



## Alton Coal Development, LLC

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April 12, 2016

Daron R. Haddock  
Coal Program Manager  
Oil, Gas & Mining  
1594 West North Temple, Suite 1210  
Salt Lake City, UT 84114-5801

Subject: **Appendix 3-8 North Private Lease GRSG Management Plan, Alton Coal Development, LLC, Coal Hollow Mine, Kane County, Utah, C/025/0005**

Dear Mr. Haddock,

Alton Coal Development, LLC is providing the revised Appendix 3-8 North Private Lease GRSG Management Plan with the modifications recommended by the Division and consulting agencies. Changes to the MRP associated with this amendment have been uploaded to the DOGM's server for review. Upon approval, 2 (two) clean hard copies of the text for insertion into the MRP will be submitted. Please do not hesitate to contact me if you have any questions 435-691-1551.

Sincerely

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:** Chapter 3, Appendix 3-8 North Private Lease GRSG Management Plan

**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                      04/25/2016                      *B. Kirk Nicholes*  
 Print Name                                      Position                                      Date                                      Signature (Right-click above choose certify then have notary sign below)

Subscribed and sworn to before me this 26 day of April 2016

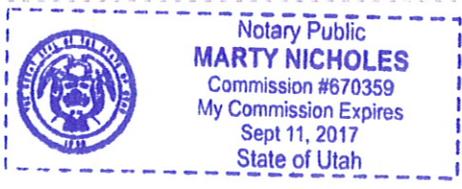
Notary Public: Mary J. Nichols, state of Utah.

My commission Expires: 9-11-2017

Commission Number: 670359

Address: 1670 E Millstone Cir

City: Enoch State: UT Zip: 84721



<b>For Office Use Only:</b>	<b>Assigned Tracking Number:</b>	<b>Received by Oil, Gas &amp; Mining</b>
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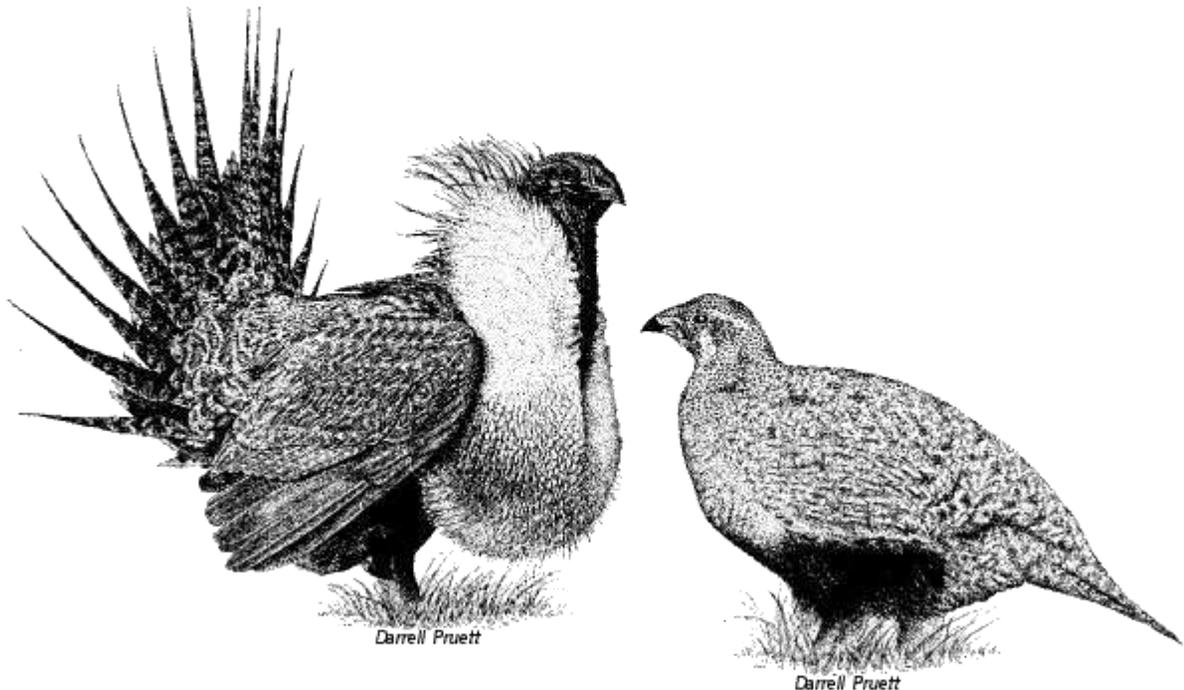


## Appendix 3-8

Coal Hollow Mine Including the  
North Private Lease  
Greater Sage-grouse  
Management Plan  
2015

# **Greater Sage-grouse Management Plan Coal Hollow Mine Including the North Private Lease, Alton, Utah**

Coal Hollow Mine, Alton Coal Development



Drawing provided by USGS ([www.npwr.usgs.gov](http://www.npwr.usgs.gov))

**June 14, 2015  
Modified October 8, 2015  
Modified February 23, 2016  
Modified April 19, 2016**

**Prepared by  
Steven L. Petersen, Ph.D.  
Sage-grouse Population and Habitat Consultant**

## **Greater Sage-grouse Management Plan Coal Hollow Mine Including the North Private Lease, Alton, Utah**

The Alton-Sink Valley region of southern Utah is rich in coal deposits that are being extracted to supply energy demands for several western states. In 2014, approximately 650,000 tons of coal were extracted by Alton Coal Development Inc. (ACD) from the Coal Hollow Mine located on private leases in this area. ACD proposes to add 295.60 acres of private lease lands to the Coal Hollow Mine, which will be located some 1.9 miles north of the existing mining operations.

Both the existing Coal Hollow Mine and the proposed North Private Lease tract are located within the larger Alton-Sink Valley area. See Figure 1.

Within the Alton-Sink Valley area, greater sage-grouse (*Centrocercus urophasianus*) are found utilizing sagebrush and wet meadow habitats for nesting, brood rearing, and wintering. Greater sage-grouse are a species of significant concern throughout western North America. Impacts that threaten sage-grouse populations include habitat loss, habitat fragmentation, degraded habitat condition, fire, invasive plant species, predation, and disease (Crawford et al. 2004).

