



## Alton Coal Development, LLC

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Cedar City, Utah 84720

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December 27, 2018

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

Re: **2018 Annual Progress Report, Alton Coal Development, LLC, Coal Hollow Mine, Kane County, Utah, C/025/0005**

Dear Mr. Haddock:

Alton Coal Development, LLC (ACD) is submitting an amendment to the MRP to include the 2018 Annual Sage-grouse Progress Report

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.

Very truly yours,

B. Kirk Nicholes  
Environmental Specialist  
Alton Coal Development

## 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:** Annual Sage-grouse Report

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

Annual Sage-grouse Report

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

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

*Explain:* \_\_\_\_\_

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

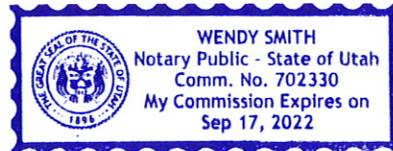
I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

B. Kirk Nicholes Environmental Specialist 12/27/2018 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 27 day of Dec, 2018

Notary Public: Wendy Smith, state of Utah.

My commission Expires: Sept 17 2022 }  
 Commission Number: 702330 } ss:  
 Address: 377 N Main }  
 City: Cedar City State: UT Zip: 84720 }



**For Office Use Only:**

**Assigned Tracking Number:**

**Received by Oil, Gas & Mining**



# **Greater Sage-grouse Population Monitoring and Habitat Improvement**

## **Alton - Sink Valley, Utah**

### **Progress Report**

For

### **Alton Coal Development, LLC**



**November 16, 2018**

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

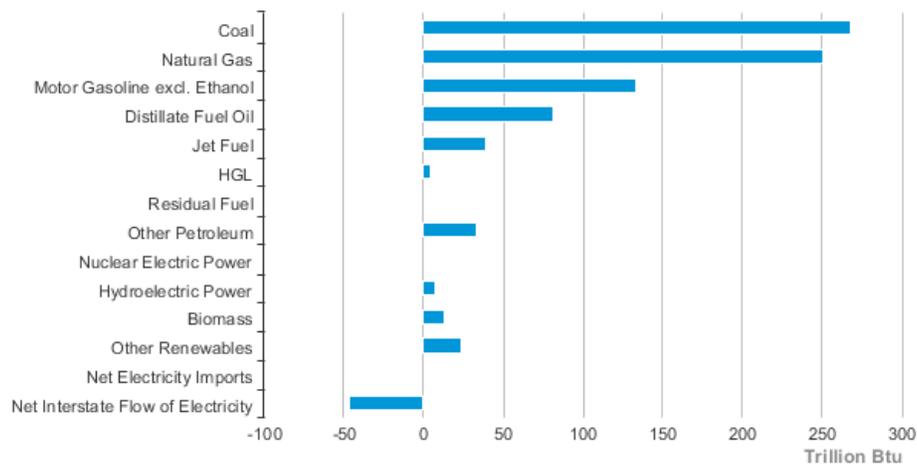
## Greater Sage-grouse Population Monitoring and Habitat Improvement Alton – Sink Valley, Utah

**Steven L. Petersen, Ph.D., Consultant**

### Introduction and Background

In the state of Utah, coal is mined to provide an important energy source for local and regional electrical power generation. In 2016, coal and natural gas combined produced 90% of Utah’s net electricity, with coal responsible for nearly 70% of that total (Figure 1, USEIA 2018). In Alton, coal is currently mined 2.7 km south of town, supporting local industry and providing employment for neighboring communities. In addition to coal, this region also provides important habitat for a diversity of plant and animals species. Of significant importance is the sagebrush habitats that sustain a sustained local population of sage-grouse (Petersen et al. 2016), hereafter referred to as sage-grouse. To ensure the long-term conservation and management of this sage-grouse population. The purpose of this report is to provide an assessment of the habitat conservation accomplishments from fall 2017 to fall 2018 within the Alton and Sink Valley region. Specifically, it will describe the status of the sage-grouse population, habitat improvements implemented in the past year (including post-disturbance habitat reclamation and pinyon-juniper tree removal), and predator control (i.e. ravens and coyotes).

**Utah Energy Consumption Estimates, 2016**



Source: Energy Information Administration, State Energy Data System

Figure 1. Estimates of energy sources used in the state of Utah. Coal is the highest, providing approximately 70% of Utah’s total energy demand.

Summary of the 2017-2018 Outcomes

The following is a report describing the significant accomplishments in sage-grouse monitoring, habitat improvements, and predator control activities accomplished during the past year. A summary of each topic described in this document includes:

1. During non-breeding months, ACD monitored sage-grouse in the Sink Valley area within important habitats that include:
  - the sagebrush field to the south of the mine
  - the bullhogged area further to the south and southwest of the mine
  - the conservation area to the east
  - the historic and new leks plus surrounding sagebrush habitats
2. Counted a maximum of 16 male birds attending the lekking areas during February 2018, which surpasses the highest count since 2001.
3. Reclaimed 279 acres of mined lands using mixes with both native and introduced plant species.
4. Mitigated 554.5 acres of mining disturbance with 2,700 acres of habitat improvements.
5. Killed 1,730 pinyon pine and Utah juniper trees in primary habitats throughout the Alton/Sink Valley area.
6. Destroyed approximately 142 ravens, 12 coyotes, and 4 red fox. All three species are known to represent threats to sage-grouse nesting success, chick survival, and adult survival.

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## **1. Sage-grouse Population Monitoring**

### **1.1 Employee Observations and Sage-grouse Population Monitoring**

All ACD employees are requested by management to report any sighting of sage-grouse within the mining region. All observations are reported to Kirk Nicholes, ACD Environmental Manager, who records the date, location and number of birds observed. ACD employee bird observations are reported when employees are fulfilling regular mining operations. They do not conduct surveys or searches for sage-grouse. Subsequently, these sightings may provide additional data on sage-grouse spatiotemporal seasonal habitat use, however, they are insufficient to adequately assess sage-grouse density and distribution within the area alone. Variability in observations may be a result of heightened awareness by employees rather than an increase in bird use activity or density.

During the 2017-18 season, mining efforts have been concentrated in the North Lease area. Collared data and surveys show that sage-grouse occurrence is much lower here than in the Sink Valley area (Frey Annual Report 2016, 2017). Similarly, the total number of birds observed by employees has also decreased compared to years when operations were being conducted in the Sink Valley area.

ACD mine employees are provided trained to identify and accurately record sage-grouse observations. K. Nicholes communicates with those who report sightings and ensures that dates, times, and coordinate locations are accurate and recorded. These results are used to demonstrate frequency of bird sightings in the area and to determine patterns of habitat use (Table 1).

Table 1. Observations of sage-grouse reported by ACD employees between March 2018 and October 2018 within the Alton/Sink Valley region and the North Lease mining area.

