

# Lee Ranch Mine Use Attainability Analysis Sampling Plan

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*September 2015*

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## Background

The Lee Ranch Mine (LRM) is a surface coal mine located in McKinley County New Mexico. There are a number of drainages that cross the permit boundary. Most of these are small first and second order ephemeral drainages that typically only flow in response to precipitation. LRM has point source discharges located on these drainages and operates under an existing NPDES permit (No. NM0029581). This Use Attainability Analysis (UAA) is being conducted to classify the drainages according to their hydrologic characteristics.

The New Mexico Environment Department (NMED) conducted a UAA on the principal highest order drainage in the permit area designated Mulatto Canyon. The UAA was performed in accordance with the New Mexico Hydrology Protocol. The results of the NMED UAA indicated that the Mulatto Canyon drainage is an ephemeral drainage (Figure 1).

LRM intends to follow the same hydrology protocol to classify the remaining drainages located within the permit area. Drainages within the western portion of the mine are tributaries to Mulatto Canyon. Drainages within the eastern portion of the mine are tributary to Doctor Arroyo. Mulatto Canyon and Doctor Arroyo have confluence to the northeast, outside of the LRM surface mine permit boundary. The classifications resulting from this UAA will affect effluent limits imposed at NPDES outfalls, NMED application of water quality standards and future permitting actions with the New Mexico Mining and Minerals Division (MMD) associated with the LRM surface mining permit (No. 19-2P).

## Sampling Plan

### Sample Timing

The hydrology protocol recommends conducting the hydrology protocol between mid-September and early-November to avoid influence from monsoon rainfall. Cumulative rainfall recorded at LRM for the period of June through August of 2015 was 6.52 inches (Figure 2). The 12-month Standardized Precipitation Index (SPI) shows that the site is currently within the range of +0.8 – 1.29, indicative of above average rainfall conditions (Figure 3). Although the data show that conditions are above average moisture at this time, a field reconnaissance was conducted on September 2 and 3 for the proposed sampling locations and the majority of sites had dry stream beds. LRM personnel intend to conduct the field work for the hydrology protocol in late October and early November, 2015. This should be enough time for the streams to stabilize following the monsoon rain events.

### Sampling Site Locations

The primary drainages cross the LRM permit area and flow downstream to the northeast (Figure 1). The mining process has modified and diverted many of these drainages around the active mining areas (Figure 4). The sampling site locations were located such that they will characterize the undisturbed portions of tributary drainages both upstream and downstream of the mining areas. No sites were selected within disturbed areas due to the difficulty of assessing disturbed streams with the hydrology protocol (i.e. the hydrology protocol is dependent on vegetation growth within and surrounding the stream, which is highly altered in the disturbed areas). Furthermore, the majority of NPDES outfalls are

oversized (constructed to the 100-yr 6-hr storm or 10-yr 24-hr storm) and have rarely discharged historically. Of note, there have been no discharges from any of the outfalls over the previous 5-year permit term for the LRM NPDES Permit. Therefore, the receiving streams and diversions in the disturbed areas receive little or no runoff during precipitation events.

The proposed sites are shown in Figure 5. It is the intent of this UAA to classify all drainages within the permit area. The proposed sites provide sufficient coverage of Mulatto Canyon, Doctor Arroyo, and their tributaries across the site. Following the completion of the UAA, LRM expects that all drainages identified as “Post-UAA Classified Streams” in Figure 5 will be classified.

### **Initial Field Reconnaissance**

An initial field reconnaissance was conducted to ensure that the sampling locations selected would accurately characterize the stream reaches / assessment units. The field reconnaissance was conducted on September 2 – 3, 2015. Significant rainfall occurred in the headwater areas of these drainages the afternoon of September 2, although it wasn’t recorded by the onsite precipitation gauge due to its location. Similar to the UAA conducted by NMED, these streams show ephemeral characteristics. For example, these streams had rooted upland plants within the streambed, little to no riparian vegetation, no aquatic life or filamentous algae present, and they contained no flowing water and only two sample reaches contained pooled water despite the recent rain events. The stream geomorphology is shaped by intense flow events of short duration and there was no evidence of groundwater derived baseflow. Photos were taken of the streams in the proposed locations and are included as Attachment 1 to this Sampling Plan. Sites U18 and U19 were added following the field reconnaissance so there are no pictures of these sample reaches.