Mitigation efforts should focus on reducing impacts to sage-grouse habitat and help maintain stable sage-grouse populations. The purpose of this management plan is to present strategies that will be implemented by ACD at the Coal Hollow mine including the North Lease project area to reduce impacts to sage-grouse and improve habitat structure and availability.

ACD has maintained a close working relationship with partners in sage-grouse conservation, in particular the Utah Division of Oil, Gas, and Mining (UDOGM), the Utah Division of Wildlife Resources (UDWR), the Color Country Adaptive Resource Management group (CCARM), and the Bureau of Land Management (BLM). These partnerships will be included throughout the life of the mine to develop and assess strategies for improving rangeland resources and providing the conditions required for a stable sage-grouse population.

The purpose of this plan is to present the management strategies designed to sustain sage-grouse populations and maintain suitable sage-grouse habitat in the North Private Lease area near the Town of Alton, Utah.

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## North Private Lease Description

The proposed North Private Lease coal mining area is located some 0.8 miles south and east of the Town of Alton, Utah (Alton). This new lease tract will be added to the existing Coal Hollow Mine which is located on private lands some 1.9 miles to the south. The Sink Valley area is located some 2 miles south of the North Private Lease Area to the east of the Coal Hollow Mine.

(Figure 1). This area, broadly referred to as the Alton/Sink Valley area is dominated by 1) an association of sagebrush (*Artemisia* L. spp) and perennial grasses, 2) sagebrush and Gambel Oak (*Quercus gambelii* Nutt.) communities, riparian habitats and 3) wet meadow plant communities. In many locations, Utah juniper (*Juniperus osteosperma* Torr.) and pinyon pine (*Pinus edulis* Engelm.) have expanded into critical sagebrush habitats or have infilled over time resulting in the shift from a Phase I to Phase II woodland community, or Phase II to Phase III closed canopy woodland condition. Pinyon – Juniper (PJ) woodlands in phase II or phase III condition typically have low sagebrush and herbaceous plant species densities, low forage availability, high erosion potential, and degraded nesting and brood rearing habitat structure (Nebo Scientific 2013 report, Pierson et al. 2014). Additionally, the Alton / Sink Valley region has supported human populations for many generations and the associated impacts have been expansive. Along with the development of city infrastructure and associated impacts, much of the land surrounding Alton has been converted from rangelands into irrigated crops (e.g. alfalfa) or pasture.

Currently, there are no known leks reported in the North Private Lease Area. Greater sage- grouse have been observed historically within the broader Alton/Sink Valley area, using habitats within the North Private Lease site. During 2006-2010, birds were observed in this region typically within the alfalfa fields, wetland areas, and pasturelands in closer proximity to the North Private Lease tract. Since 2010, bird observations within the North Private Lease area have been substantially lower compared to the higher habitat use recorded prior to this time period. This change in habitat use is likely attributed to habitat improvement projects completed by BLM and private entities in the Sink Valley area (Personal Communication with Frey 2015). Habitat improvement projects completed or participated in by ACD are as follows in Table 1.

Table 1. Mitigation completed by ACD, LLC between 2009 and 2015.

Year	Location	Treatment	Acres
09-11	Corridor located north of Alton	PJ/Oak removal, reseeding	428
09	Conservation Area	PJ removal, Sagebrush thinning and seeding	72
12	Water Canyon East of Mine	PJ cutting, spraying rabbitbrush	146
13-15	West of mine (BLM)	PJ removal	355
14	WRI Project 2701 & 3011	PJ removal, rabbitbrush mowing/spraying	600
15	WRI Project 3419	rabbitbrush mowing/spraying	442*
<b>Total acres of mitigation</b>			<b>2044</b>

\* Project paid for by ACD, WRI completed 265 acres in 2015 leaving 177 acres to be completed in 2016.

A focus of this management plan is to establish goals and priorities for habitat improvement that promote sustained sage-grouse populations. Even though mining will be completed over several years (Figure 2), habitat mitigation, including wet meadow and riparian habitats, at the required ratio will occur prior to conducting mining or disturbance activities in areas 2 or 3 of the North Private Lease. The Governor's Conservation Plan for Greater Sage-grouse in Utah (Conservation Plan) and recent comments provided by the Governor's Office and UDWR, have been used to develop the sage-grouse conservation strategies set forth in this document. This agreement may be used to ensure that functional mitigation actions have been clearly identified and that funds have been fully committed to their implementation. Funds used for mitigation projects and habitat improvement will be channeled through the Watershed Restoration Initiative (WRI). ACD and other WRI partners can provide input and comments on proposed treatments when requested, however WRI will make project decisions and use ACD funding to support that work as they deem appropriate and necessary. The habitat improvement efforts for sage-grouse will be determined by WRI.

## **Sage-grouse Population Monitoring**

### *Historic and Current Lek use in Alton/Sink Valley*

Greater sage-grouse are long-term residents of the Sink Valley and Alton areas of Kane County, Utah. Birds exhibit breeding and nesting activity in Sink Valley, and winter habitat use in the Sink Valley and the surrounding Alton area. Population densities have fluctuated widely based on data reported by wildlife biologists from UDWR. Since 1991, data suggest that there has been an oscillation in male lek attendance over the past 20 years which would indicate variable sage-grouse presence and habitat use within this area (Figure 4). In contrast to lek use patterns in Sink Valley, there are no known leks reported in the North Private Lease area. Similar to lekking patterns recorded for the Sink Valley region, lek counts have also been recorded for Hoyts Ranch located approximately 15 miles north of the North Private Lease region (Figure 5).