Obs ID	Date	Time of observation	Number of birds Observed	Location	State Plane Coordinates
1	Mar 16, 2018	8:00 am	5	Observed males strutting on the New Lek along the ridgeline (K. Nicholes)	349208.0 E 1766132.0 N
2	Mar 28, 2018	8:00 am	1	Observed 1 bird (female) on the edge of the PJ woodland near the mechanics conexas (D. Jones)	355670.3 E 1769258.9 N
3	Mar 28, 2018	3:00 pm	1	Observed 1 bird (female) on the edge of the PJ woodland near the mechanics conexas (D. Jones)	355643.1 E 1769156.7 N
4	Mar 30, 2018	8:00 am	7	6 males were strutting with 1 female observing nearby within the New Lek area (K. Nicholes)	349159.8 E 1766006.2 N
5	Apr 5, 2018	10:00 am	1	One female was located near the new cattle guard near the NPL (A. Allen)	355381.1 E 1767974.9 N
6	Jun 12, 2018	3:00 pm	7	One hen with 5-6 chicks in the well area (D. McDonald)	353597.8 E 1770180.1 N
7	Jun 13, 2018	9:15 am	3	One hen with 2 chicks found near the well area (R. Anderson)	353446.3 E 1770134.0 N
8	Jul 2, 2018	11:48 am	7	Observed 2 hens in the orchard on route to the MET station, and 1 hen, 4 chicks on the return (K. Nicholes)	353329.2 E 1770586.9 N
9	Sep 12, 2018	10:40 am	5	All 5 birds observed near the orchard (D. McDonald)	353376.8 E 1770113.5 N
10	Oct 4, 2018	12:30 pm	4	Flushed four birds during a fall trapping effort (K. Nicholes)	349507.4 E 1766969.0 N

### 1.2 Ground-based Sage-grouse Surveys

Site-wide surveys are conducted each month by Dr. S. Petersen, with the intent of locating and counting the total number of sage-grouse found within the mining region. This includes areas near the mining headquarters, the sagebrush flat, the new lek location, the bullhog region to the south, the well and conservation area (Figure 2). During breeding months, surveys are limited to non-nesting habitats to prevent hens flushing from nests or disturbing hens with chicks during the early brood-rearing period. Survey efforts in these months concentrate on lek counts and road surveys.

A survey path has been established that is roughly followed each month. This makes it possible to compare observations between months to look for increasing or decreasing sage-grouse population patterns or trends. The path courses through primary sage-grouse preferred habitats that include sagebrush (black and mountain big sagebrush), bullhogged areas, and post-mining reseedings. Each survey is conducted by slowly walking along looking for any sign of birds that includes fecal deposits, nest sites, feather piles, and flushed birds. Each time an individual bird or group of birds are observed, the coordinate position for that location is recorded (using GPS) along with the time of day.

Sage-grouse observations are recorded for the specific flush location (Figure 1). The specific areas that are searched include

- Sagebrush flat (SF)
- New lek (NL) – this breeding area is positioned along the ridge crest, located at the hilltop south of the sagebrush flat.
- South Mine Sagebrush Patch (SMSP) – this area is surrounded by PJ woodland, and supports a springtime pond, located just south of the original spoils pile.
- North Mine Sagebrush Patch (NMSP) – positioned north of the original spoils pile, this area is being invaded by young pinyon and juniper trees.
- Original Lek (OL) – until 2010, this area supported the primary lek site for Sink Valley. The birds have since shifted strutting behaviors in the NL area. The OL was mined in 2012 and is currently existing as reseeded pasture, dominated by perennial grasses, forbs, and a few naturally recruiting sagebrush seedlings.
- Wet meadow (WM) – This site supports a grass/rush/sedge community which has served historically as a site for raising chicks. This area supports a natural spring, the well, and orchard.
- East Sagebrush Patch (ESP) – this site is located east of the mine and west of the conservation area. It is dominated by black sagebrush and surrounded by PJ woodland.
- Conservation Area (CA) – located east of the mine site along the upper bench. This includes some grassland but also disked sagebrush surrounded by oak and PJ woodland.
- West Sagebrush Fields (WSF) – including all of the bullhog area located south of the new lek which connects to the sagebrush fields west of Sink Valley
- Ford’s Pasture (FP) is located 10 miles south of Sink Valley. Sage-grouse have been seen in that area during historic surveys, but no birds were detected during surveys within this area between 2017-present.
- Rabbitbrush Field (RF) – this area was treated in 2010 to reduce rabbitbrush dominance and enhance sagebrush recovery. Birds have not been seen in this area before or after treatment by ACD biologists.

