2010

Searchlight Botanical Survey

Alphabiota Environmental Consulting

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Searchlight Botanical Survey
Searchlight Wind Farm Development
Town of Searchlight,
Clark County, Nevada

November 19, 2010

Prepared for:

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Botanical Survey Report

Searchlight, Nevada

Clark County, Nevada

Alphabiota Environmental Consulting, LLC
Project Number: 09-1034

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Executive Summary

The purpose of this Report is to provide the project proponent with an observed account of the botanical resources and potential sensitive plant species with the potential to occur within the proposed project site. A focused botanical survey for sensitive target vascular plant species, an account of all observed and identifiable vascular plants encountered, a concurrent weed survey (separate report), and a cacti and yucca count estimation were performed to support documentation of these activities.

The purpose of the Botanical Resources Survey is to provide the project proponent with an identification of the observed botanical resources and/or an account of the potential for "target and/or sensitive" vascular plant species that may occur at the site. "Target or sensitive" plant species are those species that have been identified by environmental regulatory agencies, recognized botanical societies, or other governing agency having jurisdictional interest in the identification and management of botanical species within the State of Nevada. The site survey is conducted with consideration for current existing environmental laws, regulations, and policies for the time that the surveys were conducted. A Botanical Resource Survey is a view of the project site at a particular point in time. The habitats and resources on site may exhibit a seasonal and permanent change after the Botanical Resource Survey is completed. Therefore, the survey report can only represent the site as it was observed during the survey period(s).

To date nearly 198 plant species within 38 plant families were identified within the project areas. No target plant species identified for this project were observed or located within the proposed project disturbance areas, or within the vicinities of these areas. At this time no impacts are expected or anticipated to occur for any of the target sensitive plant species identified in this report.

The purpose of the Cactus and Yucca Count Estimate Survey is to provide the project proponent with an estimate of the numbers of observable cacti and yucca species that may occur within the proposed ground disturbance areas of the proposed project. The survey estimate is not intended to provide absolute counts. Survey counts are neither intended to express calibration or validation of the estimates. However, the survey as it was conducted should provide the project proponent with statistically informative counts

for the purpose of assessing permitting and mitigation development. It is further understood that the survey counts may be used to assess and develop potential mitigation to offset potential impacts to cacti and yucca species occurring within the project impact areas with respect to the current Nevada Legislative Statutes.

13 species of cacti and yucca were detected during the survey count in February. 69 linear transects were walked along 32.71 linear miles of survey transects. A total of approximately 119 acres of transect area was surveyed during the cacti and yucca count estimates.

A weed survey performed concurrently with the Botanical Surveys will be reported in further detail within a separate report. However, survey teams discovered one weed that is generally considered a major concern for the Mojave Desert. Sahara Mustard (*Brassica tourneforti*) is an introduced species that was typically found near ranches, homesteads, and farms of the surrounding deserts and as it is understood was generally kept in check by herbicides, plowing, agricultural practices, and grazing. Observations of Sahara Mustard generally occurred as widely scattered individuals and not as populations. Most of the Sahara Mustard observed on or within the vicinity of the site occurred along the boundaries of Rte 164 (Cottonwood Cove Road) and less significantly within the adjacent wash. Seed bank appears to be transported and perpetuated by normal traffic, roadside maintenance, recreational ATVs, maintenance vehicles, and runoff from precipitation events. It is our belief that control and potential eradication of the Sahara Mustard detected within the project could potentially be achieved prior, and/or during, and/or after construction activities occur.

1.0 Introduction

1.1 Project Description

Alphabiota Environmental Consulting, LLC (AEC) understands that the project proponent (Duke Energy) is proposing the development of a wind energy facility (Project). The Project proponent is proposing to erect approximately 120 to 140 wind turbines with supporting infrastructure, transmission lines, distribution lines, and collection lines.

1.2 Project Location

The proposed Project area include locales within the rural outskirts to the north, east, and south of the town of Searchlight within the County of Clark, Nevada. The site is located within the Searchlight (35114d8), Fourth of July Mountain (35114d7), Ireteba Peaks (035114e7) Nelson SW (35114e8) 7.5 Minute United States Geological Survey Quadrangle (Plate 1). The overall Project boundary encompasses approximately 22,000 acres of Bureau of Land Management (BLM) managed lands where approximately 2260 acres of this land was surveyed for potential ground disturbance and development (Plate 2). Most of the site and the surrounding vicinity is currently undeveloped, and/or is managed by the BLM, with some of the site containing off-road vehicle trails. Four hundred foot-wide survey corridors were developed around the proposed center line of turbine strings, roads, collector lines, and transmission lines. Other features such as the O&M building, substation, and laydown area were buffered by 200 feet from the outer edge. At the time of the report, the survey corridors are found exclusively within the Project boundary and represent the areas of potential development.

1.3 Report Sequence

This report will represent two of three separate botanical surveys that were conducted for the project. These surveys consisted of a botanical survey, cacti and yucca count estimates, and a weed survey. The survey representing weeds will be represented in a separate report, however data presented in that report may be referenced in this report to emphasize pertinent information. In the interest of conserving redundancy this

report will also endeavor to describe data that is applicable to surveys only once. However, emphasis of certain data may need to be repeated for clarity within a section. The following outline represents the flow of this report.

- Research and Background Review
  - Botanical Survey Background Review
  - Cacti and Yucca Survey Background Review
  - Weather / Precipitation
- Major Habitat Descriptions
  - Creosote Scrub
  - Joshua Tree Woodland
- Topographic Features
- Dominate Soil and Substrate Characters of the Site
- Cacti and Yucca Count Estimate Assessment
  - Survey purpose
  - Methods
  - Summary of results and conclusions
- Rare Plant Surveys
  - Survey purpose
  - Methods
  - Summary of results and conclusions

2.0 Research and Review

2.1 Botanical Survey Background Review

AEC reviewed readily available biological resource documents and databases to help identify special-status vascular plant species and/or sensitive habitats that may be present within or adjacent to the Project. Research also included review of aerial satellite imagery, reconnaissance site visits, and visual indications based upon

experience of the surveyors. The major databases accessed include: Nevada Native Heritage Program (NNHP), United States Fish and Wildlife Service (FWS) special-status species and critical habitat database, Nevada Native Plant Society (NNPS) on-line database, Bureau of Land Management on-line resources (BLM), FWS National Wetlands Inventory (NWI) GIS database, and the University of Nevada, Reno (UNR): Checklist of the Non-Native plants of the Southern Nevada. The Natural Resource Conservation Service (NRCS) website was also viewed to identify soil types and structures that have been identified for the geographic locale. Preliminary soil typing was used to identify the potential for some of the target species to occur within the project vicinity. Target species identified for the Project and their general habitat requirements can be found in Table 1. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) on-line soil designations for each of the locale regions can be found on plate 3 and appendix A.

Twenty Two (22) plant species were identified as target sensitive plants (listed in Species Table 1 on the following page and Table 1 of the Appendices) with potential to occur within the Project vicinity. Three of these 22 were identified as having the highest likelihood of occurring within the Project boundary.

These 3 species are identified as:

- *Penstemon albomarginatus*:
- *Penstemon bicolor ssp. bicolor*
- *Penstemon bicolor ssp. roseus*

Species Table 1 Plants identified as Target Sensitive Species with potential to occur within the Project boundary.	
Scientific Name	**Common Name**
Anulocaulis leiosolenus var. leiosolenus	Sticky Ringstem
Arctomecon californica	Las Vegas Bearpoppy
Arctomecon merriamii	White Bearpoppy
Astragalus funereus	Black Woollypod
Astragalus geyeri var. triquetrous	Three-cornered Milkvetch
Astragalus mohavensis var. hemigyrus	Halfing Milkvetch
Astragalus mokiacensis	Mokiak Milkvetch
Astragalus nyensis	Nye Milkvetch
Calochortus striatus	Alkali Mariposa Lily
Cylindropuntia multigeniculata	Blue Diamond Cholla
Dudleya pulverulenta (syn.Escheveria pulverulenta)	Chalk Live-forever
Enceliopsis argophylla	Silverleaf Sunray
Eremogone stenomeres	Meadow Valley Sandwort
Eriogonum corymbosum var. nilesii	Las Vegas Buckwheat
Eriogonum heermannii var. clokeyi	Clokey Buckwheat
Eriogonum viscidulum	Sticky Buckwheat
Mentzelia polita	Polished Blazing Star
Penstemon albomarginatus	White-margined Beardtongue
Penstemon bicolor ssp. Bicolor	Yellow Two-tone Beardtongue
Penstemon bicolor ssp. Roseus	Rosy Two-toned Beardtongue
Perityle intracata	Delicate Rock Daisy
Porophyllum pygmaeum	Pygmy Poreleaf

On Tuesday, March 23, 2010 botanists Mr. Yancey Bissonnette, Mr. Neil Kramer, Mr. Bruce Lund, and Mr. Thomas Gehrkens visited a known reference population of *Penstemon albomarginata*. Populations of this species had been visited and recorded by Mr. Kramer and Mr. Bissonnette in previous years while conducting botanical surveys within the Ivanpah Valley. Additional location data can be supplied upon

request. Reference populations of the other two Penstemon species were unavailable at the time; however, three of the senior botanists working on the project have had previous observations of these species prior to these surveys. Detailed descriptions and photos of these and all other sensitive target species were compiled and distributed to field surveyors prior to field investigations.