Since mining began in 2010, the sage-grouse population within the region (particularly Sink Valley) has remained relatively constant and stable. Male lek attendance has fluctuated over time, however recent numbers are similar to counts recorded prior to mining (13-15 males; Figure 4). Sage-grouse surveys have also reported a relatively consistent bird population density since mining as compared to pre-mining densities. During fall 2015, 43 sage-grouse were counted near the mine in September and 41 in October. These are counts comparable to pre-mining sage-grouse survey numbers. Most sage-grouse are regularly observed in the sagebrush field south of the active Coal Hollow mine site and the wet meadow, sagebrush grassland area east of the mine (ACD Annual Report 2012, 2013, 2014).

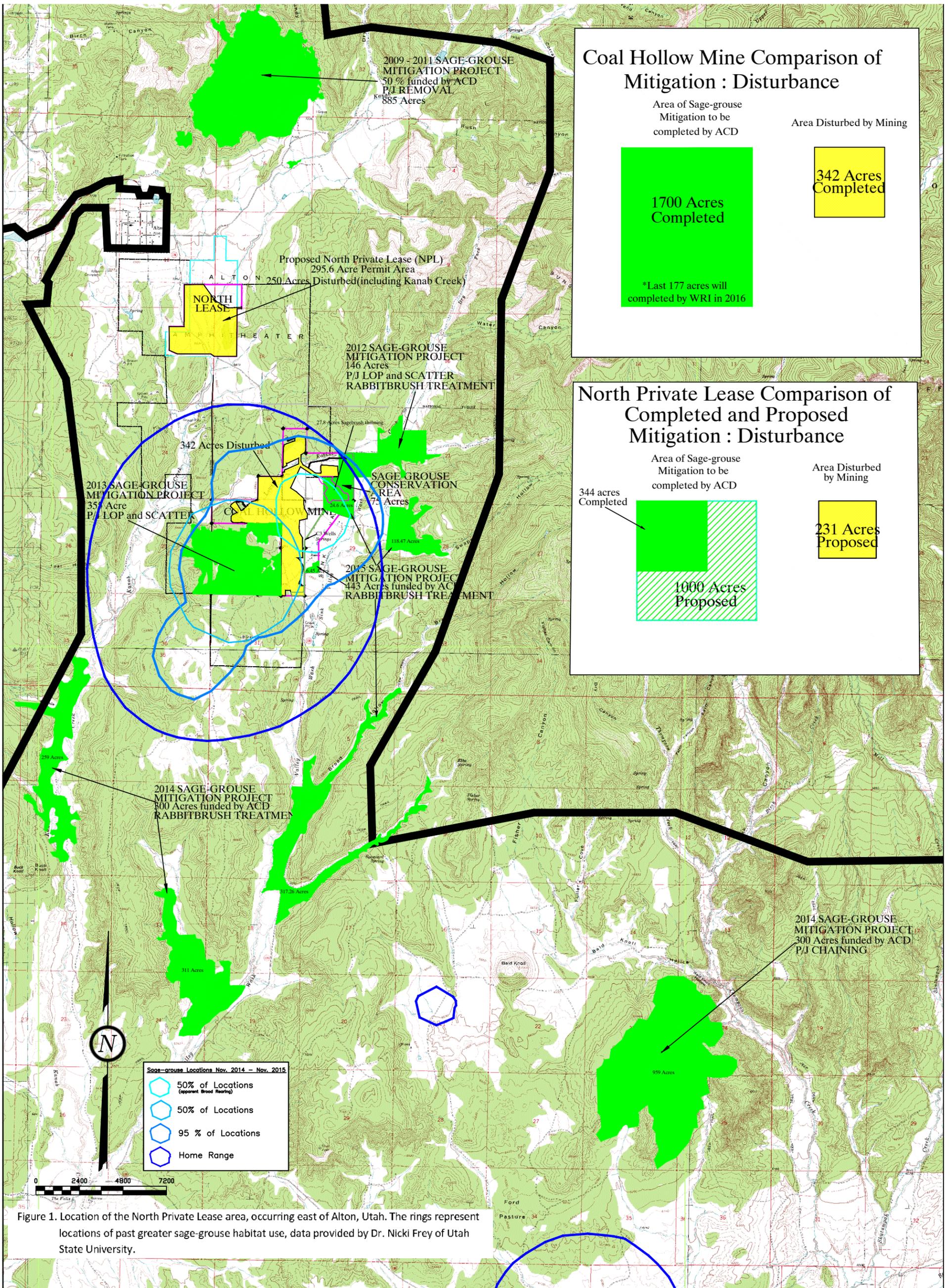
The Color Country Adaptive Resource Management group met in December, 2015 and February, 2016 and used this monitoring data and available collaring data to revise the habitat map for the State Conservation Plan, South Panguitch Population Area which includes the Coal Hollow North

Private Lease and the Alton Coal LBA. The link to that data is as follows:

<http://dwrcdc.nr.utah.gov/ucdc/DownloadGIS/disclaim.htm>. This data was used to prepare Figure 3 herein. The legend on the map shows Nesting and Brood-rearing habitat in light blue. The “year round” classification termed Nesting & Brood-rearing and winter habitat is shown in light green. The State has clarified that the SGMA designation of the South Panguitch Population Area includes both habitat and non-habitat opportunity areas.<sup>1</sup>

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<sup>1</sup> In correspondence with BLM concerning this SGMA, the Governor’s Office has stated, “The boundaries of the SGMAs were drawn to include the required year round habitat needs of the species, as well as areas which could, at the completion of restoration or enhancement projects, become usable habitat.” Letter dated March 27, 2015 from Kathleen Clarke, Public Lands Policy Coordination Office to BLM State Director Jenna Whitlock, p. 5. To that end, the state does not define SGMAs as essential habitat. Rather, the state defined SGMAs as “areas which represent the best opportunity for high value, focused conservation efforts.” Id.



### Coal Hollow Mine Comparison of Mitigation : Disturbance

Area of Sage-grouse Mitigation to be completed by ACD	Area Disturbed by Mining
1700 Acres Completed	342 Acres Completed
*Last 177 acres will be completed by WRI in 2016	

### North Private Lease Comparison of Completed and Proposed Mitigation : Disturbance

Area of Sage-grouse Mitigation to be completed by ACD	Area Disturbed by Mining
344 acres Completed	231 Acres Proposed
1000 Acres Proposed	

Figure 1. Location of the North Private Lease area, occurring east of Alton, Utah. The rings represent locations of past greater sage-grouse habitat use, data provided by Dr. Nicki Frey of Utah State University.