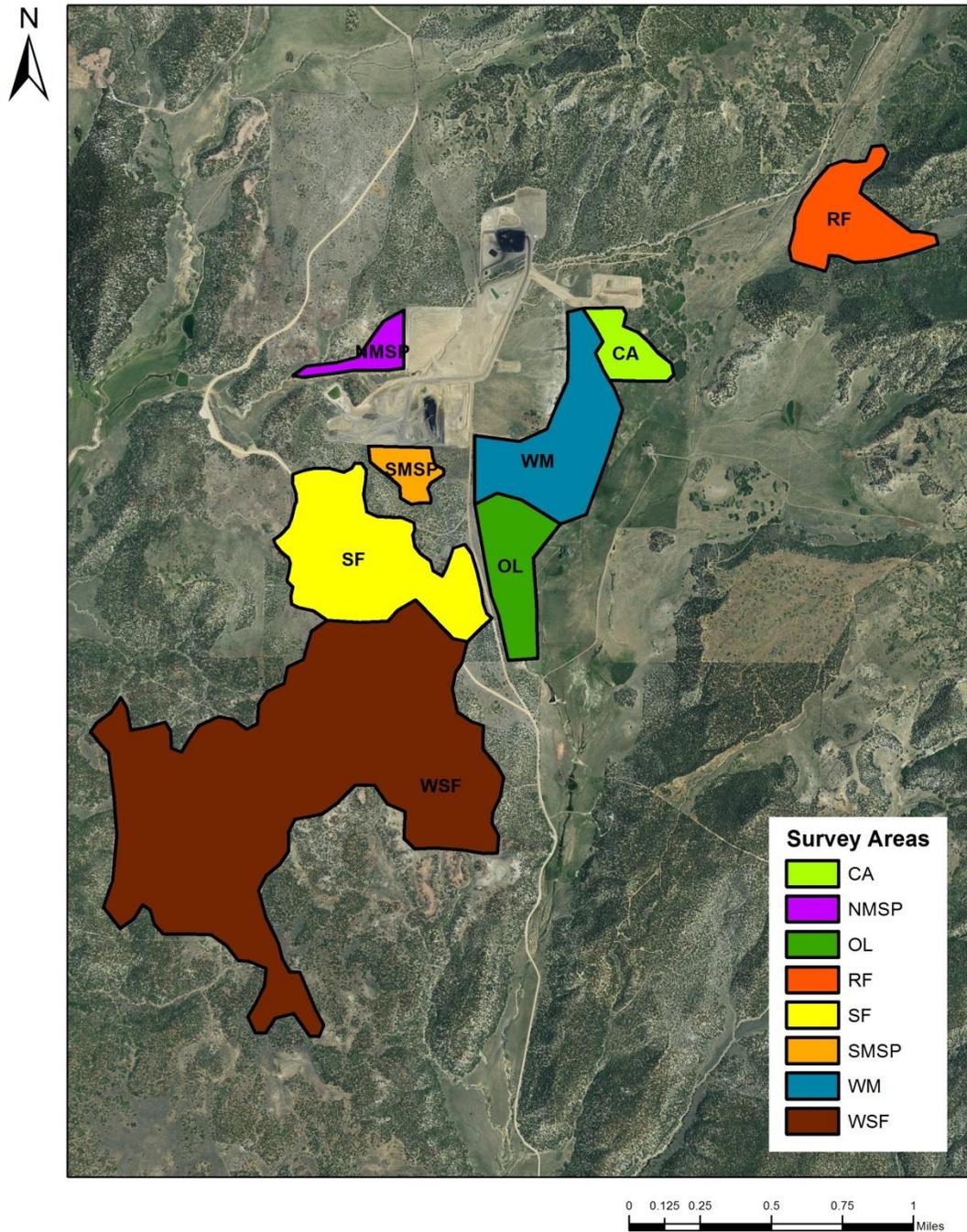


Figure 1. Location of survey areas for sage-grouse during the 2012-2018 monitoring seasons. CA = Conservation area, NMSP = North mine sagebrush patch, OL = Original lek, RL = Rabbitbrush field, SF = Sagebrush flat, SMSP = South mine sagebrush patch, WM = Wet meadow, and WSF = West sagebrush fields. Additional sites not shown above include the corridor (C) and the alfalfa fields (AF) east and south of the town Alton, respectively.

A summary of the results recorded for each monthly sage-grouse survey is provided in table 2. Historically, highest occurrence of sage-grouse has been within the sagebrush flat. However, with extensive bullhogging south of that area, birds are almost exclusively observed within these treated areas. This demonstrates the value of habitat improvement projects for this region (Frey et al. 2013).

Table 2. Observations from monthly surveys conducted by S.L. Petersen between February 2018 to December 2018.

Date	Time of observation	Number of birds	Location
Feb 10, 2018	8am-12pm	26	Flushed 1 bird at 8:15am in valley east of SF, 1 at 8:50 in the WSF-south bullhog (SB) and 24 also in the WSF bullhog area.
March 3, 2018	7am-12pm	16	Males strutting on NL at 8:40am, located along a 100m stretch across ridgeline. Males in 2 groups with 8 birds in one and 7 in the other.
April 3, 2018	7:30-12pm	0	No lekking birds observed. No extensive surveys to avoid disturbing hens. Clear sky but very cold (below freezing) and windy (+10mph)
April 23, 2018	7:30am-12pm	8	Eight males on NL at 7:45am. Active mining at the North Lease and crushing at the headquarters. Clear skies and warm morning.
May 26, 2018	7-11am	10	Flushed all birds in the WSF-SB area, in two groups of 5 at 7:27am. No active mining activity during the day.
July 7, 2018	7-12am	11	Flushed 7 birds from WSF-SB. Two birds in one group and 3 in the other at 8:28am. Flushed 1 hen with 3 chicks in the grassy portion of CA at 10:52am. Chicks were mid-size and strong fliers. No active mining and crushing, low wind speeds.
August 8, 2018	7-12am	25	Flushed 15 birds from NL in two groups (8 and 7 individuals in each at 7:45am). Flushed 5 birds at the WSF (S Bullhog) at 8:14am. Flushed 1 hen with 4 chicks from the well/orchard area at 9:53am. All 5 flew into the sagebrush treated CA.
October 13, 2018	7-11am	30	Flushed 3 birds at the SF foothills and 2 birds in the valley to the east (8:18am). Flushed 14 birds at 8:55am and another 11+ birds from the WSF-SB.
November 10, 2018	7-12pm	20	Flushed 1 bird in the WSF-SB area at 8:31. Jumped another 7 birds by the cattle guard along the county road at 9:45am and 12 birds by the sagebrush patch just south of the original spoils pile site (near the little lake).

Over the past 10 years, birds were most often observed in the sagebrush flat, however, since the WSF area was bullhogged in 2015-16, the birds have been seen almost exclusively within this area. The plant community in WSF-SB is dominated by low density (*Artemisia nova* A.

Nelson) and mountain big sagebrush (*Artemisia tridentata* Nutt. ssp. *vaseyana* (Rydb.) Beetle). There is also scattered rubber rabbitbrush (*Ericameria nauseosa*) with relatively high density Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*) seedlings. Figure 2 displays the location of birds where they have been flushed during monthly surveys within the non-lekking or nesting time periods (July-Feb) and Figure 3 depicts the number of birds included in each flushed flock.