2.2 Cacti and Yucca Count Estimate Background Review

AEC conducted reviews of readily available resource documents and databases to help identify cacti and yucca species with potential to occur within the Project boundary or the Project vicinity. The major databases accessed include those listed in the botanical background review. In addition to these resources AEC contacted members of the local Nevada Native Plant Society (NNPS) chapter to discuss potential and known vegetation and plant species likely to be observed in the general vicinity. AEC also contacted Dr. Mark Baker to discuss additional information on cacti species that occur within the area. Dr. Baker was helpful in conveying information regarding identification of Blue Diamond Cholla (*Cylindropuntia multigeniculata*) and Silver Cholla (*Cylindropuntia echinocarpa*) and their differences with respect to habit and flower morphology. Blue Diamond Cholla is identified as one of the target sensitive plant species for which the botanical surveys were being conducted. On Tuesday, March 23, 2010 Botanists Mr. Yancey Bissonnette, Mr. Neil Kramer, Mr. Bruce Lund, and Mr. Thomas Gehrkens visited the Blue Diamond Mountains to visit reference populations of Blue Diamond Cholla.

AEC also conducted a review of the *Nevada Legislative Revised Statutes, Title 47 – Forestry; Forest Products and Flora, Chapter 527 – Protection and Preservation of Timberlands, Trees, and Flora*, prior to field investigations. A copy of the statute can be found in Appendix B.

2.3 Weather/Precipitation

Although no known active research and recording stations currently occur within the direct vicinity of the City of Searchlight, weather stations within the region indicated that the 2009-2010 winter-spring had a higher than average amount of precipitation. This produced an abundance of growth and appearance of plants within the region. Online research of NOAA and local weather reporting services indicate that Searchlight, NV

can expect annual precipitation of approximately 4” annually. Precipitation records from the Bullhead City, AZ airport recorded 3.28” of precipitation from December 2009 through March 2010 (Dec 2009 - 0.70”; Jan 2010 – 1.66”; Feb 2010 – 0.33”; March 2010 – 0.49”). These records indicate a significantly higher than normal amount of rainfall when compared to the 2008-2009 total accumulated annual precipitation of 1.62” for the Bullhead City, AZ airport.

3.0 Major Habitats

3.1 Habitat

For the purpose of this report, habitat is defined by the physical area characterized by an assemblage of botanical species, substrate features, or aquatic environment. Habitat types comprised of botanical assemblages illustrate a community typically associated or classified by the dominant vegetation type present in the locale where the survey is being conducted. Habitat may be utilized by organisms that may occupy the area and may provide some subset of essential or preferred ecological and biological needs for those species that may be found in a described habitat. Habitat types are utilized to classify elements of nature associated with the physical, biological, and ecological conditions in an area. These habitat characteristics may be utilized as indicators of the potential for special-status species and/or plant communities to occur, to be associated with, or may be affected by a project.

Two major habitat types are identified and referenced for the site. These have been identified as Creosote Scrub and Joshua Tree Woodland. The overall landscape of the site is comprised mostly of Creosote Scrub (*Larrea tridentata*) with varying degrees of associations of Bursage (*Ambrosia dumosa*), Black Brush (*Coleogyne ramosissima*), and Mohave Yucca (*Yucca schidigera*) and Rhatany (Krameria sp.) as the most common sub-components of this habitat type. The Northern most regions of the site include Joshua Tree Woodland with Mohave Yucca (*Yucca schidigera*) as an associate.

3.2 Creosote Scrub (Barbour, Keeler-Wolf, & Schoenherr, 2007) (Figures 1 & 2) is a widespread habitat occurring in the Mojave, Sonoran, and Colorado deserts extending into the southeastern Great Basin. Stands occur on alluvial fans, bajadas, upland

slopes, and minor washes. The vegetation is characterized by an open, xeromorphic shrub layer dominated by *Larrea tridentata*. Cover of other species generally does not exceed the dominant by more than twice, and no other species greatly exceeds the cover of the dominant combined. Desert shrubs and dwarf-shrubs may be present to co-dominant. Occasional emergent *Fouquieria splendens* or *Yucca brevifolia* and herbaceous species such as *Croton californicus, Eriogonum inflatum, Echinocactus polycephalus, Galium angustifolium*, or *Pleuraphis rigida* may also be present. Abundant annuals are usually seasonally present. Co-dominant shrubs for our site may include *Ambrosia dumosa, Ephedra nevadensis, Hymenoclea salsola, Krameria grayi, Krameria erecta, Lycium andersonii and cooperi, some Cylindropuntia species, Coleogyne ramosissima,* and *Salazaria mexicana*.

Figure 1: Creosote Scrub: View depicting overall landscape of the southern portions of the site. Photo looking west, just south of the Searchlight Airport with an open pit excavation/mine and I-95 in background.

Figure 2: Creosote Scrub: Photo looking north toward the open-pit mine, and the town of Searchlight. Photo taken spring 2009, note the annuals emerging in the interstitial spaces.

3.3 Joshua Tree Woodland (Barbour, Keeler-Wolf, & Schoenherr, 2007) (Figures 3 & 4) is generally characterized by succulent shrublands of the Mojave Desert. These habitats are generally found on extremely xeromorphic, gently sloping alluvial fans. The vegetation is characterized by an emergent (up to 13m high) and typically abundant *Yucca brevifolia* layer over a shrub-dominated understory. Shrub and ground layers are variable. Shrub species may include *Artemisia tridentata, Chrysothamnus viscidiflorus, Coleogyne ramosissima, Ephedra nevadensis, Eriogonum fasciculatum, Larrea tridentata, Lycium andersonii, Salazaria mexicana, Tetradymia sp.*, and *Yucca schidigera*. The ground layer may contain cacti, perennial grasses, and seasonal annuals. Soil types and elevation usually limit the distribution of the vegetation. Supporting soil structures are generally colluvial or alluvial deposits with textures that are sandy, loamy, or gravelly. Slopes are gentle to moderate with all aspects capable of supporting this flora.

Figure 3: Joshua Tree Woodland, Photo looking northwest towards the North Met Tower.

Figure 4: Joshua Tree Woodland: Photo looking north along the north access road. The North Met Tower is located approximately 300 m northeast of this photo location. This local consists of a generally larger, and site comparative higher density of Joshua Trees

3.4 Topographic Features

The general terrain within the Project vicinity includes contiguous wash systems, upland ridges and rock outcrops, cliffs, and steep hills in the northern parts of the site (BSA 1, 2, 3, 4, 5) and shallow sloping (< 5%) outwash plains in the southern part (BSA 5, 6). The elevation ranges within the project ranged from about 2800 feet at the southern end of the site to approximately 3900 feet at the higher points in the northeastern portions of the site. The City of Searchlight is generally oriented in the middle at about 3500 feet.

Typical topographic features encountered within the site include;

- Low to medium gradient alluvial fan deposits,
- Desert Washes and drainages,
- Bajadas (A convergence of neighboring alluvial fans into a single apron of deposits against a slope),
- hills,
- low to high gradient slopes and ridges,
- and rock outcrops.

Some southeast portions of the site and the proposed southern collection line area consist mostly of locally higher elevation, high gradient slopes, and ridges. **Note:** The regional landscape generally sloped to the South. Most local features are generally oriented toward the north-south and tend to drain toward the south or the east (toward the Colorado River).

3.5 Soil and Substrate Characters

The predominant soil characters consist mostly of gravelly to rocky sedimentary surface soils of granitic and volcanic parent materials. Gravelly to sandy shallow sedimentary surface soils of granitic and volcanic parent materials, or rocky and semi-barren rock-outcrops of volcanic and/or granitic parent material. Calcareous substrate outcrops were noted but were very small and local compared to the site. These outcrops and ruptures were estimated to comprise less than 1% of the site, and tend to occur in the southern reaches of the site near an open pit excavation / strip-mine, and less

conspicuously throughout the higher elevations where surface ruptures indicate an east-west orientation.

3.6 Project Locale Designations

To help in assessing cacti and yucca estimates and for differentiating between general areas of the proposed disturbance areas, AEC demarcated six different Botanical Survey Areas (BSA) that encompass the survey corridors, which are numbered BSA 1 – BSA 6 (Plate 4). The BSAs were delineated based on their observed general habitat type, topographic features, location within the overall Project boundary, and with minor consideration to their overall general soil classification as determined by the NRCS. The intended use of the BSA designations is to help delineate and identify areas that may represent similar types of conditions and/or habitats throughout the site. The BSAs are not considered to be absolute and only should be used to represent the general setting for the particular area identified.

In addition to the BSAs a separate parcel of land, approximately 20 acres in area, was also included in the botanical surveys. AEC understands that this area may be used as a potential future maintenance building and storage facility / operations building for the post-construction activities of the wind farm facilities. For the purpose of this report this area will identified as the Facilities Operations Site (FOS).

The following list identifies each BSA and the general habitat and topographic features associated within the BSA.