### **UAA Methods**

LRM intends to undertake the hydrology protocol at all locations. Similar to the NMED UAA on Mulatto Canyon, the majority of these sites will likely only require completion of the Level 1 Hydrology Determination Field Sheet. Additional information that will be collected where available includes soil and geologic information for the area, alluvial groundwater information, climatic information, and aerial photography and other GIS coverages. Following completion of the field assessments, this information will be compiled into a final UAA report.

### **Sampling Personnel**

LRM intends to use onsite and regional personnel to conduct the UAA. The names and experience of the personnel are provided below.

John Cochran is with Peabody’s regional office. John received his B.S. degree in hydrology from the University of Arizona. John has been practicing hydrology and hydrogeology in the arid southwest for 33 years.

Chad Gaines is the onsite environmental specialist at Lee Ranch Mine. Chad received his B.A. in Organizational Management from Ashford University. Chad has 9 years experience in coal mining at this location and 3 years experience in the environmental sector.

Jimmy Boswell is with Peabody's regional office. Jimmy received his B.S. degree in Environmental Science and M.S. degree in Geology at Indiana University. Jimmy has been practicing hydrogeology for 13 years, with 5 years experience in the arid southwest.

Ellen Price is with Peabody's regional office. Ellen received her B.S. degree in Geology at Indiana State and her M.S. degree in Geology at the University of Georgia. Ellen has been practicing hydrogeology for 7 years.

## **Conclusion**

Lee Ranch Mine has outlined the sampling plan that will be undertaken in late-October / early-November of 2015. LRM intends this UAA to classify all drainages upstream and within the permit area. Such classifications will be used when determining appropriate application of water quality standards in future proceedings associated with the NPDES permit, the MMD permit, and water quality standards applied by NMED. Any comments and recommendations received by NMED or USEPA during the review of this sampling plan will be considered and if necessary, updates to the plan will be made prior to carrying out the sampling plan.

## Figures



Figure 2: 2015 Monsoon rainfall recorded at Lee Ranch Mine during 2015.

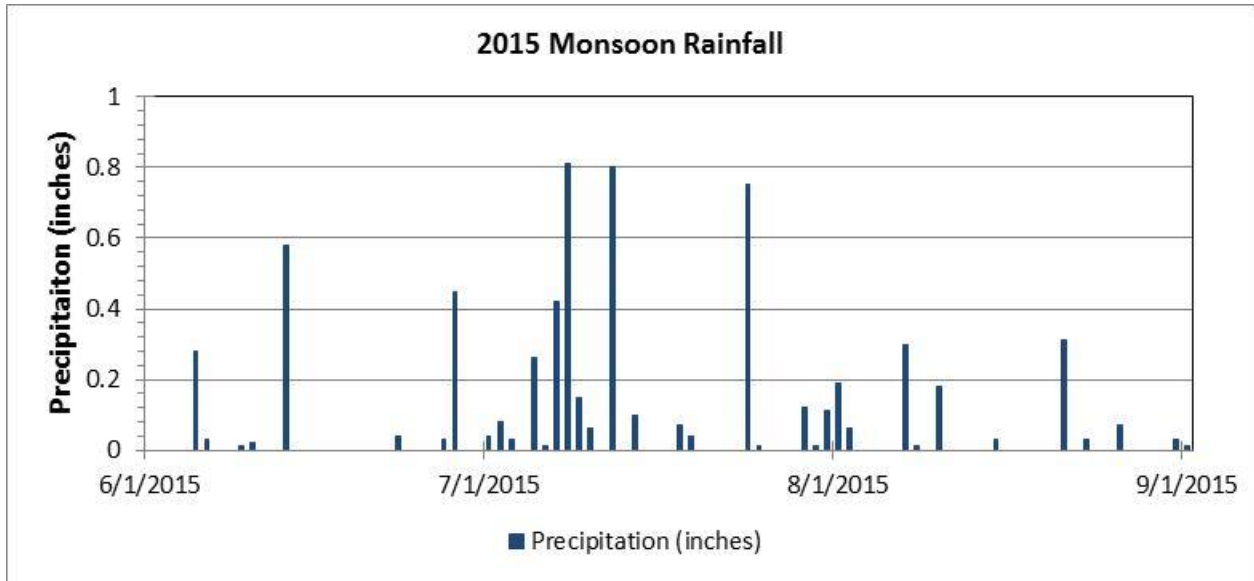




Figure 3: 12-month standardized precipitation index (SPI) from the National Oceanic and Atmospheric Administration (NOAA). Graphic includes data as of July 2015.