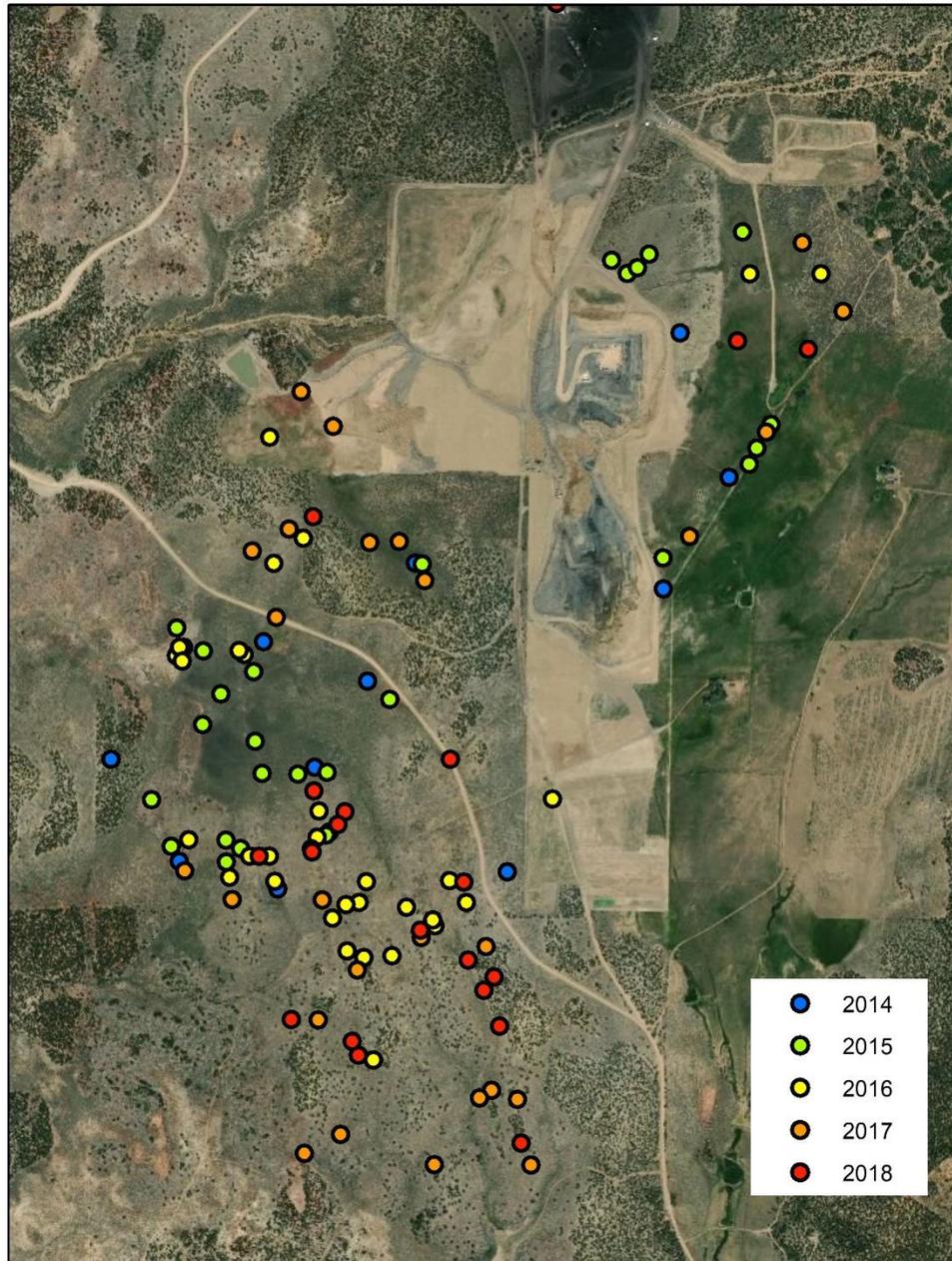


Figure 2. Distribution of sage-grouse flush locations by year. Birds were flushed during monthly surveys within non-breeding time periods (July-Feb).

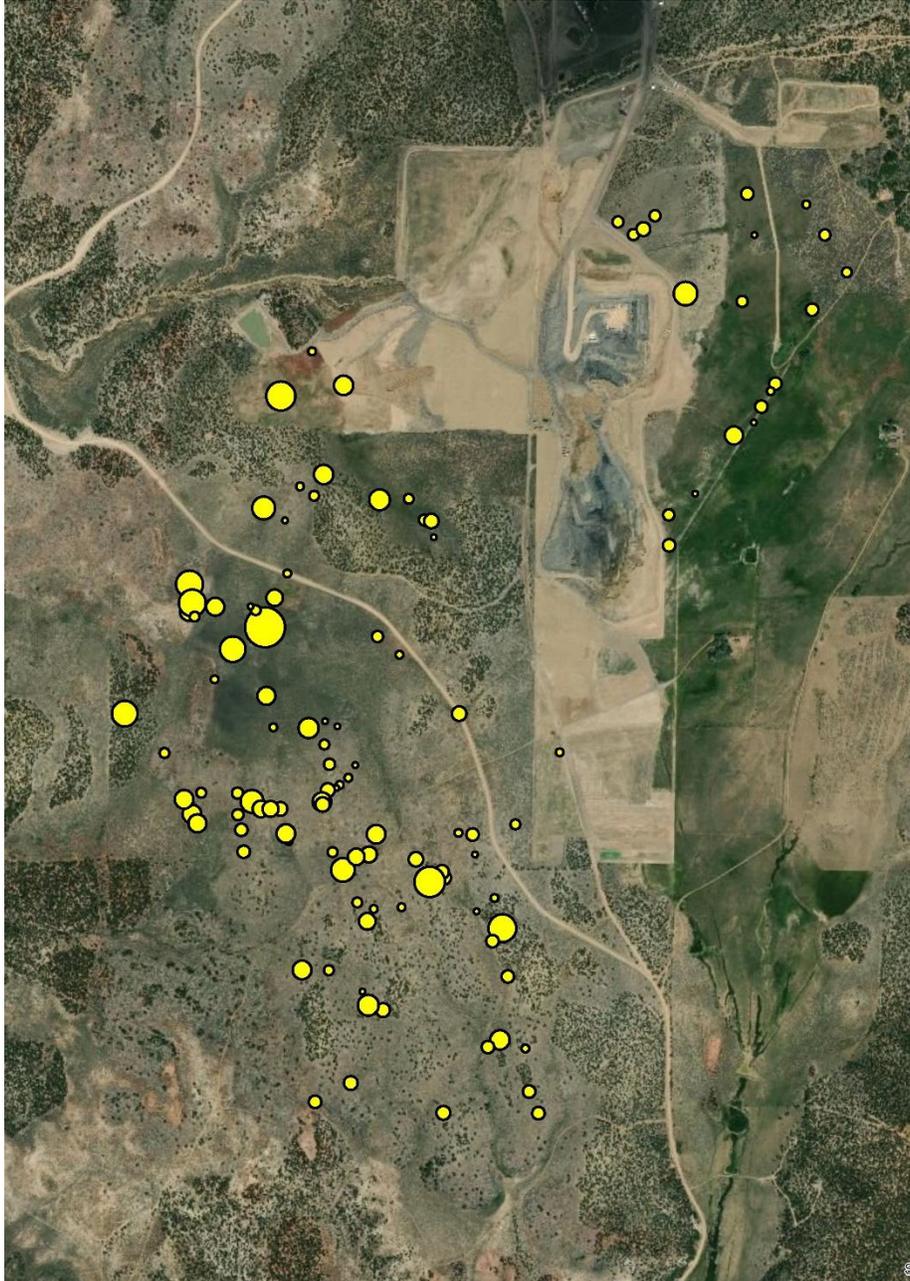


Figure 3. Flock size of birds that were flushed during monthly surveys during the 2014-18 time period.

The sagebrush flat supports a high density stand of black sagebrush with limited forbs and grasses. The well site adjacent to CA is dominated by wet meadow obligate and facultative species that includes species of sedge, rush, and a diversity of forbs (*Iris missouriensis*) and shrubs (i.e. *Rosa woodsii*). Hens often raise chicks and juvenile birds in the well area during early and late brood rearing periods. This is likely due to the rich diversity in plant species and insect food sources. CA is dominated by black and mountain big sagebrush. This area was

treated to reduce shrub density and increase the availability of sage-grouse food species that were included in the post treatment seed mix.

### 1.3 GPS Collaring and Monitoring

Sage-grouse monitoring using GPS backpack transmitters has been conducted by Dr. Frey within the Alton/Sink Valley area. These GPS transmitters were programmed to provide 4 point coordinate locations per day resulting in approximately 112 points per month for each individual bird. Since last year, birds with transmitters had either died or lost their backpack, resulting in no data for much of the 2018 year. During the fall, crews led by Dr. Frey attempted to trap sage-grouse to resume high accuracy monitoring, however, no additional birds were trapped.