BSA-1: Joshua Tree (*Yucca brevifolia*) Woodland with a Co-dominate of Mojave Yucca (*Yucca schidigera*) is prevalent throughout most areas of this unit. Topographic features include mid-elevation hills, and bajadas and drainages of larger landscape alluvial features. Note: This area contained the greatest density of *Yucca brevifolia* within the site.

BSA-2: Habitat consists mostly of Creosote Scrub with a Mojave Yucca associate. This habitat is intersected by OHV trails, development, mining, and various other disturbances (historical grazing, road use, buildings, etc.). The overall habitat quality could be described as disturbed and of low quality (potentially difficult conditions for maintaining long term populations of cacti and

yucca species). Topographic features observed include ridges, and rock outcrops, low gradient hills, slopes, and bajadas intersected by low gradient drainages.

BSA-3: Consists of a network of larger wash systems generally sloping east towards the Colorado River. A single larger wash dominates approximately 70% of this survey area. This is a large channel (generally greater than 30 feet wide at Ordinary High Water (OHM)) "desert wash" that drains to the east towards the Colorado River. This wash intersects Cottonwood Cove Road east of Searchlight and extends nearly parallel to the road towards the east for approximately 2.5 miles to the eastern extent of the site. The wash then continues through into the National Park Bounds east of the project site. General vegetation and habitat consists of Creosote Scrub.

BSA-4: Habitat consists of Creosote Scrub. Topography is generally dominated by steep to moderate upland slopes and ancillary washes. Washes associated with this area generally drain toward the east and the Colorado River. Washes consist of sandy to rocky scour bottoms. Vegetation is mostly restricted to the banks and steep rocky walls of some of the larger washes. Most slopes tend to drain toward the east. Note: This area was heavily mined. Numerous open pits, mine shafts, and mining claims are still present. Some mines still appear to be active, while others have been abandoned and fenced off by the BLM.

BSA-5: This area is dominated by upper elevation ridges, 3200 feet to approximately 3900 feet, and steep rocky slopes. Deep, mostly narrow, canyon washes within steep slopes. Overall drainage tends toward the south and southwest. Like BSA-4, washes usually consist of sandy, rocky, or exposed bedrock scour bottoms. Habitat consists mostly of open Creosote Scrub with a Mojave Yucca associate.

BSA-6: Consists mostly of the southern portions of the project site. Topography is mostly of locally expansive, gently sloping (generally less than ±0.5% gradients) alluvial deposits. Landscape in this area tends to slope toward the south southwest. This area is intertwined with contiguous small (less than 1 foot wide) to medium (1 ft. to 10 ft. OHM) drainages. Depths of washes tend to be

within a range of 6 inches to 8 feet to bottom of channel from top of bank. Creosote Scrub dominates the area.

4.0 Cacti and Yucca Count Estimates

4.1 Cacti and Yucca Count Estimate Survey Purpose

The purpose of the Cactus and Yucca Count Estimate Survey is to provide the project proponent with an estimate of the numbers of observable cacti and yucca species that may occur within the proposed ground disturbance areas of the proposed project. The survey estimate is not intended to provide absolute counts nor height classifications for individual species. However, the survey as it was conducted should provide the project proponent with statistically informative counts for the purpose of assessing permitting and mitigation development.

It is understood that the survey counts will be used to assess permitting and to develop potential mitigation to offset potential impacts to cacti and yucca species from Project development with respect to the following Nevada Legislative Statutes: *Nevada Legislative Revised Statutes, Title 47 – Forestry; Forest Products and Flora, Chapter 527 – Protection and Preservation of Timberlands, Trees and Flora* (Appendix B) prior to field investigations.

4.2 Cacti and Yucca Count Estimates Methodologies

Alphabiota Environmental Consulting, LLC conducted cacti and yucca counts on the dates of February 16 through February 20, 2010. Mr. Yancey Bissonnette (Botanist/Biologist) and Mr. Dave Silverman (Botanist/Desert Ecologist) conducted transect survey counts of Cacti and Yucca within or within the immediate vicinity of the survey corridors. Transects were of various lengths, reported in mile units and included straight line transects and/or asymmetrical transects that best maintained a transect within the bounds of the survey corridors or that best visually represented the overall habitat represented in the survey corridors for the BSA being surveyed. GIS data of the proposed impact areas and buffer zones were supplied to Alphabiota Environmental Consulting, LLC by Tetra Tech EC, Inc.

Survey areas were determined based upon visual cues and research conducted prior to field surveys. Cacti and Yucca counts were conducted by walking site determined transects. Transects were linear by design, but allowed for improvised atypical transect execution when and if necessary. Transect types were executed based on the best available route possible through a represented terrain and that best maintained the transect within the bounds of the survey corridor, or visually best represented the overall habitat for the area being surveyed. Transects were maintained by navigating with handheld GPS units (Delorme PN-40 and/or a Garmin Map 60C).

Survey count estimates were conducted by counting the number of each species of cacti and/or yucca encountered along a transect. Counts were conducted within a search image of approximately 10 meters (or approx. 30 feet). The search image was initially measured to approximately 4.5 meters (or approx. 15 feet) perpendicular to either side of the transect centerline and then maintained by visual reference. Survey counts started in the northern tracts of the proposed project areas and ended in the Southern tracts of the proposed project areas.

Collected field data was then translated to an excel spreadsheet. The tallies of each transect were summed and then calculated to encompass the transect areas. Estimates of numbers of each cacti or yucca species were calculated by extrapolating the transect area data to account for numbers of each species per acre with respect to the BSA area designation for which the transect data was collected (Table 3). Note: That cacti and yucca counts do not include structure size of individuals. Species were counted as individuals, and as individuals within a colonial patch if encountered as such regardless of the height or habitat. The location and distribution of transects can be found on Plates 5.

4.3 Cacti and Yucca Survey Summary of Results

- 13 species of cacti and yucca detected during the survey count in February (Species Table 2).
- 69 linear transects completed.
- 32.71 linear miles of transects surveyed.
- Approximately 119 acres of transect area surveyed.

- A population of *Echinocereus engelmannii* and other cacti identified below was detected locally during the botanical surveys (Figure 5). This area appeared to contain a greater density of individuals than indicated by the initial cacti and yucca count survey. This area occurs along a south-facing slope in the northwest areas of the project within BSA-2, (Plate 6 and 9).
- One (1) additional species of yucca, Banana Yucca (*Yucca baccata*), and one (1) additional species of cacti, Old Man Cactus (*Opuntia erinacea*), were detected during the botanical (target vascular plants) surveys. Less than 12 individuals of Banana Yucca were observed in a localized area southeast of the north Met tower. This occurrence appears to be a localized incidence, no other individuals were observed within or near the project site. These individuals are not accounted for in cacti and yucca count estimates. An individual of Old Man Cactus was identified during the botanical surveys within the northern reaches of the Project area. No specific site location data was collected for this individual. The following pages exhibit photos of some of the cacti observed during surveys. A table (Species Table 2) following the next photos identifies those species of cacti and yucca encountered and observed during the Cacti and Yucca Count Estimate survey. Figures 6 through 8 are representatives of some of the cacti species observed during the surveys.

Figure 5: View looking South-Southwest showing a portion of an *Echinocereus engelmannii* population with higher density of individuals when compared other areas of the project.

Figure 6: Fishhook Cactus (*Mammalaria tetrancistra*): Field notebook is approximately 5x8 inches

Figure 7: Teddy Bear Cholla (*Cylindropuntia bigelovii*) and parent population in background. This population was detected along a ridgeline at the eastern portion of the site (BSA 4) during the botanical surveys of the early spring.

Figure 8: Cotton Top Cactus (*Echinocactus polycephalus var. polycephalus*) this specimen observed in BSA 2.

Species Table 2 Cacti and Yucca Species Observed During Estimate/Count Surveys	
Scientific Name	**Common Name**
Yucca brevifolia	Joshua Tree
Yucca schidigera	Mojave Yucca
Cylindropuntia acanthocarpa var. coloradensis	Buckhorn Cholla, Staghorn Cholla
Opuntia basilaris var. basilaris	Beavertail Cactus
Sclerocactus johnsonii	Pineapple Cactus
Cylindropuntia echinocarpa	Silver or Golden Cholla
Echinocactus polycephalus var. polycephalus	Cottontop Cactus
Mammalaria tetrancistra	Fishhook Cactus
Ferocactus cylindraceus	Barrel Cactus
Echinocereus engelmannii	Engelmann Hedgehog Cactus
Grusonia parishii	Parish club-Cholla, Horse Crippler
Cylindropuntia bigelovii	Teddy-Bear Cholla
Cylindropuntia ramosissima	Pencil Cholla

5.0 Botanical Surveys (Target Vascular Plants)

Alphabiota Environmental Consulting, LLC conducted two separate botanical surveys during the dates of March 2, 2010 through April 4, 2010 and May 1, 2010 through May 10, 2010. Surveys were conducted to locate and identify potential sensitive plants species and/or populations that could potentially occur within the proposed project buffer zones. A reconnaissance survey was conducted on November 11, 2009, and a cursory site visit was implemented on July 7, 2010 to assess pre-survey and post-survey blooming and vegetation conditions of the site. The following botanists participated in conducting botanical surveys of the site, (Botanist) Mr. Yancey Bissonnette, (Botanist) Mr. Neil Kramer, (Botanist) Mr. Bruce Lund, and (Staff Botanist) Mr. Thomas Gehrkens. GIS data of the proposed impact areas and buffer zones were supplied to AEC by Tetra Tech EC, Inc.

