015. On 28 July 2015, SHPO provided their concurrence with DOGM's determination of adverse effects to sites 42KA3077 and 42KA3097 in conjunction with proposed mining activities within the boundaries of the North Private Lease area.

411.142.1 Adverse Impacts on Publicly Owned Parks or Places Listed on the National Register of Historic Places

The Permit area is not within any publicly owned parks and there are no places listed on the National Register of Historic Places within either the current Coal Hollow Mine area or the North Private Lease area, however there are a number of eligible cultural sites within each area that are discussed below.

CURRENT COAL HOLLOW MINE AREA

Mitigation of adverse effects has been carried out on 11 of the sites within the current Coal Hollow Mine project area through development of several archaeological treatment plans. [One additional site inside the borrow area will have mitigation work completed as part of the mine reclamation portion of the project.](#) Eight sites (42KA2042, 42KA2044, 42KA2068 & 42KA6104-42KA6108) were mitigated in 2010 under two separate treatment plans developed by MOAC (Stavish 2007b & Stavish 2008b) and reported on in 2010 (Stavish 2010). This was followed by mitigation work on two sites (42KA2060 & 42KA6093) in 2010 under a treatment plan developed by SWCA (Clark & Creer 2010) and reported on in 2011 (Clark 2011). [Reporting on this site included a preliminary letter report \(Gourley 2013\) and final report in 2016 \(Gourley 2016a\).](#) [Finally, one additional site \(42KA2043\) inside the borrow area will have mitigation work carried out on it as part of the mine reclamation work. A treatment plan for this site has been prepared by Bighorn \(Gourley 2016b\) and will be followed by mitigation fieldwork and reporting.](#) ~~[An additional five Finally, one additional site \(42KA2041\) had limited mitigation work carried out on it in 2013 under a treatment plan prepared by SWCA in 2013 \(Cannon & Fenner 2013\). A preliminary letter report for this site has been produced \(Gourley 2013\) and a final report is forthcoming.](#)~~ ~~[An additional six](#)~~ eligible cultural sites within the current Coal Hollow Mine area and two immediately adjacent to the mine have been avoided. Should mining designs change and adverse effects be necessitated, then development of an appropriate treatment plan will be completed. All new surface disturbances within the mine area have also been monitored by a qualified archaeologist per guidelines set forth in the Cultural Resource Management Plan developed by MOAC (Stavish 2008) and the Cultural Resource Discovery Plan developed by SWCA (Bollong & Johnson 2010).

NORTH PRIVATE LEASE AREA

Utilization of the North Private Lease area will result in an adverse effect on two eligible cultural sites (42KA3077 & 42KA3097). The adverse nature of these effects will be lessened to the maximum extent possible through archeological testing and data recovery.

A third historic property (42KA6080) lies immediately adjacent to the proposed project area and will require barricading and monitoring to avoid impacts during construction related activities. A draft monitoring and treatment plan addressing these effects and mitigation of such effects has been produced. Work outlined in the plan generally includes excavation of a series of 1 x 1 m test pits and possibly mechanical trenches to determine if subsurface deposits and cultural features or use surfaces exist, followed by excavation of features, use surfaces and other cultural remains to address research issues (Gourley 2015).

411.142.2 Valid Existing Rights / Joint Agency Approval

The Permit area is located on privately owned lands; however one eligible cultural site along the southern edge of the North Private Lease area is located on lands administered by the BLM. This site, 42KA6080, is proposed to be avoided and monitored by a qualified archaeologist during project related activities to ensure no adverse effect (Gourley 2015). No additional coordination with the BLM will be required.

411.143 Mining on Historical Resources

CURRENT COAL HOLLOW MINE AREA

Inventories of the Current Coal Hollow Mine area have identified 19 eligible cultural resource sites within and immediately adjacent to the project area. Eleven of these sites have seen mitigation efforts to offset adverse effects through development of a number of archaeological treatment plans. The remaining eight sites have been avoided by project activities and monitored to ensure no adverse effect.