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

During the breeding season, male sage-grouse primarily strut at NL or at several locations in WSF-SB. Over the past 6 years, counts have been relatively consistent with a maximum count of 10-16 birds, with the highest occurring in 2018 (16; Figure 4). The most accurate estimates of bird densities in this region are provided by lek counts conducted annually by wildlife biologists with the Utah Division of Wildlife Resources (UDWR) with contribution from observations made by ACD employees and consultants. In Figure 2, Observations between 1991-2016 were provided by Utah DWR, based on surveys during lekking periods (February – April). For 2017-18, observations were made by Petersen (ACD consultant) and ACD employees (Kirk N and Josh) from surveys in the lekking period. UDWR was unable to provide 2017-18 count data. Both 2005 and 2007, no males were observed at the lek. Similarly, in 2011 no males were counted at the historic lek (HL), however, it may have been that birds were displaying at NL and were not detected. Observations from 1991-2011 were of birds lekking at HL only.

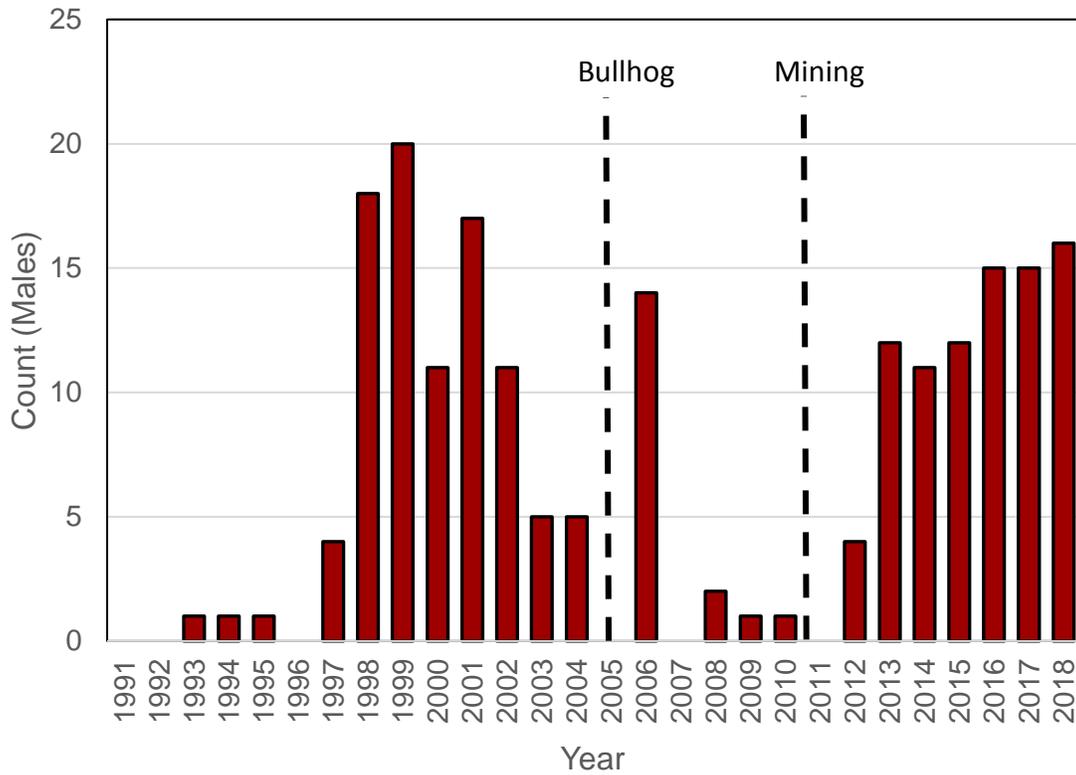


Figure 4. Male sage-grouse lek attendance at the Sink Valley lek, located south of Alton, Utah. All males were observed during morning hours strutting on the primary lek.

1.5 Noise Detection and Sound Assessment

The influence of sound (noise pollution) on sage-grouse was measured this year to determine the influence of mining activity in the North Lease area. Sound monitoring is conducted by determining maximum decibel levels using an Extech 407735 Sound Level Meter. Sound measurements were recorded at increasing distances from the mining activity at the North Lease area. In each cardinal direction, sound was recorded at the edge of the immediate mining activity, and then at 100, 500, and 1000m away. The results of all sound measurements is shown in Figure 5.

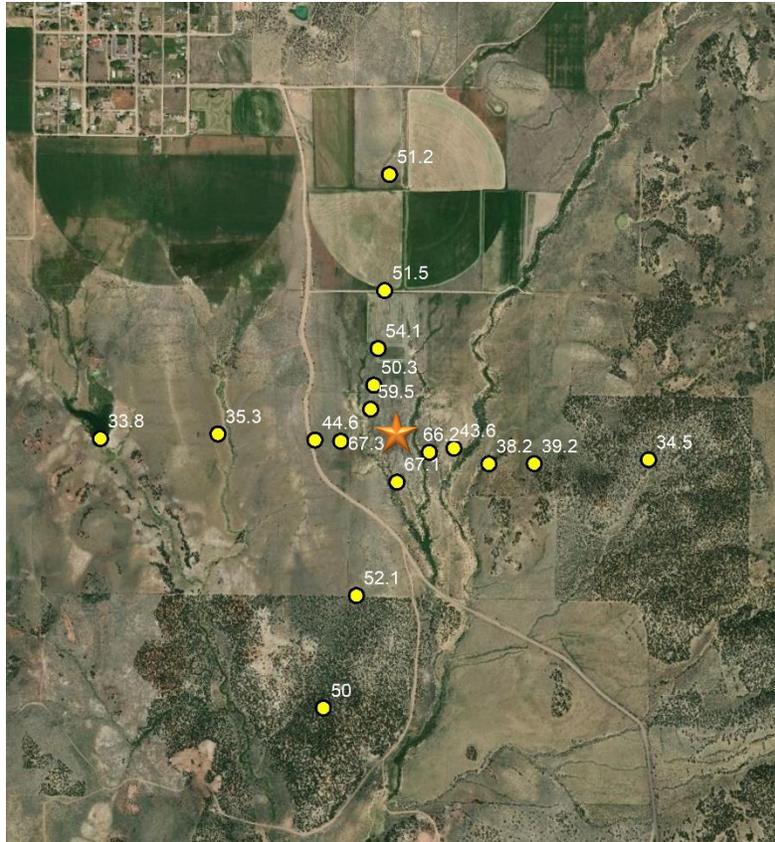


Figure 5. Sound measurements (db) in relation to the north lease mining area (orange star). Measurements were recorded at the disturbance edge, 100m, 500m, and 1000m distant.