**LEGEND:**

	PERMIT AREA
	LBA AREA
	MITIGATION PROJECT BOUNDARY
	MINING DISTURBANCE
	COUNTY ROAD
	PANGUITCH SGMA

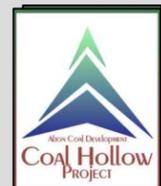
DRAWN BY:	CHECKED BY:
K. NICHOLAS	LWJ
DRAWING:	DATE:
	9/16/2013
JOB NUMBER:	SCALE:
	1" = 2400'
	SHEET

**ACD SAGE-GROUSE MITIGATION PROJECTS**

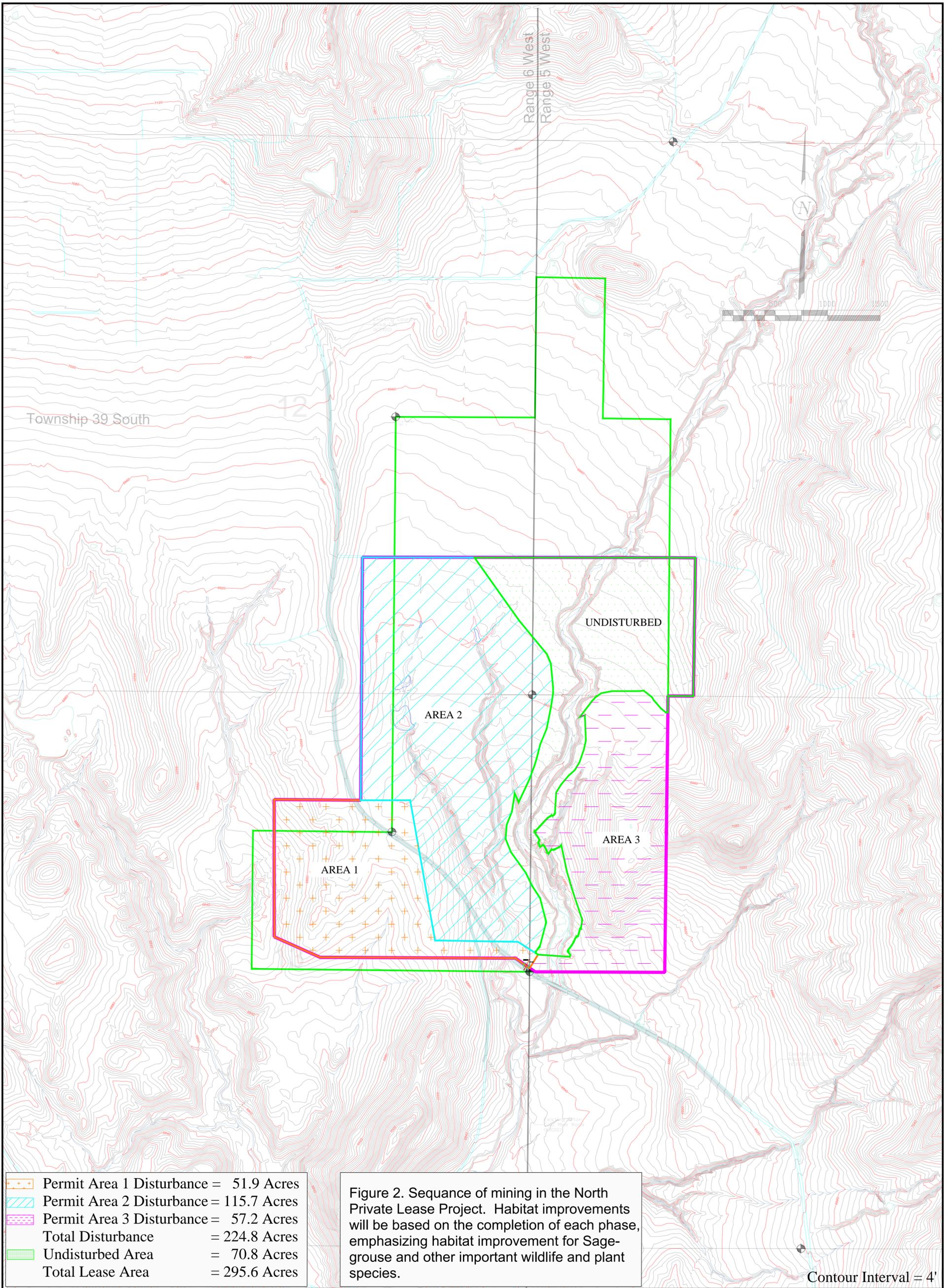
**COAL HOLLOW PROJECT**

**ALTON, UTAH**

<b>REVISIONS</b>	
DATE:	BY:
9/16/2013	KN
11/07/2013	KN
02/08/2015	KN
12/30/2015	KN
04/21/2016	KN



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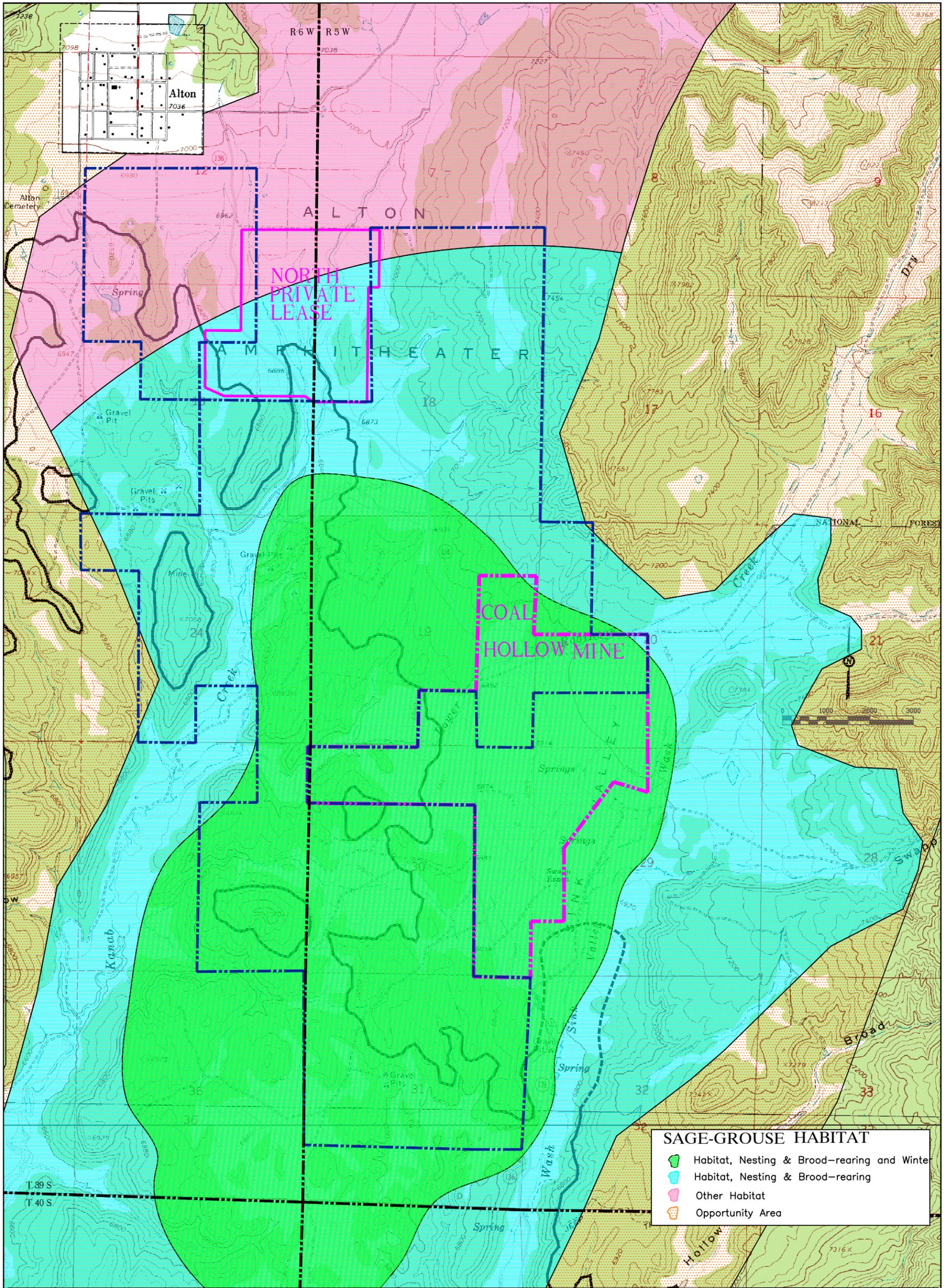


	Permit Area 1 Disturbance = 51.9 Acres
	Permit Area 2 Disturbance = 115.7 Acres
	Permit Area 3 Disturbance = 57.2 Acres
	Total Disturbance = 224.8 Acres
	Undisturbed Area = 70.8 Acres
	Total Lease Area = 295.6 Acres

Figure 2. Sequence of mining in the North Private Lease Project. Habitat improvements will be based on the completion of each phase, emphasizing habitat improvement for Sage-grouse and other important wildlife and plant species.

Contour Interval = 4'