5.1 Botanical Survey Purpose

The purpose of this Botanical Resources Survey is to provide the project proponent with an identification of the observed botanical resources and/or an account of the potential for "target and/or sensitive" vascular plant species that may occur at the site. "Target or sensitive" plant species are those species that have been identified by environmental regulatory agencies, recognized botanical societies, or other governing agency having jurisdictional interest in the identification and management of botanical species within the State of Nevada. The site survey is conducted with consideration for current existing environmental laws, regulations, and policies for the time that the surveys were conducted. A Botanical Resource Survey is a view of the project site at a particular point in time. The habitats and resources on site may exhibit a seasonal and permanent change after the Botanical Resource Survey is completed. Therefore, the survey report can only represent the site as it was observed during the survey period(s).

5.2 Botanical Survey Methodologies

AEC conducted the botanical survey for this project with respect to BLM guidelines. The following paragraph is an excerpt of the Nevada BLM survey protocols that identifies the guidelines by which surveys were implemented by AEC.

"*<u>Intuitive Controlled Survey:</u> This method is suitable for large areas and highly skilled investigators. This method includes a complete survey in habitats with the highest potential for having the target species. The investigator traverses through the project area, covering sufficient area to see a representative cross section of all the major habitats and topographical features, looking for the target species while en route between different areas. When the investigator arrives at an area of high potential habitat (defined in the pre-field review) a complete survey (see previous paragraph) for the target species should be made.*"

AEC botanists accessed the site by either ATV's or 4x4 trucks. Teams of 2 or 4 persons walked meandering pedestrian transects at 50 to 100 foot intervals. Generally starting to one side of the survey corridor centerline and returning to the start point on the other side of the centerline. Surveyors determined necessary spacing based on the visual cues of the habitat, topography, and/or accessibility of the terrain. The survey corridor encompassed a 400 foot area that extended 200 ft. to either side of the proposed centerlines, center points of wind turbines, or edges of polygons. Buffer zones were identified on maps and within GIS supplied by Tetra Tech EC Inc. The project buffer zones were then uploaded onto GPS units (DeLorme PN-40's or Garmin Map 60 CS units) by AEC. GPS units were used to ensure surveyors remained within survey corridors while conducting field surveys. Navigation and data collection GPS units were set to UTM values for the botanical surveys and reporting.

Vascular plant species were identified in the field using hand lenses and field identification resources. Unidentifiable specimens were collected for identification within a laboratory environment. Binocular microscopes, additional reference books, and resources not readily available in the field were used to identify plants in the laboratory. Habitats were identified and characterized based on current excepted habitat descriptions. Habitat descriptions follow and/or integrate types that have been described by Holland (Holland R. F., 1986), Sawyer Keeler-Wolfe (Keeler-Wolfe & Sawyer, 2007, 2008), Holland (Holland & Keil, 1989), and the International Vegetation Classification Alliances and Associations Occurring in Nevada with Proposed Addition (Peterson, E. B. 2008, Nevada Natural Heritage Program), and/or by derived descriptions that best characterize the general habitat as it was observed during the survey. Botanical specimens observed during the survey were identified to the species

level whenever possible; otherwise they were documented to the genus and/or family level.

A list of target species identified from the research compiled prior to conducting field investigations was used to generate a table of the general morphological, environmental, and habitat characters for field investigations (Table 1). Additional photos and/or descriptions were generated from the list and distributed by AEC prior to commencing field surveys. In addition to the information distributed by AEC, a field guide designed by Botanist Bruce Lund was developed and distributed to each team member (Addendum C). Target species identified for this project have previously been viewed, observed, and/or identified by at least one or all the team members prior to field investigation. Three of the four team members conducting surveys had also previously viewed, identified, and observed all of the *Penstemon spp.* identified for this project.

5.3 Botanical Survey Summary of Results

No target plant species identified for this project were observed or located within the proposed project buffer zones, or within the vicinities of the project buffer zones. At this time no impacts are expected or anticipated to occur for any of the target sensitive plant species identified in this report. To date, 198 plant species within 38 plant families were identified within the project areas (Table 2). Three weed species of note, Sahara Mustard (*Brassica tourneforti*) (Plate 6 and Plate 8), Red Brome (*Bromus madritensis ssp. rubens*) (Plate 6 and Plate 9), Red-stemmed Filaree (*Erodium cicutarium*), and one uncommon native perennial of note, Spring Parsley (*Cymopterus multinervatus*) (Plate 6 and Plate 7) (Figure 9) were observed within the survey corridor and/or within the Project area.

Figure 9: Spring Parsley (*Cymopterus multinervatus*): flower and fruits.

A population of Spring Parsley (*Cymopterus multinervatus*), a regionally uncommon species of vascular plant, was observed within in a small wash within the survey corridor identified as the FOS just east of the City of Searchlight (Plate 6 and Plate 7). Spring Parsley is a perennial herb of the Apiaceae family. This species generally blooms March through April and is found in sandy to gravely substrates of the Mojave Desert. At this time there is no official listing of this species for Nevada; however, four other species of Cymopterus sp. are listed as sensitive or watchlist species by the Nevada Native Plant Society and/or various State and Federal agencies. AEC is reporting this population for the purpose of documentation since there is four other members of this genus already considered sensitive species within Nevada. Site location data and general information regarding this observation will be relayed to NNPS and the BLM for their records. Other than documentation of this population no other consideration is needed at this time regarding this species. No project impacts are anticipated or implied to this species as of the time of this report.

Although the weed survey will be discussed in a separate report, weeds and non-native introduced species of plants have been a constant nuisance and concern throughout the United States and Nevada. Many horticultural and forage species of non-native plants have been introduced into areas where they potentially become a threat to the existing fauna and flora of the area. Threats from non-native species include, but are not limited to the following examples, out competing native plants for space, sunlight, and nutrients, use and introduction for agriculture, urban and sub-urban development (escapees), or through adaptive overpopulation within an area. As a result of these threats some areas of the desert have been overcome by competition and threats from non-native or weedy species introduced from outside the typical environment we see within desert ecosystems. Once these species have established themselves, it is sometimes a battle of control rather than eradication. Fortunately for the area of Searchlight, it appears, at least from the view of the botanical surveys AEC conducted, that the surrounding vicinities have a surprisingly intact native ecosystem where most native species of flora are still dominant, thriving, and adaptive to the surrounding use. This is not to say that there are no weedy species within the area, it was the opinion of the botanists working on this survey that the area appeared to be maintaining a sustainable desert ecosystem given the amount of disturbance, use, and development present within the local region.

That being said, the survey teams did discover one weed that is generally considered a major concern for the Mojave Desert. Sahara Mustard (*Brassica tourneforti*) is an introduced species that was typically found near ranches, homesteads, and farms of the surrounding deserts and as it is understood was generally kept in check by herbicides, plowing, agricultural practices, and grazing. However, recent years have seen an end or severe decline to these types of activities in the deserts, which appear to have allowed this species to thrive and overcome vast acreage of land within deserts and arid regions of North America. Survey teams observed Sahara Mustard in BSA 3 & BSA 4, within a contiguous wash system (Plate 6 and Plate 8).

Figure 10: Sahara Mustard, Amsinckia sp., and Phacelia sp. growing under a "nursery" plant of Mojave Yucca.

Observations of Sahara Mustard generally occurred as widely scattered individuals, where the majority of these individuals were surviving opportunistically under larger native “nursery” plants, and not as populations. Most of the Sahara Mustard observed on or within the vicinity of the site occurred along the boundaries of Rte 164 (Cottonwood Cove Road) and within the bisecting and adjacent wash that makes up a significant portion of BSA 3 and portions of BSA 4. This wash also contains an access road that services power lines installed near the highway and wash. Seed bank appears to be transported and perpetuated by normal traffic, roadside maintenance, recreational ATVs, maintenance vehicles, and runoff from precipitation events. It is our belief that control and potential eradication of the Sahara Mustard could be achieved prior, during, and/or after construction activities occur. Since these species tend to occur as widely scattered individuals or within significantly minor population occurrences within localized areas, AEC believes control could potentially be achieved through mechanical or individual labor means, and/or herbicide applications (if applicable) through all phases of construction. Preventive measures to control weed

distribution and perpetuation could potentially be implemented through Best Management Practices (BMP's) developed within the mitigation process of permitting.

Red Brome (*Bromus madritensis ssp. rubens*) was also observed on site and within the general vicinity of the project. Red Brome is generally accepted as an introduced non-native species of grass that has become naturalized in most areas of the U.S. where it occurs. Red Brome occurred as widely scattered individuals and within locally small scattered populations (population within a localized area of BSA 2) (Plate 6 and Plate 9). Red Brome is considered a naturalized non-native grass, where eradication and/or control are unlikely to be successful.