## 2. Habitat Mitigation and Improvements

Following mining, ACD implements habitat improvement through soil preparation and seeding adapted species that stabilize soils and establish a functional plant community (Figure 6). These land improvement activities focus on planting seeds using a rangeland drill followed by covering the soil with shredded straw to protect soils and enhance seed microsite conditions (Petersen et al. 2004).

Other projects that are being implemented to improve the habitat for sage-grouse surrounding the Alton/Sink Valley area which involves mowing rabbitbrush using a combine mower in the area north of the mine (Figure 7), the area south of the mine located at the Fords Pasture area 10km south of the mine area (Figure 8). At each site, rabbitbrush will be mowed up to 6 ft. in height and then Tordon 22K herbicide will be applied in a single application to prevent regrowth or resprouting. ACD will fund Utah DWR up to \$14,040.00 to complete this habitat improvement work at the Ford Pasture area.

To date, a total of 2,700 acres have been treated by ACD (Figure 6). This includes bullhogging, chaining, and lop-and-scatter of PJ woodlands, reduction of rabbitbrush, mowing and treating willow with herbicide, and disking and reseeding sagebrush to improve sage-grouse habitat in the Conservation Area.

### 2.1 Reclamation Response

Habitat reclamation following mining is an integral part of the work being done at the post-mining locations. Reclamation activities enhance plant community conditions and wildlife habitat by stabilizing soils, reducing potential soil erosion, increasing seed establishment and plant community sustainability. These activities aid in returning ecological structure and function, and facilitating establishment of grass and shrub species important for habitat required by sagebrush obligate species (i.e. sage-grouse, sage sparrows). Dahlgren et al. (2006) found that implementing mechanical treatments can increase sage-grouse use of managed landscapes.

Following mining operations, the landscape has been recontoured to resemble pre-mining landform conditions. Topsoil is replaced and reseeded using a mix of native and introduced shrub and herbaceous species. Seed is distributed using a seed drill pulled behind a John Deer tractor (Kevin Heaton operator). From 2010 to 2018, a total of 554.5 acres of land had been mined of which 279 had been reclaimed (seeded with straw covering to protect seed from desiccation). During the same period 2,700 acres of the surrounding Sink Valley landscape had been treated for habitat improvement (i.e. bullhogging PJ woodlands, thistle weed removal, seedling-juvenile PJ tree removal).

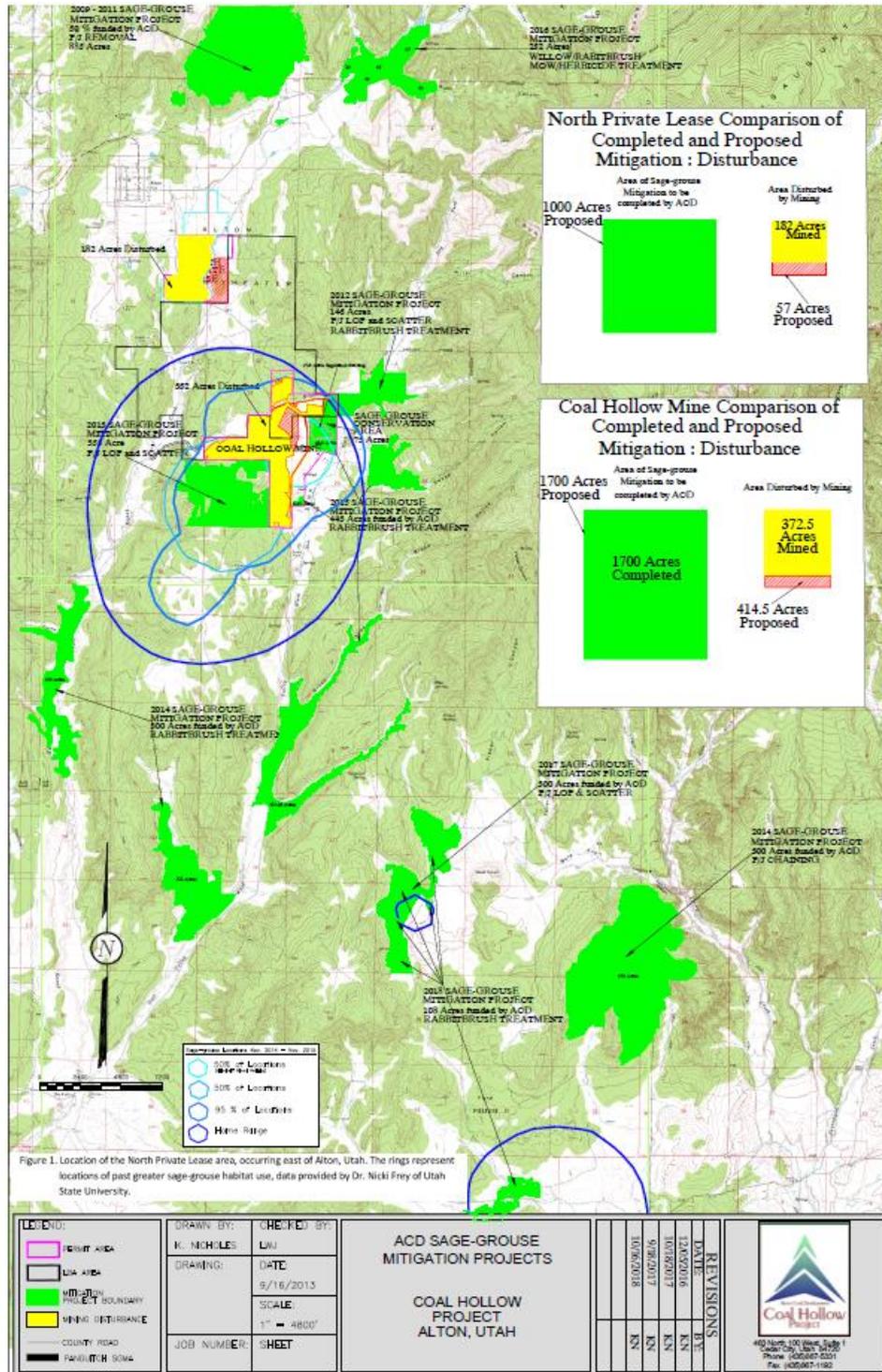


Figure 6. Total sage-grouse habitat mitigation completed through November 2018. Habitat improvements totaled 1,000 acres for the North Private Lease and 1,700 acres in the South Private Lease.