<b>LEGEND:</b> LEASE BOUNDARY PRIVATE COAL OWNERSHIP SECTION LINE FOUND SECTION CORNER FOUND PROPERTY CORNER	DRAWN BY: K. NICHOLAS  DRAWING: 5-46  JOB NUMBER: 0001	CHECKED BY: DWG  DATE: 7/14/14  SCALE: 1" = 400'  SHEET	<b>REVISIONS</b> <table border="1"> <thead> <tr> <th>DATE:</th> <th>BY:</th> </tr> </thead> <tbody> <tr> <td>10/09/14</td> <td>KN</td> </tr> <tr> <td>04/10/15</td> <td>AC</td> </tr> <tr> <td>10/12/15</td> <td>AC</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	DATE:	BY:	10/09/14	KN	04/10/15	AC	10/12/15	AC					<b>DISTURBANCE SEQUENCE</b>  NORTH COAL HOLLOW PROJECT ALTON, UTAH  <b>DRAWING: 5-46</b>		 463 North 100 West, Suite 1 Cedar City, Utah 84721 Phone (435)867-5331 Fax (435)867-1192
	DATE:	BY:																
10/09/14	KN																	
04/10/15	AC																	
10/12/15	AC																	



**SAGE-GROUSE HABITAT**

-  Habitat, Nesting & Brood-rearing and Winter
-  Habitat, Nesting & Brood-rearing
-  Other Habitat
-  Opportunity Area

**LEGEND:**

-  PROPOSED LBA BOUNDARY
-  PERMIT AREA
-  COUNTY ROAD
-  COAL LINE BOUNDARY

<b>DRAWN BY:</b> K. NICHOLS	<b>CHECKED BY:</b> APC
<b>DRAWING:</b> 1-2	<b>DATE:</b> 8/16/04
<b>JOB NUMBER:</b> 1400	<b>SCALE:</b> 1" = 2000'
	<b>SHEET</b>