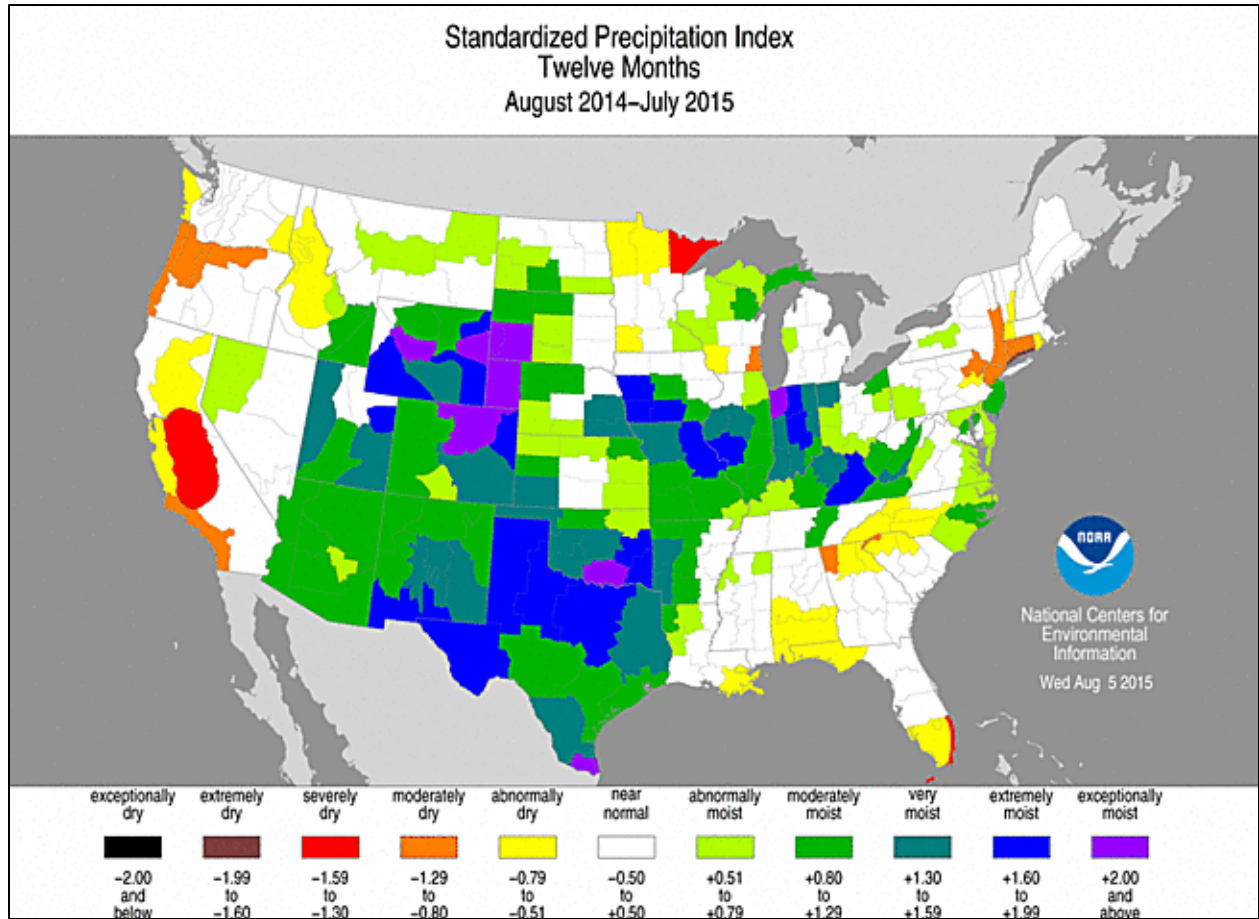


Figure 4: Map showing the Lee Ranch Mine disturbed area and water control structures (diversions and dikes) that were constructed to facilitate mining. The map also shows the locations of NPDES outfalls.