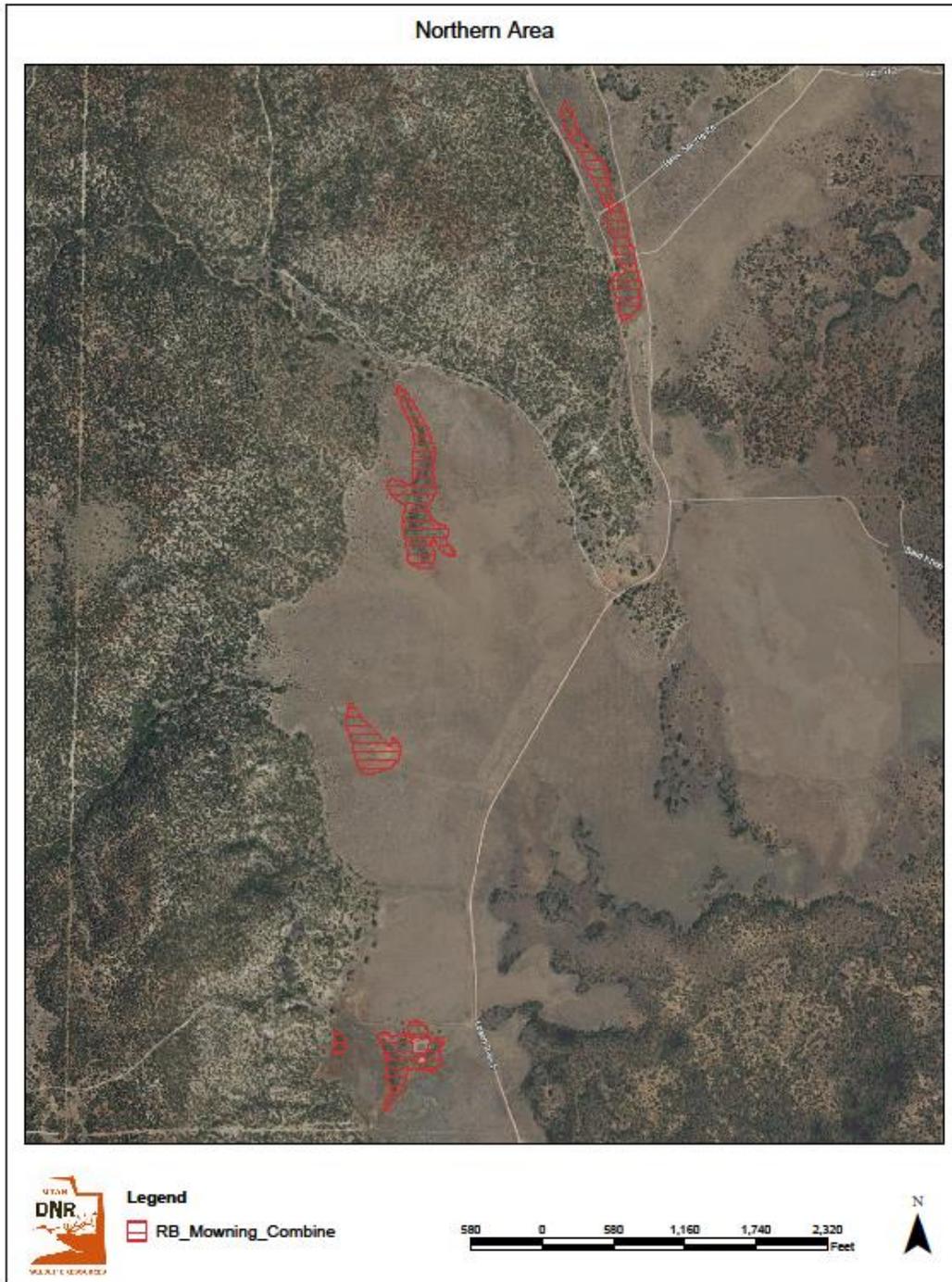


Figure 7. Rabbitbrush treatment using a combine mowing operation in the northern area.



Figure 8. Proposed treatment plan designed to enhance sage-grouse habitat in the Fords Pasture region. Rabbitbrush will be mowed to open soils allowing for greater plant community diversity, including sage-grouse cover and food plant and insect species.

## 2.2 Juniper Mastication

Pinyon-juniper woodlands have continued to be controlled within the Alton/Sink Valley area removal with treatments implemented by the BLM (Kanab field office). Most bullhogging activity was concentrated in areas south of the 2016-17 bullhogging effort, reaching distances of 1-2 miles from the headquarters. The focus has been to remove phase II and phase III woodlands using primarily mastication techniques, thus connecting intact sagebrush habitats located throughout the region. Mastication not only opens habitat, but also increases food forb and insect availability, opportunity that is created during the mastication process which releases tied up resources that increase shrub, forb, and grass cover (Bybee et al. 2016).

PJ recruitment has been extensive throughout the Alton/Sink Valley area. Seedlings of both species emerge in both untreated and treated habitats, creating a potential threat to long-term habitat conditions. ACD environmental manager (Kirk Nicholes) and sage-grouse consultant (Steve Petersen) have removed seedling and juvenile pinyon and juniper trees using tree loppers. Tree sizes that are cut range in size from 2" to 7'. A total of 1,730 trees were removed in 2018, with a focus in areas that support critical sage-grouse habitat (Table 3).

Table 3. Number of trees killed throughout the Sink Valley area from February to November 2018.

Location	Feb	Mar	Apr	May	July	Aug	Oct	Nov	Total
SF	43	0	12	0	35	5	0	0	<b>95</b>
SF-North side of road	21	0	0	26	28	0	0	19	<b>94</b>
SF-East Valley	16	142	62	0	13	0	27	22	<b>282</b>
NL	74	0	0	35	16	5	11	6	<b>147</b>
NL-West Bowl	30	0	0	52	19	15	15	16	<b>147</b>
WSF-SB	110	0	105	70	93	82	64	171	<b>695</b>
HL-West	49	0	156	0	25	0	0	0	<b>230</b>
CA-Upper	1	0	0	0	1	0	0	0	<b>2</b>
CA-Lower	2	0	0	0	0	0	0	0	<b>2</b>
NMSP	0	0	0	0	0	0	0	0	<b>0</b>
SMSP	0	0	0	4	3	0	0	6	<b>13</b>
Other	4	0	0	0	0	10	19	0	<b>33</b>
<b>Total</b>	<b>350</b>	<b>142</b>	<b>335</b>	<b>187</b>	<b>233</b>	<b>107</b>	<b>136</b>	<b>240</b>	<b>1730</b>

To expand sagebrush habitat availability and in attempt to increase connectivity with the surrounding landscape, a lop-and-scatter plan has been approved for the Alton area. This project is part of the WRI mitigation effort designed to improve sage-grouse habitat.

### 3. Predator Control Activities

Sage-grouse are impacted by predators in the Alton/Sink Valley area. In 2018, the remains of one sage-grouse was found within a primary habitat, exhibiting characteristic traits of being killed by a predator (Figure 9). The bird was observed on February 10, a killed bird was found in the sagebrush flat area (370334 E 4139169 N). At this site, feathers were spread within the immediate area, located next to many roost piles.



Figure 9. Sage-grouse feathers found at a site where a bird had been killed by a predator. Feathers were found in the sage-brush flat, an area dominated by black sagebrush that has been primary habitat for sage-grouse in this area.