REVISIONS	
DATE:	BY:
8/25/08	CRM
10/18/13	KN
2/12/16	KN
3/2/16	KN

**PERMIT AREA WITH LBA**

COAL HOLLOW PROJECT  
ALTON, UTAH

**FIGURE 3**



463 North 100 West, Suite 1  
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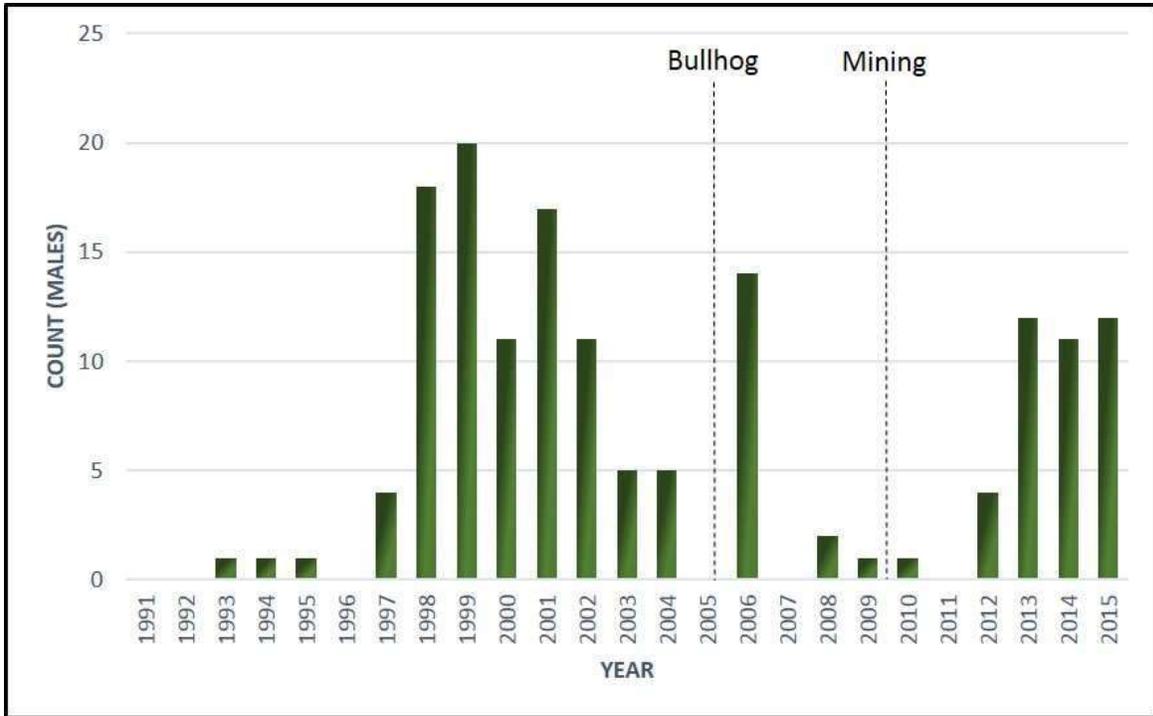


Figure 4. Male bird attendance at the Sink Valley lek, located south of Alton, Utah. Observations were made by Utah DWR employees observing during the spring breeding months (February – April). The 2005 and 2007 data are missing for this graph. Birds recorded from 2012-15 were located on a new lek, located south of the mining operations in Sink Valley.

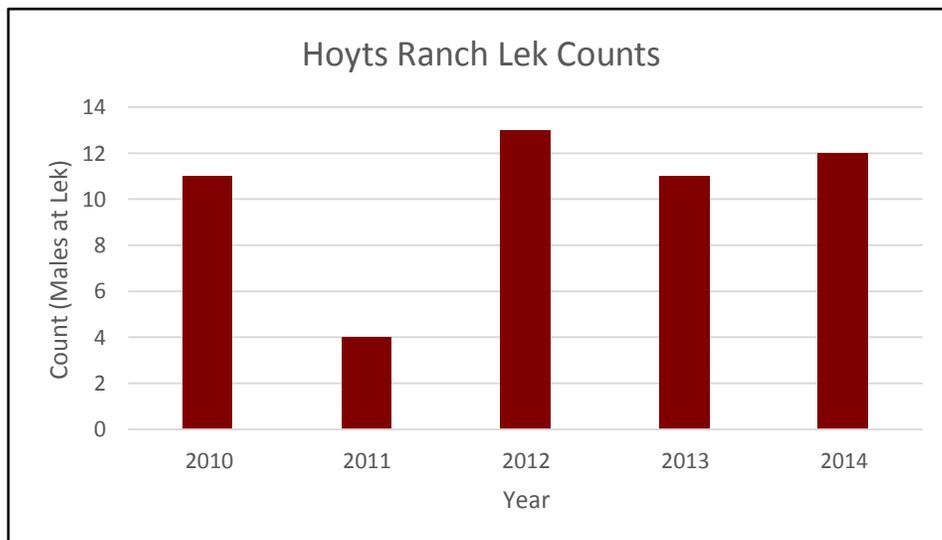


Figure 5. Male bird attendance at the Hoyts Ranch lek, north of Alton. Observations recorded expanded from 2010 to 2014.

### Employee Observations and Sage-grouse Population Monitoring

ACD employees have been trained to accurately identify sage-grouse and report any sighting and the location of that sighting whenever observed. These observations are reported directly to Kirk Nicholes (ACD Environmental Manager) who logs each sighting, records the coordinate location of each sighting, and manages this information for use in population monitoring and trend analysis.

### Monthly Bird Surveys

During the non-breeding time period, sage-grouse within the mining area have been monitored to detect population density trends. These data were particularly important when sage-grouse collaring had not been permitted (2012-2015). These data were collected with a particular emphasis in not disturbing birds during sensitive time periods (nesting, lekking, early brood rearing). Bird numbers during this monitoring period were steady, suggesting that monitoring efforts had not disturbed bird population numbers or behavior patterns. Each survey consisted of walking within each sage-grouse habitat area, using a visual (sweeping) observation patterns to detect sitting or flushed birds. Dogs have not been used to locate birds to prevent excess stress.

Bird observations will continue using this same approach, minimizing any potential impacts from the survey. Coordinate locations will be recorded for each position where the birds were observed. This approach is not intended to replace the GPS collar data, but supplement those data by providing an estimate of the number of birds observed in conjunction with individual points (currently 2 birds on the air with a plan to increase that number to 6 by 2017). These data will also be used during the noise surveys to determine sound levels at set stations and where birds are observed on the landscape.