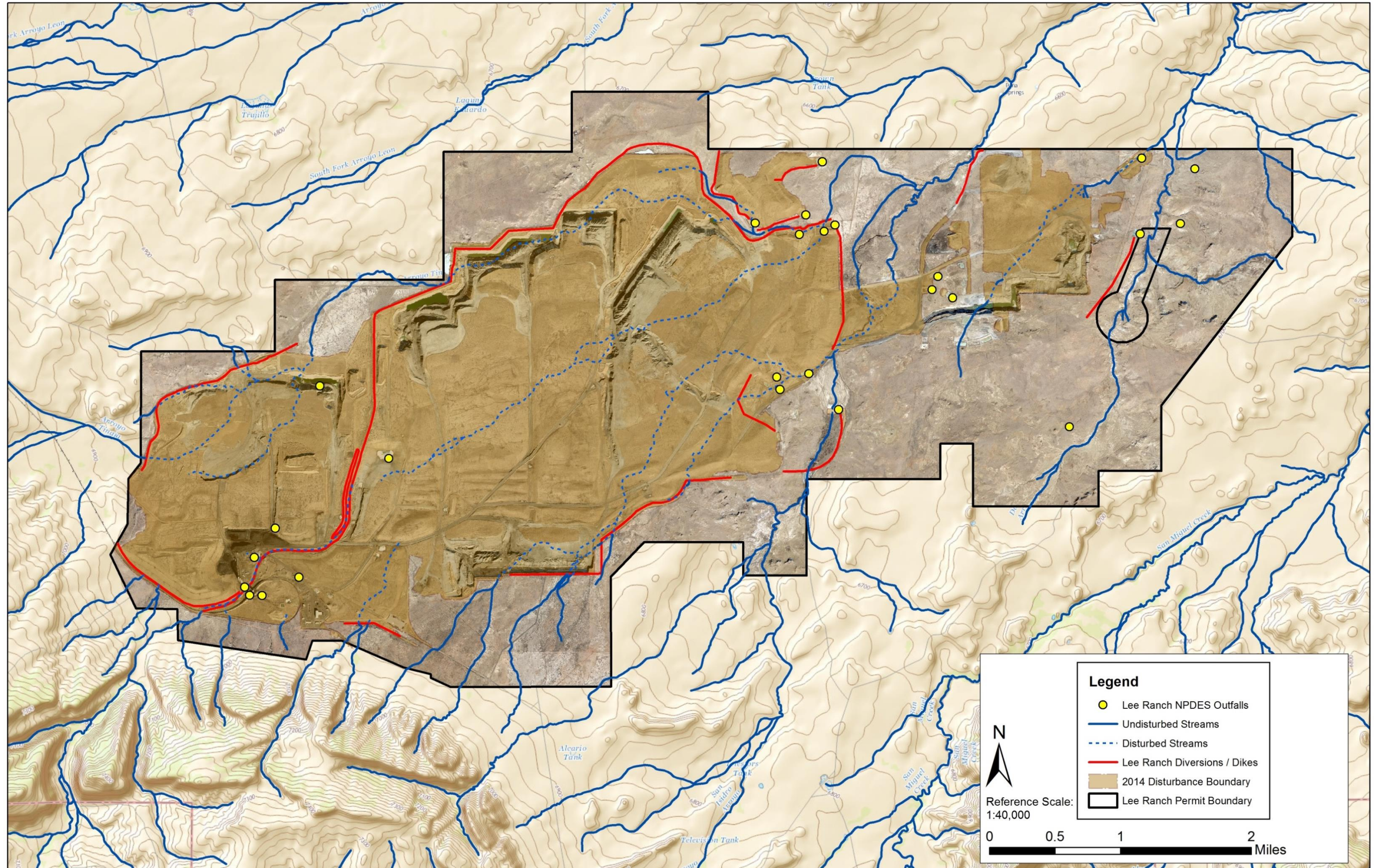
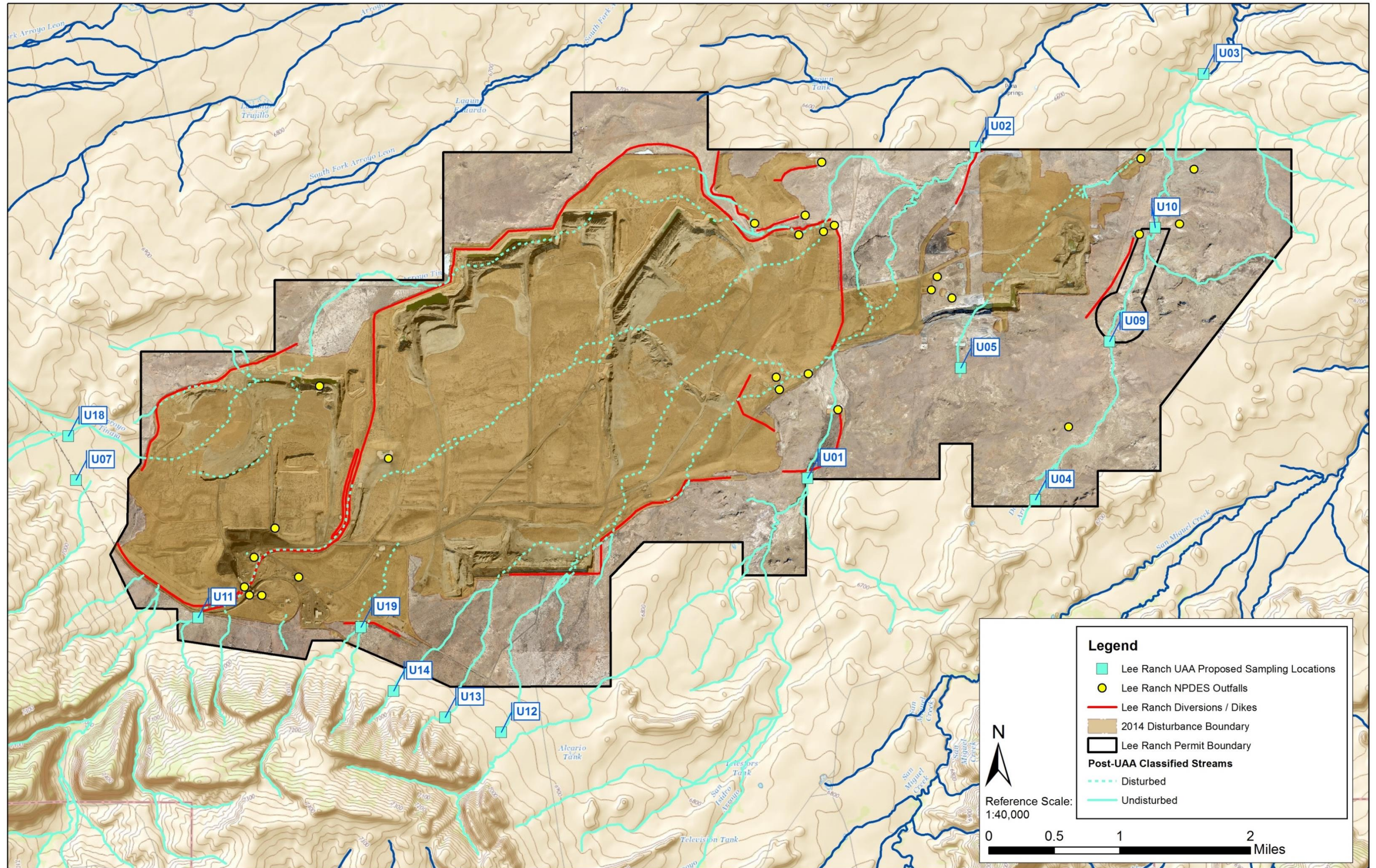


Figure 5: Map showing proposed locations of Lee Ranch Mine UAA sampling sites. Following completion of the UAA, all streams identified in light blue will be classified, including those portions that have been diverted either temporarily or permanently.



## Attachment 1

### Field Reconnaissance Photos

#### Upstream Sites - U07



**Upstream Sites - U11**



**Upstream Sites - U14**



**Upstream Sites - U13**



**Upstream Sites - U12**





**Upstream Sites - U01**



**Upstream Sites - U05**



**Upstream Sites - U04**



**Upstream Sites - U09**



**Upstream Sites - U10**



**Downstream Sites - U02**



**Downstream Sites - U03**