During 2018, avian and mesopredators were removed to increase sage-grouse nesting, brood rearing and adult survival. The primary predators removed included common ravens (*Corvus corax*) and coyotes (*Canis latrans*). Most predator control activities were conducted by USDA APHIS Wildlife Services, a federal agency that provides an integrated wildlife damage management approach to help resolve wildlife conflicts and promote human-wildlife

coexistence (APHIS 2018). ACD provides an annual funding allocation (\$7,500 for this years services) to support predator control within the Alton/Sink Valley area.

### 3.1 Raven Control

Raven control activities were coordinated by Teresa Wright, a raven control specialist with USDA Wildlife Services. Control efforts were focused on time periods when raven populations are high and during peak sage-grouse breeding periods. In 2018, raven control efforts occurred between October 1, 2017 and September 30, 2018.

The primary method used to control ravens is by dispersing hard-boiled eggs treated with DRC-1339 3-chloro-p-toluidine hydrochloride, a restricted pesticide with acute toxicity in corvids including ravens, crows, blackbirds, starlings and magpies (US EPA 2015). When consumed, DRC-1339 is readily absorbed into the circulatory system where it is metabolized in the liver forming glucuronides and mercapturides. Uric acid posits build up in the kidney and blood vessels resulting in necrosis and circulatory impairment. The cause of death is from uremic poison and congestion of the major organs (<https://ovocontrol.com/search-ovocontrol/bird-poisons/>). In most cases, the target species dies as soon as 3 hours after consuming the bait. For application in the Alton/Sink Valley area, the pesticide is injected into hard-boiled eggs rather than dispersed in granular form to reduce uptake by other susceptible species including non-target corvids, rock dove, Eurasian collared dove, ducks, geese, and pheasants.

During the treatment period, a total of 1000 hard-boiled treated eggs were distributed within the mine site and surrounding Alton area (Figure 10). Ravens cache eggs at a ratio of 1 kill for every 6 eggs distributed. Therefore the total number of ravens killed during the reporting window is 167 birds.

### 3.2 Mesopredator Control

Mesopredators that occur within the Sink Valley/Alton area include coyotes, red fox, raccoon, and skunk. Mesopredator control efforts were coordinated by Roger Nauer, USDA Wildlife Services trapper and mesopredator control specialist. To control mesopredators, Wildlife Services used foot snares, traps, and fixed-wing aircraft. Between October 2017 and September 2018, Wildlife Services harvested 12 coyotes and 4 red foxes within the mining area.

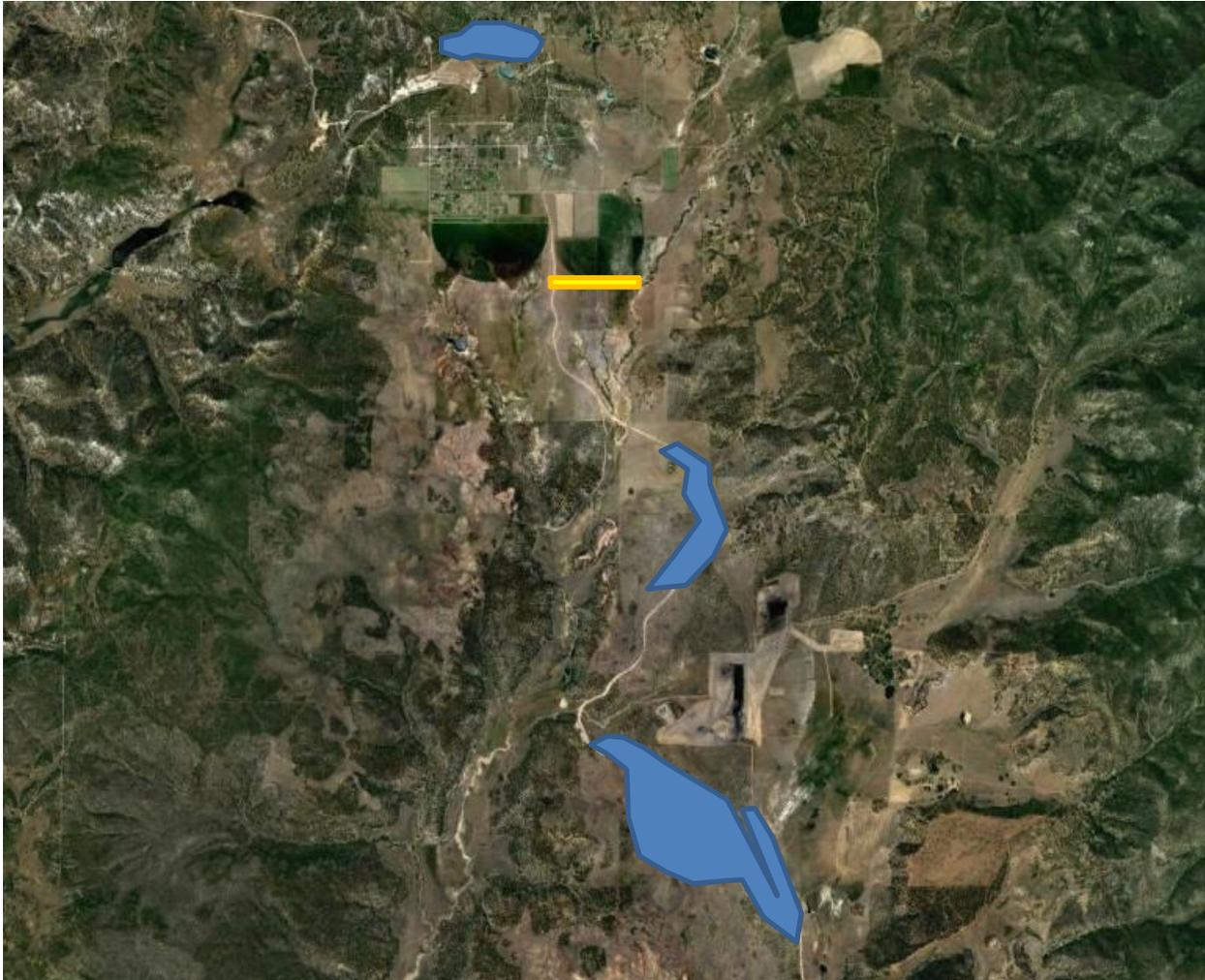


Figure 10. According to Teresa Wright, USDA Wildlife Services biologist, distributed eggs in the same general areas where eggs have been distributed over the past several years. This map portrays that area, with blue polygons indicating sites where poison eggs were distributed. This includes roadsides near critical habitat and the stock yard near Alton where birds congregate. The yellow polygon represents the location where coyote snares are set and trapped.

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

ACD participates as members of the Color Country Adaptive Resource Management (CCARM) organization. CCARM contributes meaningful input and suggestions for improving habitat conservation efforts within the Alton/Sink Valley area. This includes recommendations for sage-grouse population and habitat conservation planning. Feedback is considered in all aspects of project planning and implementation. Maintaining this cooperation with CCARM has been instrumental in the success of this project.

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