NORTH PRIVATE LEASE AREA

Inventories of the North Private Lease area have resulted in the identification of three eligible cultural sites within and immediately adjacent to the proposed project area. Proposed mining activities will result in an adverse effect to two of these sites while the third site can be avoided. A draft treatment plan has been developed to offset these adverse effects (Gourley 2015). Monitoring of the third site is also proposed to insure no adverse effect.

411.143.1 Collection of Additional Information

Alton Coal Development will continue to conduct additional field investigations and mitigation of adverse effects within the current Coal Hollow Mine area if mining plans should change and necessitate such actions. Archaeological monitoring will continue within this area per the guidelines set forth in the Cultural Resource Management Plan

(Stavish 2008) and the Cultural Resource Discovery Plan (Bollong & Johnson 2010). A map showing the survey area already investigated for archeological importance is included in Appendix 4-1.

Alton Coal Development will also complete additional inventory, treatment of adverse effects, and archaeological monitoring of eligible cultural resource sites identified within the North Private Lease area as determined appropriate through consultation with DOGM and SHPO. A draft treatment and monitoring plan for this area has been produced (Gourley 2015) and is attached in Appendix 4-7 along with a map showing the survey area already investigated for archeological importance. Archaeological monitoring will be completed within this area as well per the guidelines set forth in the Cultural Resource Management Plan (Stavish 2008) and the Cultural Resource Discovery Plan (Bollong & Johnson 2010).

411.144

Alton Coal Development will continue to follow the process for the development and implementation of appropriate treatment and mitigation plans to address adverse effects within the current Coal Hollow Mine area, should mining plans require such work. Archaeological monitoring will continue within this area per the guidelines set forth in the Cultural Resource Management Plan (Stavish 2008) and the Cultural Resource Discovery Plan (Bollong & Johnson 2010).

A draft treatment plan addressing mitigation efforts for proposed adverse effects to cultural sites within the North Private Lease area has been completed and is attached within Appendix 4-7. Once the plan is approved, Alton Coal Development will implement the mitigation measures to offset the proposed adverse effects to sites 42KA3077 and 42KA3097, as well as avoidance and monitoring measures for site 42KA6080 to ensure no adverse effect.

411.200 Previous Mining

There has been no mining within the permit area.

412 RECLAMATION PLAN

412. Reclamation & Land Use

412.100. Postmining Land Use Plan

A description of the proposed land use following reclamation of the mined areas has been provided in this section of the MRP with a summary in Chapter 3, Section 356.120. The discussions includes the utility and capacity of the reclaimed land and the relationship of the proposed uses to existing land use policies and plans, as well as the desires of the current landowners.

412.110. Postmining land use will be achieved by following the detailed reclamation plan included in the MRP. The reclamation plan includes descriptions for structure removal, excess spoil and mine waste disposal, backfilling, compacting, and regrading (Chapter 5); soil handling and stabilization (Chapter 2); revegetation techniques (Chapter 3); measures to control sediments during mining and reclamation activities (Chapter 7).

412.120. Grazing Management Plans

Consultations have been conducted with all surface landowners of the permit area to provide comments in the plan and attain their expectations for the desired postmining land use. According to the landowners, grazing and wildlife habitat would be the desired postmining land use, with emphasis on grazing by domestic livestock in most of the pasture land areas (these areas are shown on Vegetation Map, Drawing 3-1 of

the MRP and on Vegetation Map 1 in ~~VOLUME 12~~Appendix 3-9 (~~Supplemental Report: Vegetation & Wildlife Habitat of the North Private Lease Area~~). An exception to this plan is that one area in the current mine site that is now pasture land will be reseeded appropriately to provide additional habitat for sage-grouse, a sensitive species in the area. More about this plan is provided below.

A land ownership map of the current Coal Hollow Mine and North Private Lease areas has been provided in the MRP (Drawing 1-3). Descriptions of current management practices as well as future grazing plans for the postmining land use have been provided below.