### GPS Collaring and Monitoring

Dr. Nicki Frey has recorded sage-grouse locations since 2007 using VHF and more recently GPS technology. Over time, birds have been trapped and collared to track movement patterns throughout the region. Since the time that birds have been collared, these data have provided valuable coordinate locations that can be used to determine bird movement patterns and habitat use throughout the year.

ACD will continue to support Dr. Nicki Frey, USU, and SUU in collaring and monitoring birds. Nicki has historically monitored the Alton/Sink Valley area, and has the skills required to trap and outfit these birds. Dr. Frey is currently monitoring 2 birds (1 hen, 1 male) that were trapped in Sink Valley and fitted with a GPS backpack in Fall 2014 within the Alton/Sink Valley area. Each GPS backpack logs 3-4 coordinate locations per day, providing invaluable information for assessing habitat use during the year. ACD will continue to provide support in trapping efforts when the assistance is needed or requested.

To maintain sage-grouse distribution monitoring, ACD will provide four additional GPS backpacks, 2 in 2016 and 2 more in 2017, increasing the number of birds being monitored to six. In 2016, two hens (no males) will be trapped in the fall and collared. Two additional hens will be trapped and collared in 2017. Afterward, ACD will maintain the collaring program to support six active collars within the Alton/Sink Valley area (representing 10% of the total estimated population). These data are necessary to record bird movement and habitat use patterns for both the existing mine site in Sink Valley and the North Lease mine area. Any additional costs associated with trapping, collaring, and monitoring (fuel, travel and trapping time) will be provided to Dr. Frey for her assistance in a formal contract with USU. This level of support will be maintained for the length of the mining operation and will be reevaluated prior to post mining for the purpose of monitoring during the 10-year liability period.

The total monitoring effort (location data from GPS transmitters and information from DWR lek counts) will be combined to provide a comprehensive analysis of sage-grouse habitat use and population movement patterns. This data will be supplied to those entities analyzing it (Dr. Frey, DWR, DOGM, etc) upon request and compiled and submitted to DOGM in an annual report. It will be used to make improvements in sage-grouse conservation strategies as the project progresses.

#### Noise Detection and Sound Assessment

The influence of sound (noise pollution) on sage-grouse will be assessed by measuring sound (decibel) at specific areas around the North Private Lease area. In summer 2016, set survey points will be established around the mining site to determine noise levels (measured with an Extech 407735 sound level meter).

One sound station will be established at each cardinal direction at 100m, 500m and 1000m distant from the center of the proposed North Lease mine site. This will result in 9 set stations where sound will be measured. Additionally, decibels will also be recorded at each location where birds are flushed. These data will be collected monthly and analyzed to represent overall sound maximum, minimum, and average levels at each location. These data will be analyzed by ACD employees and reported in the annual conservation and management plan. Any detection in changed bird behavior resulting from noise will be reported to UDWR/UDOGM for assessment.

### **Habitat Mitigation, Conservation, Protection, and Restoration**

The North Private Lease mining operation will result in 230.8 acres of disturbance. A small portion of the 200 ft. buffer of undisturbed habitat located along Kanab Creek will be temporarily impacted by mining activities on either side of the creek. Subsequently, approximately 20 acres will be added to the total amount of disturbed area. With approximately 250 acres of planned disturbance and using an offsite mitigation treatment ratio of 4 acres of land treated to every 1 acre disturbed (4:1 mitigation ratio), 1,000 acres will be improved as habitat mitigation. These ratios for mitigation are in line with the State of Utah's Conservation Plan for Greater Sage-grouse. This

same approach to mitigation will be implemented prior to disturbing Area 2 and prior to disturbing Area 3. 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 formalized in a mitigation agreement between WRI (manages the mitigation project) and ACD (funds project). ACD's commitment is complete once the project is paid for and WRI completes, maintains and monitors the project into the future.

To ensure that useable habitat is available during and after mining, habitat improvement treatments will be completed prior to mining disturbance. This work will emphasize the need to restore nesting/brood rearing habitat throughout the area, particularly riparian areas, wet meadows, and irrigated pasture land where potential for birds use is highest. It should be noted that the majority of sage-grouse are consistently observed near the current Coal Hollow Mine in the sagebrush field south of the mine and wet meadow areas east of the mine (based on GPS and VHF data collected by Dr. Nicki Frey and monthly sage-grouse surveys).

In 2014, ACD made an Incidental Boundary Change (IBC) that added an additional 85.88 acres New Dame Lease with the anticipation of utilizing the newly acquired high-wall miner to remove coal. Coal removal from this location would have occurred (subsurface) within the original Coal Hollow Mine boundary, subsequently, no additional surface disturbance was required or scheduled to occur. 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, therefore the 344 acres of completed mitigation will far exceed the needed acreage based on the 4:1 requirement for the first year of mining. Because sage-grouse are a landscape species, utilizing habitat across the Alton and Sink Valley area, habitat improvement efforts made within the valley will potentially benefit the bird population throughout the region.

The purpose of habitat mitigation is to improve or replace vegetation structure that can enhance habitat for sage-grouse and other desired plant and animal species. Reclamation efforts will include seeding plant species mixes that include native shrubs and herbaceous species important for sage-grouse (nesting, foraging). These treatments will also improve habitat and forage heterogeneity and availability that benefit other wildlife such as local deer and elk populations. With pinyon-juniper woodland reduction, resources (e.g. water, soil nutrients, light) are released that can be used to increase total grass, forb and shrub cover and production (Frey et al. 2013, Roundy et al. 2014). Mitigation treatments should focus on restoring critical habitat such as sagebrush, grass, and forb growth and persistence, as well as an increase in mesic habitats (e.g.

riparian areas, wet meadows). These areas will be monitored to evaluate birds use patterns and to make sure all treatment in new areas are keeping pace ahead of mining disturbances.