Red-stemmed Filaree (*Erodium cicutarium*) was also observed within the Project area. This species occurred mostly within the interstitial spaces of Creosote Scrub habitat and mostly within the southern tracts of the project within BSA 5 and BSA 6. This is a low growing annual herb of the Geranium family that is also considered a naturalized weed throughout North America. Control and eradication are generally considered unattainable. During the time of the surveys there was no indication that this species was outcompeting any of the native annuals or that its presence was a threat to the annuals observed within the Project area.

During the course of these surveys other less predominant species of plants considered non-native or weed species were also observed (see Table 2). Observations usually occurred as isolated individuals or small populations. It is the opinion of AEC that these species posed little to no risk to the existing desert ecosystem as it was observed during the survey. However, AEC believes that a monitoring program could be beneficial in assessing the effects of the Project on potential distribution and fecundity of any of the non-native or weed species with respect to construction activities and post construction operations within the area. Monitoring could also help in developing or implementing a future weed control program for the Project as well as provide information that may be useful for re-vegetation when future removal of the turbines is implemented.

6.0 Bibliography

Barbour, Keeler-Wolf, & Schoenherr. (2007). *Terrestrial Vegetation of California.* University of California Press.

Barkworth, M. E., Anderton, L. K., Capels, k. M., Long, S., & Piep, M. B. (Eds.). (2007). *Manual of Grasses for North America.* Logan, Utah: Utah State University Press.

Barneby, R. C. (1998). *Intermountain Flora : Vascular Plants of the Intermountain West, U.S.A., Fabales (Intermountain Flora 3B).* New York Botanical Garden.

Cactiguide.com. (n.d.). Retrieved 2009; 2010, from Cactiguide.com - Cylindropuntia bigelovii: http://cactiguide.com/cactus/?genus=Cylindropuntia&species=bigelovii

California, T. R. (1993). *The Jepson Manual : higher plants of California* (Third printing with corrections, 1996 ed.). (J. C. Hickman, Ed.) Berkely and Los Angeles, California: University of California Press.

CNPS, C. N. (2009-2010). *Inventory of Rare and Endangered Plants*. (CNPS, Producer) Retrieved 2009;2010, from CNPS-Caliornia Native Plant Society: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

Cronquist, A., Holmgren, N. H., Holmgren, P. K., & Reveal, J. L. (1997). *Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Subclass Rosidae (Except Fabales) (Intermountain Flora Vol. 3A).* New York Botanical Garden.

Desert and Dryland Forest Research Group. (n.d.). Retrieved 2009; 2010, from Desert and Dryland Forest Research Group: http://www.unlv.edu/staff/cengel/DDFRGResearch.htm

DiTomaso, J. M., & Healy, E. A. (2007). *Weeds of California and Other Western States* (Vol. Vol. 1). Oakland, California: University of California Agriculture and Natural Resources.

DiTomaso, J. M., & Healy, E. A. (2007). *Weeds of California and Other Western States* (Vol. Vol. 2). Oakland, California: University of California Agriculture and Natural Resources.

Gilliand, K. D., Huntly, N. J., & Anderson, J. E. (April 2006). Age and Populatin Structure of Joshua Trees (Yucca brevifolia) in the Northwestern Mojave Desert. *Western North American Naturalist* , Vol. 66, Issue 2, Pages 202-208 doi : 10.3398/1527-090(2006)66[202:AAPSOJ]2.0.CO;2.

Google. (2009-2010). Retrieved 2009, from Google Earth: http://www.googleearth.com

Grenfell, J. W. (1988). *Guide to Wildlife Habitats of California.*

Harris, J. G., & Harris, M. W. (1994 & 2001). *Plant Identification Terminology An Illustrated Glossary* (Second ed.). Spring Lake, Utah: Spring Lake Publishing.

Holland, R. F. (1986). *Preliminary Description of the Terrestrial Natural Communities of California.* Sacramento, California, United States: Resources Agency.

Holland, V. L., & Keil, D. J. (1989). *California Vegetation.* San Luis Obispo, California, United States: Biological Sciences Department California Polytechnic State University.

Ingram, S. (2008). *Cacti, Agaves, and Yuccas of California and Nevada.* Los Olivos, California: Cachuma Press.

kaye, w. e. (Ed.). (last modified: 1/06/05). *http://www.nps.gov/jotr/plants/plants/trees/speak.html.* Retrieved 2009; 2010, from National Park Service : Joshua Tree National Park : http://www.nps.gov/archive/jotr/nature/plants/trees/jtrees.html

Keeler-Wolfe, T., & Sawyer, J. J. (2008). A manual of California vegetation. Sacramento, California, United States.

Knute, A. (1991, 2002). *Plants of the East Mojave Mojave National Preserve.* Barstow, California: A Mojave River Valley Museum Association Publication courtesy of Wide Horizons Press.

Lund, B. (2009). *Searchlight Wind Power Project - Sensitive Plant Species Field Guide.* Squaw Valley, California: Alphabiota Environmental Consulting, LLC.

Mackay, P. (2003). *Mojave Desert Wildflowers.* Guilford, Connecticut, United States: The Globe Pequot Press.

Munz, P. A., & Keck, D. D. (1973). *A California Flora and Supplement.* Berkeley, California: University California Press.

Nevada Department of Agriculture. (n.d.). Retrieved 2009; 2010, from Nevada Department of Agriculture Noxious Weeds: http://agri.nv.gov/PLANT_NoxWeeds_index.htm

Nevada Native Plant Society. (2009; 2010). Retrieved from Nevada Native Plant Society: http://www.nvnps.org/

Nevada Natural Heritage Program. (n.d.). Retrieved 2009;2010, from State of Nevada Department of Conservation and Natural Resources Natural Heritage Program: http://heritage.nv.gov/index.htm

Northern Arizona Flora. (n.d.). Retrieved 2009; 2010, from NAZ Flora A Photographic, Annotated Catalog of Northern Arizona Vascular Plants: http://www.nazflora.org/

NRCS Nevada State Website. (n.d.). Retrieved 2009; 2010, from Natural Resource Conservation Service: http://www.nv.nrcs.usda.gov/

Powell, E. (2002). *Checklist of Vascular Plants of Lake Mead National Recreation Area.* unknown.

Reveal, J. L. Annotated Key to Eriogonum (Polygonaceae) of Nevada. *Maryland Agriclutural Experiment Station* (Contribution No. 6819), 493-519.

Ryan, M. (2005). *CHECKLIST OF THE NON-NATIVE PLANTS OF SOUTHERN NEVADA.* Reno: University of Nevada : Cooperative Extension.

The Jepson Desrt Manual. (2002). Berkeley and Los Angeles, California: University of California Press.

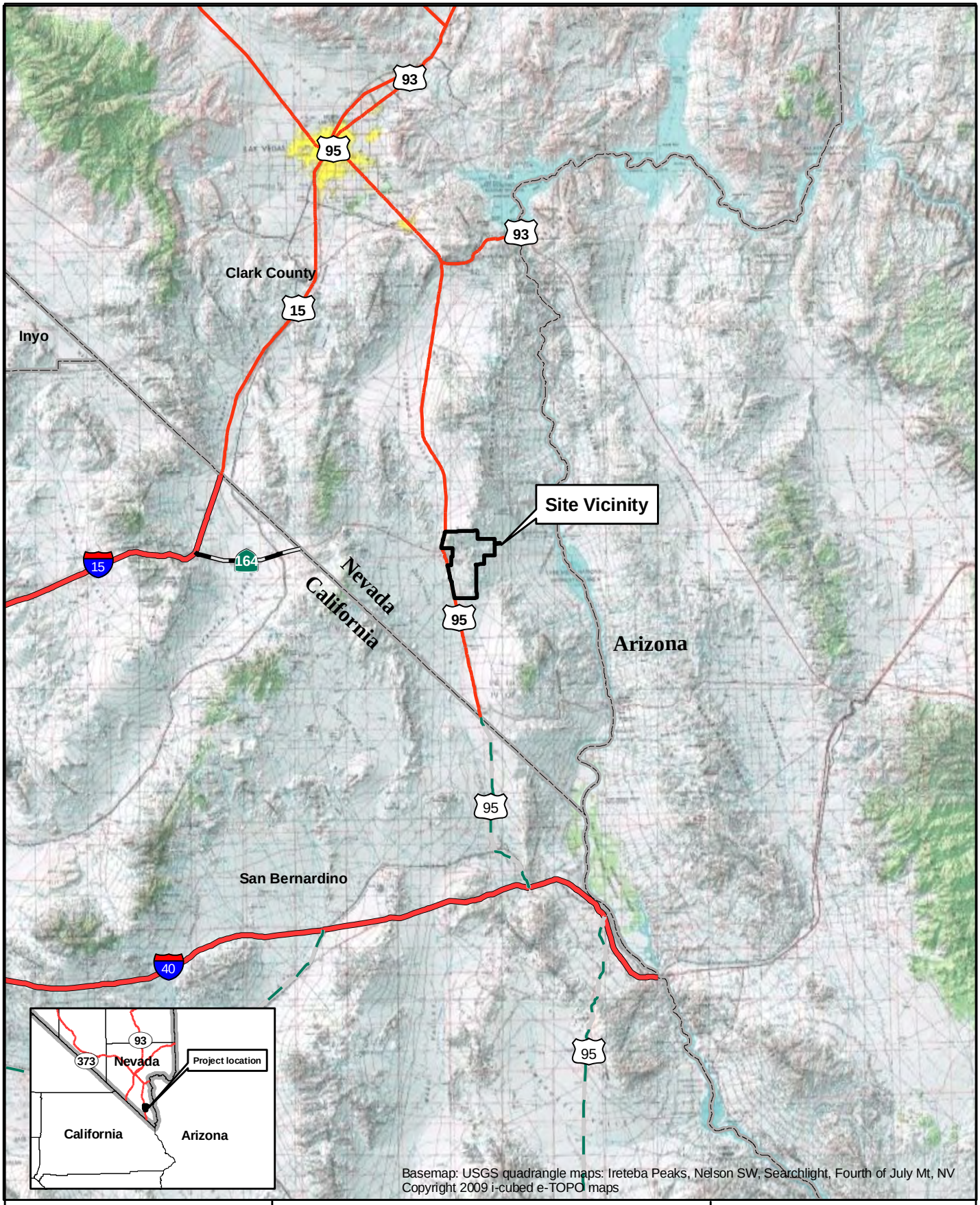
TITLE 47 - FORESTRY; FOREST PRODUCTS AND FLORA. (n.d.). Retrieved 2009: 2010, from Nevada Legislature: http://www.leg.state.nv.us/NRS/NRS-527.html