Property Management Plans

A surface ownership map for the current Coal Hollow Mine area as well as the North Private Lease has been provided in the MRP (Drawing 1-3). Management plans for each property owner is provided below.

CURRENT COAL HOLLOW MINE AREA

Richard Dame Property: The portion of land in the permit area owned by Mr. Richard Dame currently provides forage for domestic livestock and some wildlife species. This land is comprised mostly of unirrigated pasture land but also supports some native stands of pinyon-juniper and sagebrush communities (see Vegetation Map 3-1).

Mr. Dame has expressed the desire to return his property to pasture land that focuses on domestic livestock, but also wants some plant species for wildlife habitat to be seeded. In doing so, the revegetation seed mix is composed primarily of native and introduced grasses and forbs, with no woody species to be planted (for the seed mixture refer to Chapter 3, Table 3-38).

The livestock currently sustained on Mr. Dame's property are mostly cattle, with some horses. The animals are kept in the pastures from April through November of each year. A management plan to support this same postmining land use has been designed so that the property will adequately support the animals desired by the landowner and will not be over-grazed.

The management plan suggests that 1.125 animals/month/acre could reasonably be sustained on the property. This figure was derived from the *Average Animal Weight Method* (Pratt and Rasmussen) and is based on raising 1 cow weighing 1,000 lbs and her calf on pastures that have an annual biomass productivity of 1,800 lbs/acre. It conservatively estimates that one-half of the production will be consumed ("take half, leave half rationale"). Therefore, the total number of animals allowed on the property in the postmining land use management plan can be calculated by multiplying the estimated number of animals/month/acre by the number of pasture land acres available by the number of months the animals are maintained on a given pasture.

A copy of these management plans signed by the landowners along with their comments are provided in Appendix 4-3 and 4-4 of this chapter of the MRP.

Burton Pugh Property: The land in the permit area owned by Mr. Pugh also provides forage for domestic livestock and wildlife habitat. This land is comprised of unirrigated pasture land, meadows, sagebrush/grass, pinyon-juniper, and oakbrush communities (see Vegetation Map 3-1). The livestock currently sustained on Mr. Pugh's pasture land property are mostly cattle, but sometimes horses are also kept on the property. The animals are supported in the pastures from April through November of the year. A management plan to support a similar postmining land use has been designed so that the property will not be over-grazed, yet support the animals desired by the landowner.

Following mining and reclamation activities, Mr. Pugh has expressed the desire for his land to be returned to its current or better condition for livestock and wildlife habitat. In accomplishing this, the pasture lands will be revegetated to focus on domestic livestock, but the seed mixtures will also include some plant species used by the resident wildlife species. Because it has been postulated that encroachment of juniper trees into the valley in recent years has had a negative effect on the local sage-grouse populations, the revegetation plan for these areas will also focus on other plant species, or species that could have a positive effect on the birds as well as provide good forage for domestic livestock. The revegetation seed mixes for the Pugh property are shown in Chapter 3 and include: the sagebrush/grass (Table 3-37), meadows (Table 3-40), pasture lands (Table 3-38), oakbrush (Table 3-41), and pinyon-juniper communities (Table 3-39).

The management plan for Mr. Pugh suggests that 1.125 animals/month/acre could reasonably be sustained on the property. This figure was derived from the *Average Animal Weight Method* (Pratt and Rasmussen 2001) and is based on raising 1 cow weighing 1,000 lbs and her calf on pastures that have an annual biomass productivity of 1,800 lbs/acre. It conservatively estimates that one-half of the production will be consumed ("take half, leave half rationale"). Therefore, the total number of animals allowed on the property in the postmining land use management plan can be calculated by multiplying the estimated number of animals/monthly acre by the number of pasture land acres available by the number of months the animals are maintained on a given pasture.

There is, however, one area within Mr. Pugh's property that currently supports pasture land, but once it is reclaimed, it will be seeded to a mixture that would be conducive to sage-grouse enhancement. This field can easily be located on Drawing 3-1 because it is the only pasture land located west of the county road. This land will be seeded with the sagebrush/grass mixture (Chapter 3, Table 3-37). Also, the areas west of the county road designated for borrow for Pit 10 which supported pinyon/juniper, once reclaimed will have gentler slopes than premining. This borrow area will be reclaimed with the sagebrush/grass mixture (Chapter 3, Table 3-37), substantially increasing the area for sage-grouse enhancement.

