

# **ATTACHMENT D8-1**

## **Scope of Work**

This report was written on behalf of Ur-Energy, USA. NFU and LC ISR, LLC are both 100% owned by Ur-Energy, USA.

Scope of Work for:

**PROPOSED VEGETATION STUDIES**  
**AT THE LOST CREEK SITE**

Prepared for:

UR Energy  
Denver, Colorado

and

AATA International  
Fort Collins, Colorado

Prepared by:

Warren R. Keammerer, Ph.D.

Keammerer Ecological Consultants, Inc.  
5858 Woodbourne Hollow Road  
Boulder, Colorado 80301  
(303) 530-1783  
[wrkeam@comcast.net](mailto:wrkeam@comcast.net)

This document outlines the proposed scope of work for vegetation studies to be conducted at the Lost Creek site. The proposed work is designed to address requirements laid out in the Wyoming Department of Environmental Quality, Land Quality Division Guideline No. 2 for Vegetation Studies.

### Vegetation Mapping

A vegetation map of the site will be prepared on a photographic base at a scale of 1 inch = 500 feet. The map will be prepared using a combination of air photo interpretation and field checking. The vegetation map will include the area defined by the permit boundary. Based on initial site reconnaissance, it appears that two vegetation types occur on the site. While the entire site is overwhelmingly dominated by big sagebrush, two different big sagebrush types occur on the site: 1) an upland big sagebrush type and 2) a lowland big sagebrush type. The primary differences between the types include higher sagebrush densities in the lowlands and differences in the herbaceous species composition in the upland and lowland areas. Overall, the site is too dry to support any wetland vegetation types. Also, no communities dominated by grass species occur. On sites with lower big sagebrush densities, the most common herbaceous species are cushion plants.

### Sampling of Plant Communities

Each of the two mapped plant community types will be sampled to obtain data for the following parameters:

- Percent vegetation cover by species
- Percent total vegetation cover (sum of all species)
- Percent total ground cover (vegetation + litter + rock)
- Percent bare ground
- Density of shrubs and sub-shrubs
- Species diversity and species composition.

These two plant communities will be sampled considering the entire permit area as the sampling unit with no distinction being made between potentially affected and non-affected areas. Cover data will be summarized and presented both as absolute and relative cover values. No production data will be collected. There are no trees on the site, so no density data for trees will be collected.

### Establishing and Sampling Control or Reference Areas

No control or reference areas will be established. The sampling design will consist of obtaining data from the vegetation types across the entire site. Since the proposed project will not remove all of the existing vegetation, the non-affected vegetation within the permit area will provide the basis for future evaluation of revegetation success.

### Descriptions of the Plant Communities

Each of the plant communities will be described based on general features of the vegetation; dominant species; relationships to topography, soils, slope, or aspect; and

relationships with other vegetation types. The descriptions will also address variability within the vegetation type. These descriptions will be based, in part, on the collected data and on other field observations.

Field observations will include the evaluation of the status of weed species that may occur on the site. Preliminary observations on the site suggest that while weed species may occur, they do not form patches greater than three acres in extent. If any large areas dominated by weeds do occur, they will be mapped and described separately, but no sampling data will be derived for these patches.

The presence of any plant species that have been identified as selenium indicators will be noted. If any selenium indicator species occur, their locations and distributions will be discussed.

As part of the description of the plant communities, a tabular summary will be prepared that includes the following information:

1. Total acreage of each vegetation type on the permit area
2. Total acreage of each vegetation type that will be affected by project activities (to the extent possible)
3. Percent of each vegetation type affected by project activities (to the extent possible).
4. Total acreage of any other mapping units.

Photographs (digital) of each of the vegetation types will be included, along with location data defining where the photographs were taken.

#### Species List for the Project Area

Observations on the species that occur on the project site will be made in association with all other field activities. Several trips will be made to the site during the growing season in order to better document the overall species composition. Separate lists will be prepared for each of the mapped vegetation types. The species in the lists will be separated on the basis of life forms (cool season perennial grasses, warm season perennial grasses, introduced perennial grasses, annual grasses, perennial forbs, sub-shrubs, shrubs, cacti and succulents. Any rare or unusual species will be collected for documentation purposes.

#### Sample Adequacy

Data will be collected from enough sampling sites in order to obtain sample adequacy for total vegetation cover and for total ground cover. Enough samples will be taken to allow for detection of a 10 percent difference in means with 90 percent confidence.

#### Sampling Locations and Sampling Methods

All sampling locations will be randomly located. Random locations will be determined using either a grid approach or a GIS approach. With the grid approach, a grid will be superimposed on the vegetation map and each of the grid cells will be numbered. The individual grid cells will be approximately one acre in size at the map

scale. Random numbers will then be used to identify which of the grid cells will be sampled. The sampling points will be located in the center of the grid cells. With the GIS approach, random locations will be developed using the computer software to identify coordinates for sampling locations. Either of these two approaches will result in the sampling sites being randomly located.

Vegetation cover data will be obtained using a point intercept approach. Each sampling unit will consist of a 25-meter transect. An optical point sampling device will be used to evaluate cover at one-meter intervals along the transect. Observations will be made at a distance of 0.5 meter on each side of the transect at each observation point for a total of 50 observation points per transect. The sampling device is equipped with a set of crosshairs. "Hits" consist of what appears in the crosshairs of the device. Hits on vegetation will be recorded by species. Other cover categories include plant litter, bare soil and rock.

Density for shrubs and subshrubs will be obtained along the transect lines. All shrubs and subshrubs that occur within one meter on either side of the transect will be counted by species.

Information on species diversity will be obtained by recording all of the species that occur within one meter on either side of the transect line (a total of 50 square meters). Data from this approach will allow for computation of the mean number of species per 50 square meters for each of the vegetation types. Overall species composition of each vegetation type will be obtained by recording all of the species that are observed in each type regardless of whether or not the species occurs along a transect site. These two approaches provide information on both overall species composition and species richness.

#### Evaluation of Sample Adequacy and Minimum Sample Size

A minimum of 20 samples will be collected from each vegetation type. Data for total vegetation cover and total ground cover will be evaluated for sample adequacy using the following formula:

$$n_{\min} = \frac{2(sz)^2}{(d\bar{x})^2}$$

Where  $n_{\min}$  = the number of samples needed adequately sample the type

s = sample variance

z = the z statistic (for this application z = 1.28)

d = acceptable amount of inherent variability to be identified between the sample mean and the true population mean (for this application d = 0.1)

$\bar{x}$  = sample mean

If the sample adequacy requirements are not met with 20 samples, additional samples will be collected until sample adequacy is obtained. No more than 50 samples will be taken.