United States Army Corps of Engineers, U. (1987). *Corps of Engineers Wetlands Delineation Manual.* United States: Department of the Army.

United States Fish and Wildlife Service, F. (n.d.). *Wetlands Mapper*. Retrieved December, January 2007, 2008, from Wetlands Geodatabase: http://wetlandsfws.er.usgs.gov/NWI/index.html

USDA NRCS Web Soil Survey. (n.d.). Retrieved 2009; 2010, from Natural Resources: http://websoilsurvey.nrcs.usda.gov/app/

Whitson, T. D., & et.al. (2002). *Weeds of the West* (9th ed.). (T. D. Whitson, Ed.) Jackson , Wyoming, United States: The Western Society of Weed Scieince in cooperation with the Western United States Land Grant Universities Cooperative Extension Services.



Legend

Project Boundary

Searchlight Wind Farm

0 10 20 30 Miles

Project Number: 09-1034

Date: 11/17/2010

Plate 1
Site Location

Alphabiota

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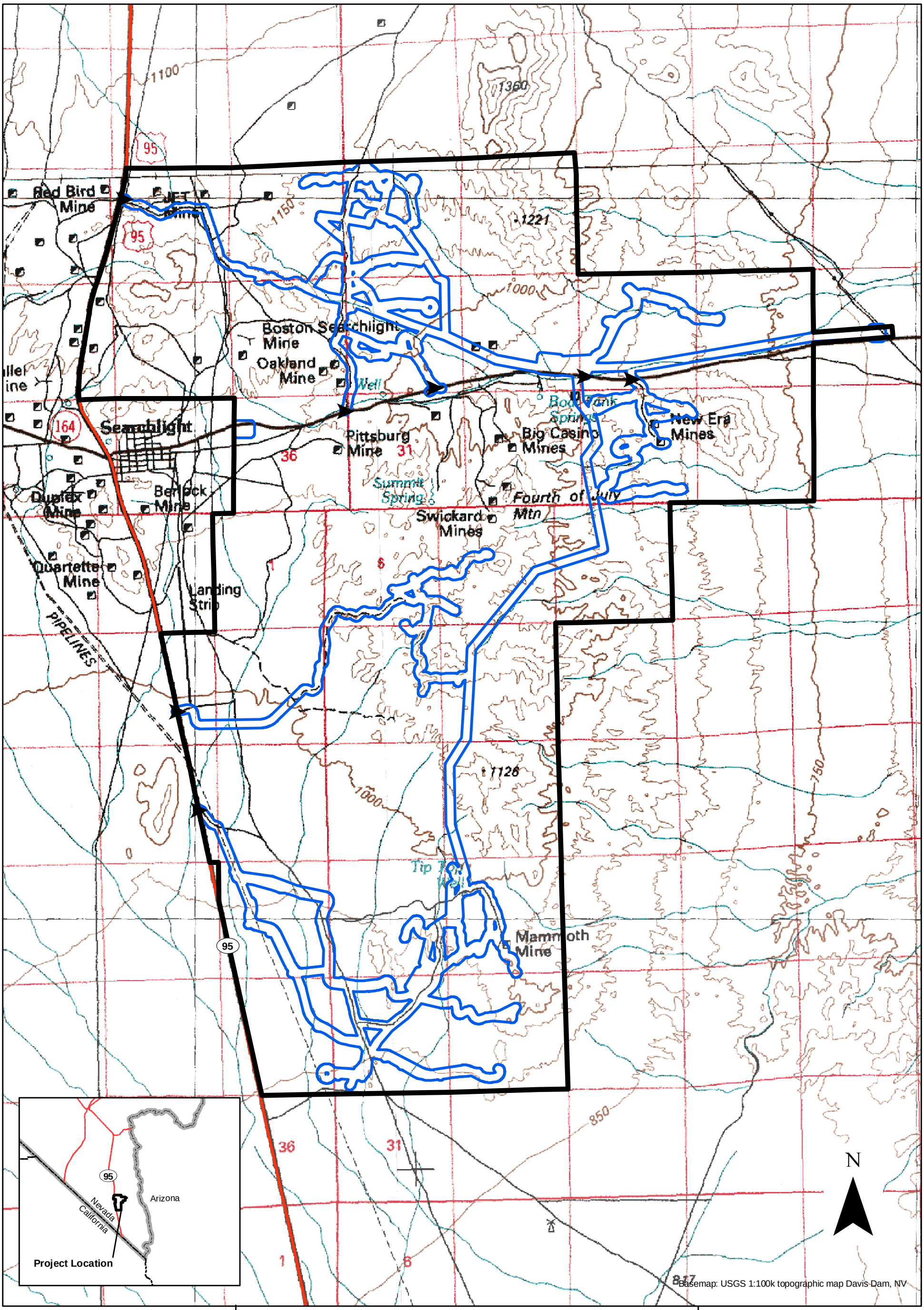

Legend

- Access Points
- Survey Corridor (200 ft from centerline)
- Project Boundary

Searchlight Wind Farm

0 0.5 1 2 Miles

Scale 1:50,000

Project Number: 09-1034

Date: 11/17/2010

Plate 2
Project Boundary

Alphabiota

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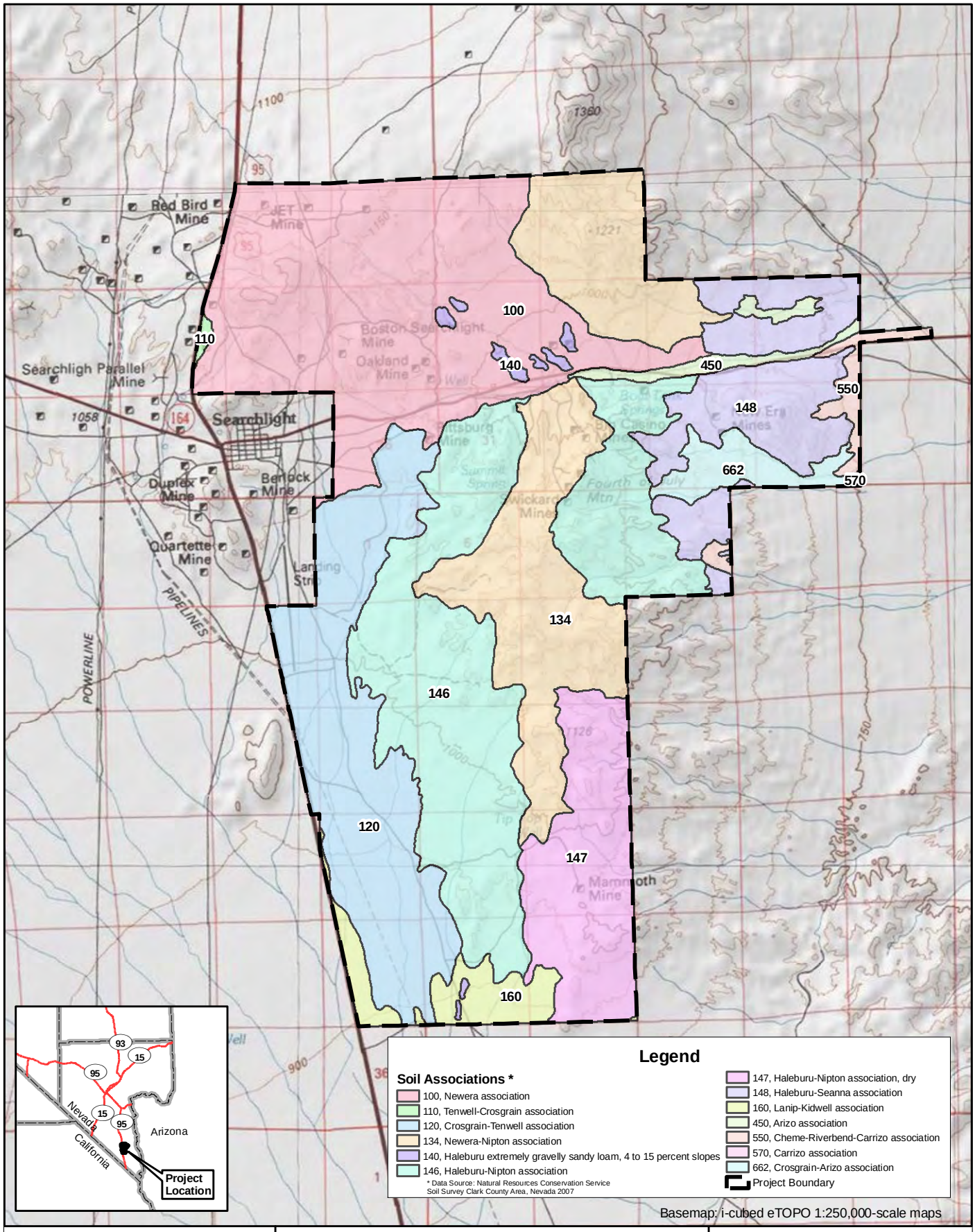