A copy of these management plans signed by the landowners along with their comments have been provided in the Appendix 4-3 and 4-4 of this chapter of the MRP.

NORTH PRIVATE LEASE AREA

In the North Private Lease area, current plans have restricted mining to the areas located south of what is called “Farm Road”. This east-west road can be easily identified on Vegetation Map 1, ~~VOLUME 12~~[Appendix 3-9 \(Supplemental Report: Vegetation & Wildlife Habitat of the North Private Lease Area\)](#). It is south of the distinctive center-pivot field. Consequently, more specific land use descriptions and reclamation plans in this section will concentrate more on the areas south of Farm Road.

As mentioned previously, the majority of the area in the North Private Lease, especially those areas south of Farm Road, are comprised of rangelands that have been converted to pasture lands. Based on quantitatively sampling results from the vegetation in both areas, these pasture lands are very similar to those described in the current Coal Hollow Mine area. Consequently, the land use, management and reclamation plans are also very similar. There are, however, incised channels that dissect the North Private Lease. More information about these channels has been provided in the specific parcels of land described below.

Following are descriptions of current management practices for the major landowners as well as future grazing plans for the postmining land uses.

Dean R. Heaton Property: This landowner has 3 parcels south of Farm Road for a total of 45 acres (Drawing 1-3). The lands here are developed rangelands and currently support grass species for domestic livestock grazing. Based on previous studies and information gathered from other landowners with similar pasture lands, a management plan suggests that 1.125 animals/month/acre could reasonably be sustained on the property. As explained before, this figure was derived from the *Average Animal Weight Method* (Pratt and Rasmussen) and is based on raising 1 cow weighing 1,000 lbs and her calf on pastures that have an annual biomass productivity of 1,800 lbs/acre. It conservatively estimates that one-half of the production will be consumed (“take half, leave half rationale”). Therefore, the total number of animals allowed on the property in the postmining land use management plan can be calculated by multiplying the estimated number of animals/month/acre by the number of pasture land acres available by the number of months the animals are maintained on a given pasture.

Unless the landowner specifies a change in the revegetation plans in the future, the pasture will be reclaimed with the existing pasture land species mixture (see Table 3-38).

G. Ferril & Dorothy M. Heaton Property: These landowners have approximately 110 acres of land south of Farm Road. Most of this land is pasture land, but Kanab Creek dissects some of it where its deeply incised channel supports riparian and wetland communities along with adjacent uplands. This stream channel is basically undeveloped rangeland and, other than some grazing pressure and the erosional component so common in the area, the riparian and upland communities are relatively undisturbed. The uplands in the channel are located on the flood plains and stream terraces bordering the riparian zones. The upland communities are primarily dominated by Wyoming big sagebrush and black sagebrush.

Additionally, there was one relatively small area within this property that supported trees and shrubs. The area consists of native, mostly undisturbed, plant communities (or undeveloped rangelands) that are primarily pinyon-juniper and sagebrush. These communities will have little mine-related disturbance to them. However, if the fringes of this area are disturbed, the landowner may likely prefer re-seeding it to increase and blend in with the adjacent pastures and not be restored to trees and shrub-lands. Therefore, the postmining land use will be that of wildlife habitat and domestic livestock grazing. It will most-likely be seeded with the pasture land seed mixture (Table 3-38), but the pinyon-juniper (Table 3-39) mix may also be utilized.

The incised channels of Kanab Creek will not be disturbed by the proposed mining operations and therefore reclamation will not be needed. The current land uses will be continued in the future. The pasture lands within these properties are similar to those described above with respect to current land use and productivity. They will also be reclaimed with the same species list (see Table 3-38).