To assess whether mitigation sites are being successfully used by wildlife, in particular sage-grouse, these treatment areas will be monitored regularly to identify 1) if the proper treatment prescription was used and 2) if sage-grouse are utilizing these areas successfully, particularly for brood rearing. Over the past 8 years, no nesting or early brood rearing activity has been observed in the North Private Lease area. However, all sites will be monitored annually (via GPS transmitter data) to determine if birds are using this area for these purposes. If nesting or brood rearing behaviors are detected, disturbance in those areas will be minimized and alternate habitat will be enhanced (wet meadows and riparian areas for food and shelter). If nesting or brood rearing activities are detected within the area, ACD will consult with UDWR regarding recommended guidelines for mining activities (sound <10 db over ambient levels, distance to bird habitat use). ACD in coordination with USU and UDWR will monitor bird activities to detect bird response and minimize impacts.

All habitat monitoring and improvement activities will be maintained throughout the life of the North Lease mine.

## **Vegetation Improvements and Monitoring**

Improving habitat for sage-grouse is an important objective to land managers for maintaining or increasing sage-grouse populations. Boyd et al. (2011) provide several examples of effective land management practices that have resulted in greater habitat use by sage-grouse. Dahlgren et al. (2006a, 2006b) found that habitat treatment in the Parker Mountains of south-central Utah resulted in higher sage-grouse densities. They mechanically treated sagebrush using a Dixie harrow or herbicide applications of tebuthiron to reduce decadent or high density sagebrush stands as recommended in the sagebrush guidelines (Connelly et al. 2000). By managing sagebrush to create target vegetation densities and increasing plant community diversity (mosaic patterns), sage-grouse habitat is improved.

Vegetation improvements will be completed in areas recommended by ACD, state and federal consulting entities (NRCS, DWR, DOGM, BLM, and FWS) and CCARM. ACD will also provide maintenance toward already treated areas by removing young trees. Sagebrush canopy cover will be managed to create habitat structure suitable for sage-grouse nesting and brood rearing using local cover levels and Connelly et al. (2000) guidelines. The location of management areas will be identified as treatment is conducted or when maintenance is performed. Any onsite consultation regarding management areas will be coordinated with the consulting entities and ACD.

To date, the DWR has commended ACD for their involvement and contribution in Utah's Watershed Restoration Initiative (WRI). The partnership between ACD, BLM, UDWR, and NRCS

has resulted in the implementation of several projects that will benefit grouse in the Sink Valley area and beyond. These habitat improvements and the protection of existing habitat will help sage grouse be more resilient during the periods of disturbance and noise created by the mining operations.

Sites that will be monitored will be based on recommendations and discussions with state and federal consulting entities (NRCS, DWR, DOGM, BLM, and FWS) and CCARM. The data collected will be consistent from previous years, consisting of species composition, percent cover, density, and bird use (noted by feathers, tracks, fecal piles, or bird sightings).

## **Predator Control Activities**

Sage-grouse predators will continue to be removed from the Alton / Sink Valley area using the same procedures as utilized at the Coal Hollow Mine during previous years. Wildlife Services provides raven and mesopredator control throughout this area to increase nest and brood rearing success. Predator control activities will continue for this region as long as the mine is operational.

The types of predators that will be removed are common ravens (*Corvus corax*), American crows (*Corvus brachyrhynchos*), coyotes (*Canis latrans*), and red fox (*Vulpes vulpes*). All predator control activities are conducted by USDA Wildlife Services. Ravens are considered one of the greatest threats to sage-grouse eggs and chicks in the Alton/Sink Valley area.

Ravens have been found to increase with a higher availability of resources found near towns (i.e. Alton and its stockyards) and subsequently have a higher impact on sage-grouse populations (Bui et al. 2010). Additionally, Bui et al. (2010) found that resident ravens that exhibit high territorial behavior have a greater impact on nest success than birds only flying through an area. Resident birds in the Alton/Sink Valley are common and are predicted to have a high impact on bird populations.

Small mammalian mesopredators can also have a distinct negative impact on sage-grouse. Little evidence has been provided on the impact of coyotes on sage-grouse, however fox, badger, raccoon, and skunk have been shown to significantly impact nest and brood-rearing success (Mezquida et al. 2006). The removal of coyotes should be carefully monitored to ensure that lagomorph populations do not increase throughout the area. The lack of coyote predation on lagomorphs can result in higher densities that will potentially attract golden eagles (*Aquila chrysaetos*) into the valley. Golden eagles have been considered to be the most significant predator of adult sage-grouse (Mezquida et al. 2006), and have been observed taking adult sage-grouse in the Alton/Sink Valley area (Personal Communication with Frey 2010).

In a study conducted in Pinedale, Wyoming, 51% of monitored sage-grouse nest sites failed, of which 83% were lost to predation by mesopredators. 47% of all broods failed, all attributed to

predation (Bui et al. 2010). Fragmentation or reduced density of sagebrush habitats can also increase exposure of nests and young birds to predators, increasing impacts of predators on sage-grouse survival (Lyon and Anderson 2003).

To control ravens, Wildlife Services specialist Theresa Wright will distribute poisoned eggs through the North Lease area in locations that are not planned to be immediately mined. With a 4:1 egg to kill ratio, more eggs will need to be placed than the number of birds that will be removed. To control mammalian mesopredators, Roger Nauer will set a trap line along the fence near the alfalfa fields south of Alton. In 2014, approximately 20 snares were set along the fence, placed at locations where holes had been dug under the fence by mesopredators. A total of 19 coyotes were killed during the year.

Chicks raised by hens in the valley have been observed at the Coal Hollow Mine near the well. While not monitored from the time since hatched, chicks are found with hens throughout the brood-rearing period. With consistent chick counts, it is likely that chick mortality is low. This is likely due to the reduction in predators in the Alton/Sink Valley area.

Predator control will be maintained annually throughout the life of the mine using the techniques provided above.

## **Participation and Involvement with Local Working Groups**

ACD will maintain a collaborative partnership with UDWR, CCARM, USU Extension, Southern Utah University, the Heaton family, and other organizations and individuals focused on sage-grouse conservation efforts. ACD will provide periodic updates on monitoring, mitigation and mining activities to the Color-Country Adaptive Resource Management group during the scheduled bi-monthly meetings.

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