N

Searchlight Wind Farm

0 0.5 1 2 3 Miles

Scale 1:80,000

Project Number: 09-1034 Date: 11/17/2010

Plate 3
NRCS Soil Associations

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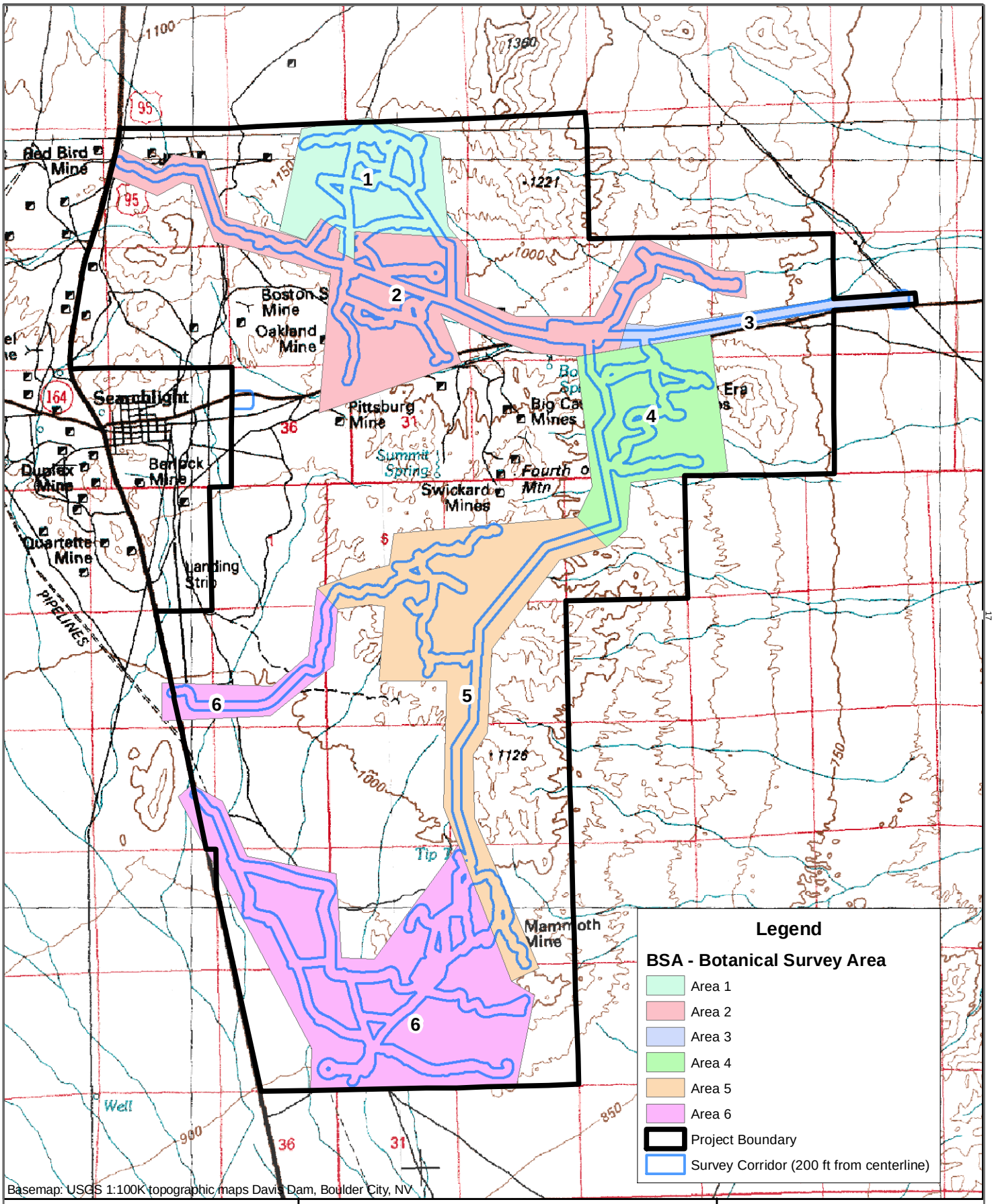

Basemap: USGS 1:100K topographic maps Davis Dam, Boulder City, NV

N

Searchlight Wind Farm

0 0.5 1 2 Miles

Scale 1:68,000

Project Number: 09-1034

Date: 11/17/2010

Plate 4
Botanical Survey Areas

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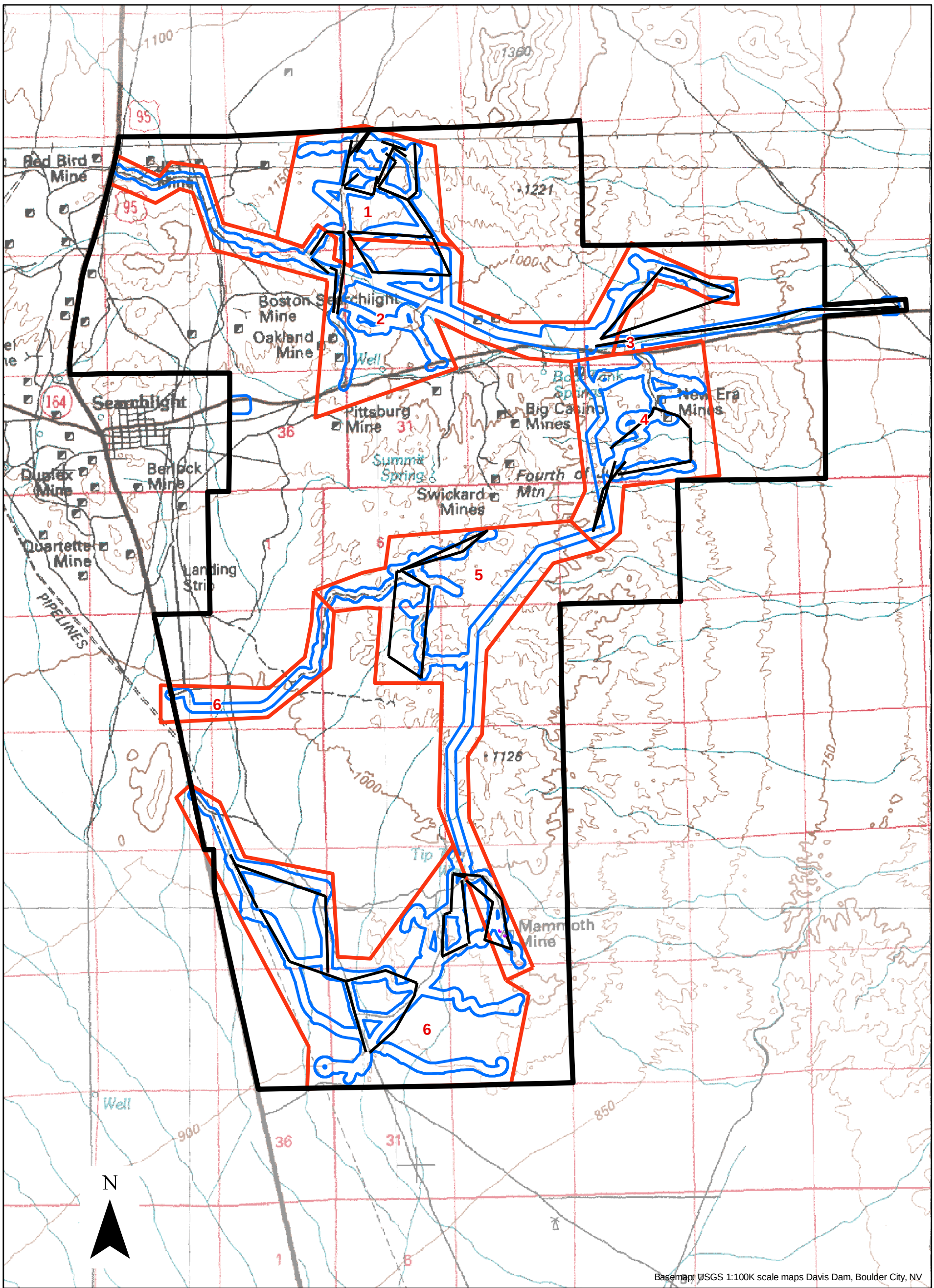