Heaton Brothers, LLC Property: The Heaton brothers also own a significant portion of the North Private Lease land south of Farm Road, or approximately 150 acres (Drawing 1-3). Like the properties described above, most of this land are pastures. The pasture lands are very similar to those described above, with the same current land uses, reclamation plans and postmining land uses.

The Heaton brothers property also includes some ephemeral drainage channels. They are located west of Kanab Creek. The ephemeral drainages have also been studied extensively and reported in a document called *Wetland & Ordinary High Watermark Identifications, Private Lease Area* (VOLUME 10, Supplemental Report) and in another study called *Vegetation & Wildlife Habitat of the North Private Lease Area* (VOLUME 12, Supplemental Report).

The channels support some riparian and wetland communities including riparian wet meadows, mixed riparian scrub/shrubs, as well as narrow bands of sagebrush communities on the adjacent upland terraces. The field studies found that the Private North Lease study area supports 9.44 acres of jurisdictional wetlands, most of which were identified in the Kanab Creek drainage. Kanab Creek and the plant communities supported within it will *not* be disturbed by mining activities. The other channels, however, may be disturbed by mining, some of which support wetland and upland communities. The landowner has

indicated that the erosional features be eliminated, therefore areas of the channels will be reclaimed and seeded to support pasture land.

Postmining land uses of the Heaton Brothers property will be returned to the current land use – that of grazing in the pastures and wildlife habitat in the drainage channels.

Orval & Greta Palmer Property: There is one relatively small parcel of land, about 10 acres, owned by Orval & Great Palmer. This is a pasture with identical current land uses as described above for other pasture lands. It will also be seeded the same at the time of final reclamation and result in the same postmining land use.

412.130. Postmining Land Use Changes

With the exception of improvement of the current pasture lands, pinyon/juniper borrow area, and the area mentioned above that will be seeded with plant species that enhances sage-grouse habitat, there will be no changes from the pre-mining land use for the postmining land uses.

412.140. Land Use Considerations

Considerations for postmining land uses have been made by consulting with the surface landowners for the pasture lands as well as the native plant communities that will be impacted by the mining activities. The landowners have special concerns regarding plant species for livestock and others for wildlife. Basically, the pasture lands will be planted with grass and forb species good for livestock and wildlife species, and will not include any woody species. At final reclamation, the natural plant communities disturbed by mining will be seeded with native plants, some of which will have special considerations for habitat improvement for the sensitive bird, greater sage-grouse.

Additionally, considerations were made to insure compliance with all state and federal regulations for postmining land use and reclamation. For example, all plant communities that will be impacted by mining ~~will behave been~~ quantitatively sampled beforehand and compared to similar communities that will not be affected. The unaffected communities will remain undisturbed and will be used as "reference areas", or future standards for revegetation success at the time of final reclamation. Those native plant communities that were disturbed prior to mining (i.e. pasture lands) will not have reference areas for comparison at the time of final reclamation. Instead, revegetation success standards have been developed beforehand and were based on sampling the pasture lands in the area from 2006 to 2012 (see Chapter 3, Section 356.120). Nonetheless, reference areas for the pasture lands will also be established for revegetation success standards.

412.200. Land Owner or Surface Manager Comments

The postmining land use plans that have been signed by the landowners and are included in the appendix of this chapter. Also included is a page for "Comments" by the landowners.

412.300. Suitability and Compatibility

~~The final fills containing excess spoil will be suitable for reclamation and revegetation and are compatible with the natural surroundings and the approved postmining land uses. The final fill slopes will be regraded to a maximum angle of 3h: 1v (33 percent). The slopes will be revegetated and drainage will be established in a manner similar to the original flow patterns. These slopes will be suitable for grazing and wildlife habitat. The design for this excess spoil and the final landform can be viewed on Drawings 5-35 and 5-36. The construction and reclamation practices for the excess spoil are further explained in Chapter 5. All areas utilized for excess spoil will be restored to AOC at final reclamation and are compatible with the natural surroundings and the approved postmining land use. The final landform configuration can be viewed on Drawings 5-37 and 5-37A.~~

413 PERFORMANCE STANDARDS

413.100. Postmining Land Use

All disturbed areas will be restored in a timely manner to conditions that are capable of supporting the uses that were present before any mining occurred. In some cases improvement of the land will be achieved (see Postmining Land Use Plan above [and Chapter 3, Section 356.100](#)).

413.200. Determining Pre-Mining Uses of Land

The pre-mining uses of land in which the postmining land use is compared have been previously described (see Postmining Land Use Plan above).

413.300. Criteria for Alternative Postmining Land Uses

Other than improvements to the existing land described above, the land will be returned to its pre-mining conditions.

420 **AIR QUALITY**

421 **CLEAN AIR ACT**

Coal mining and reclamation operations will be conducted in compliance with the requirements for the Clean Air Act and Any other applicable Utah or Federal statutes and regulations containing air quality standards.

422 UTAH BUREAU OF AIR QUALITY

For the Coal Hollow Mine, Alton Coal Development, LLC retained JBR Environmental Consultants to prepare a Notice of Intent (NOI) for a new source at the Coal Hollow Project. The original NOI was submitted to the Utah Division of Air Quality (UDAQ) on May 8, 2007. This NOI provided an initial assessment of air emissions for the project based on the MRP prior to being determined Administratively Complete. JBR coordinated preparation of the original NOI with Tom Bradley and Jon Black of the UDAQ. In September 2008, JBR began development of a revised NOI to include air dispersion modeling. This air dispersion modeling was coordinated with Dave Prey of UDAQ. A conference call was conducted with representatives of UDAQ, JBR and Alton Coal on December 8th, 2008 to discuss modeling inputs, background emissions and preliminary modeling results. The revised NOI was submitted on April 20, 2009. UDAQ responded to the NOI on June 23, 2009 by asking for additional information. The Fugitive Dust Control Plan is provided as Appendix 4-5. Alton Coal was issued by the Executive Secretary of the Utah Air Quality Board Approval Order DAQE-AN0140470002-10 for a new source on November 10, 2010. After consultation with Jon Black, an NOI dated August 22, 2013 was submitted to UDAQ, Alton Coal requested addition of a highwall miner to list of mobile equipment in use at the Coal Hollow Mine. On November 12, 2014 prior to beginning underground operations, Jon Black of the UDAQ was consulted with the proposed underground plans. An NOI was sent to UDAQ on November 17, 2014 listing the additional equipment and increase in pollutants anticipated with the operation of the underground mine. The revised Air Approval Order including the underground was received April 21, 2015.

For the North Private Lease, Alton Coal development began coordination preparation of the NOI with Jon Black of UDAQ on June 4, 2015. The North Private Lease will be an amendment to the Coal Hollow Mine Approval Order and will require dispersion modeling. Ramboll Environ has completed the dispersion modeling in coordination with UDAQ. The final NOI and dispersion model was submitted to UDAQ on September 9, 2015 with the model being accepted September 24, 2015 and the engineering review approved September 25, 2015. Public Notice was advertised in the Southern Utah News October 1, 2015.

423.100- 200 AIR POLLUTION CONTROL PLAN

Production rates at the Coal Hollow Mine are expected to exceed 1,000,000 tons of coal per year. Appendix 4-5 provides a Fugitive Dust Control Plan (FDCP). This plan includes

controls and monitoring measures that will be taken to minimize air pollution related specifically to fugitive dust.

Production rates at the North Private Lease of the Coal Hollow Mine are expected to exceed 1,000,000 tons of coal per year. Appendix 4-6 provides a Fugitive Dust Control Plan (FDCP). This plan includes controls and monitoring measures that will be taken to minimize air pollution related specifically to fugitive dust.

424 PLAN FOR FUGITIVE DUST CONTROL PRACTICES

Proposed mining will exceed 1,000,000 tons annually. A Fugitive Dust Control Plan is provided as Appendix 4-5 for the Coal Hollow Mine and in Appendix 4-6 for the North Private Lease.