Legend

- Approximate Transects Locations
- Botanical Survey Area Boundary
- Survey Corridor (200 ft. from centerline)
- Project Boundary

Searchlight Wind Farm

0 1 2 Miles

Scale 1:50,000

Project Number: 09-1034

Date: 11/17/2010

Plate 5
Transect Locations

Alphabiota

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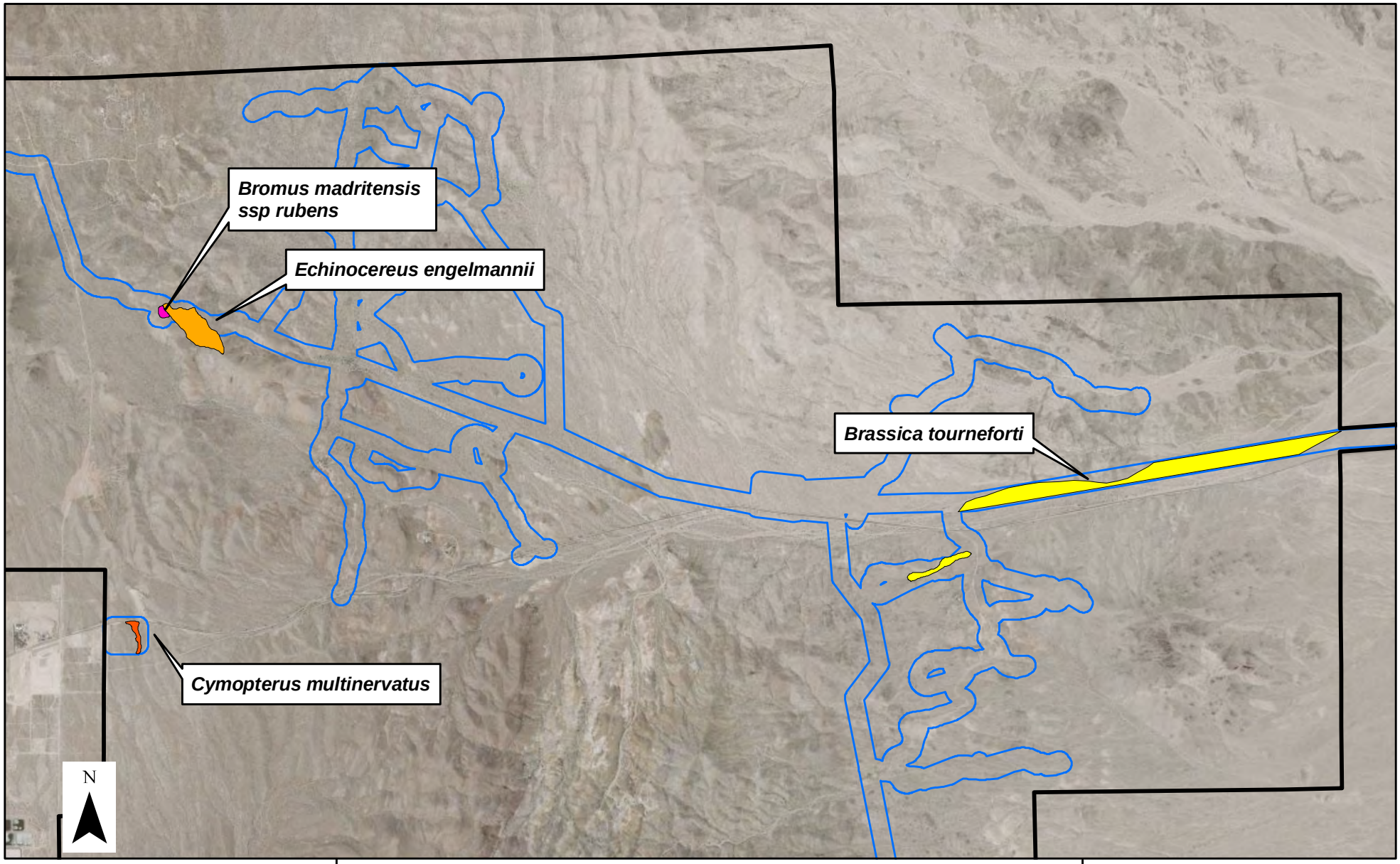

Legend

Plant location

Species observed in these areas

- Brassica tourneforti
- Cymopterus multinervatus
- Echinocereus engelmannii
- Bromus madritensis ssp rubens
- Project Boundary
- Survey Corridor (200 ft from centerline)

Searchlight Wind Farm

0 0.5 1 2 Miles

Scale 1:35,000

Project Number: 09-1034

Date: 11/17/2010

Plate 6
Plant Locations

Alphabiota
ENVIRONMENTAL CONSULTANTS

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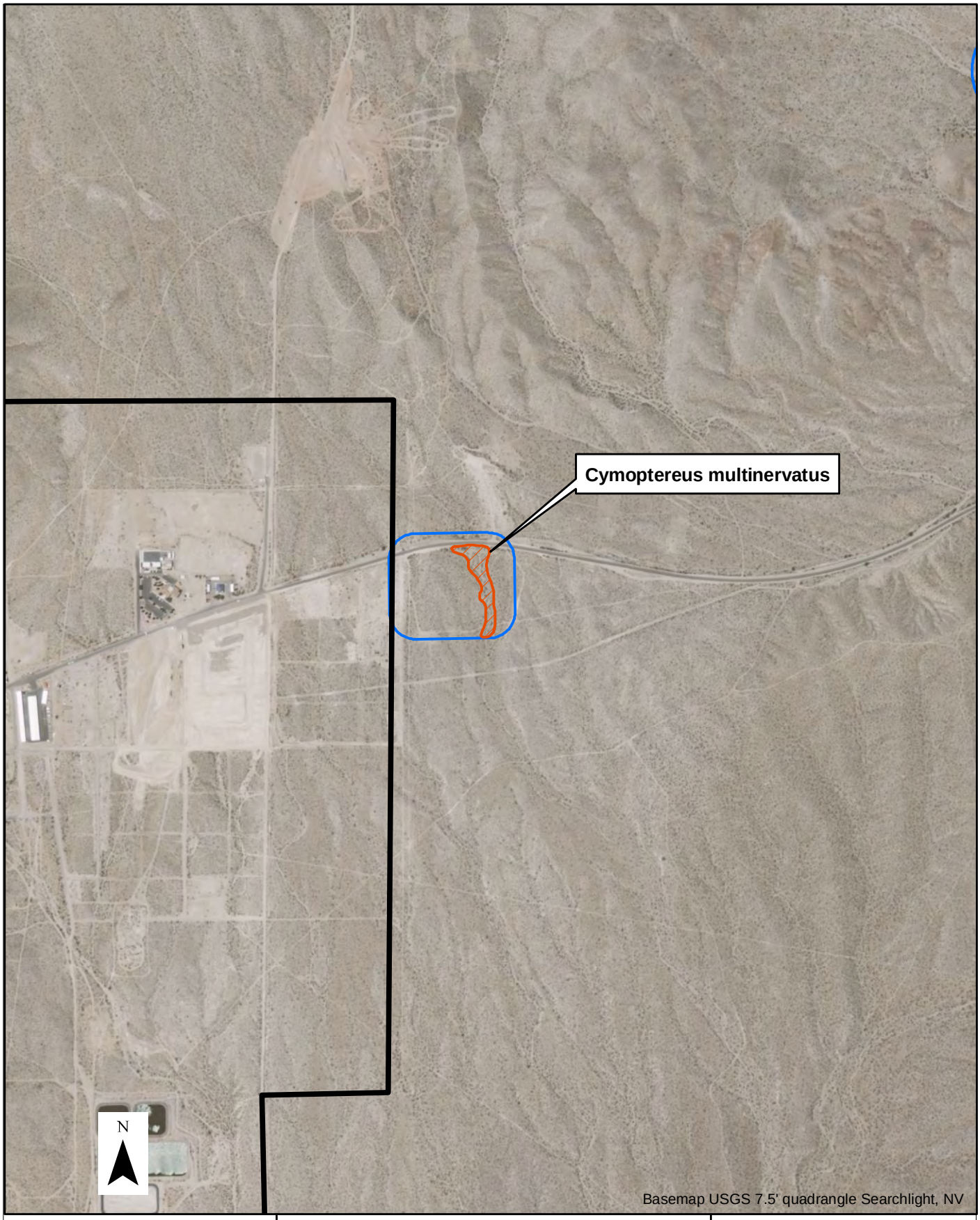

Legend

- Cymopterus multinervatus (species observred in these areas)
- Facilities Operation Site
- Project Boundary

Searchlight Wind Farm

0 500 1,000 2,000 Feet

Scale 1:12,000

Project Number: 09-1034 Date: November 17, 2010

Plate 7
Cymopterus multinervatus

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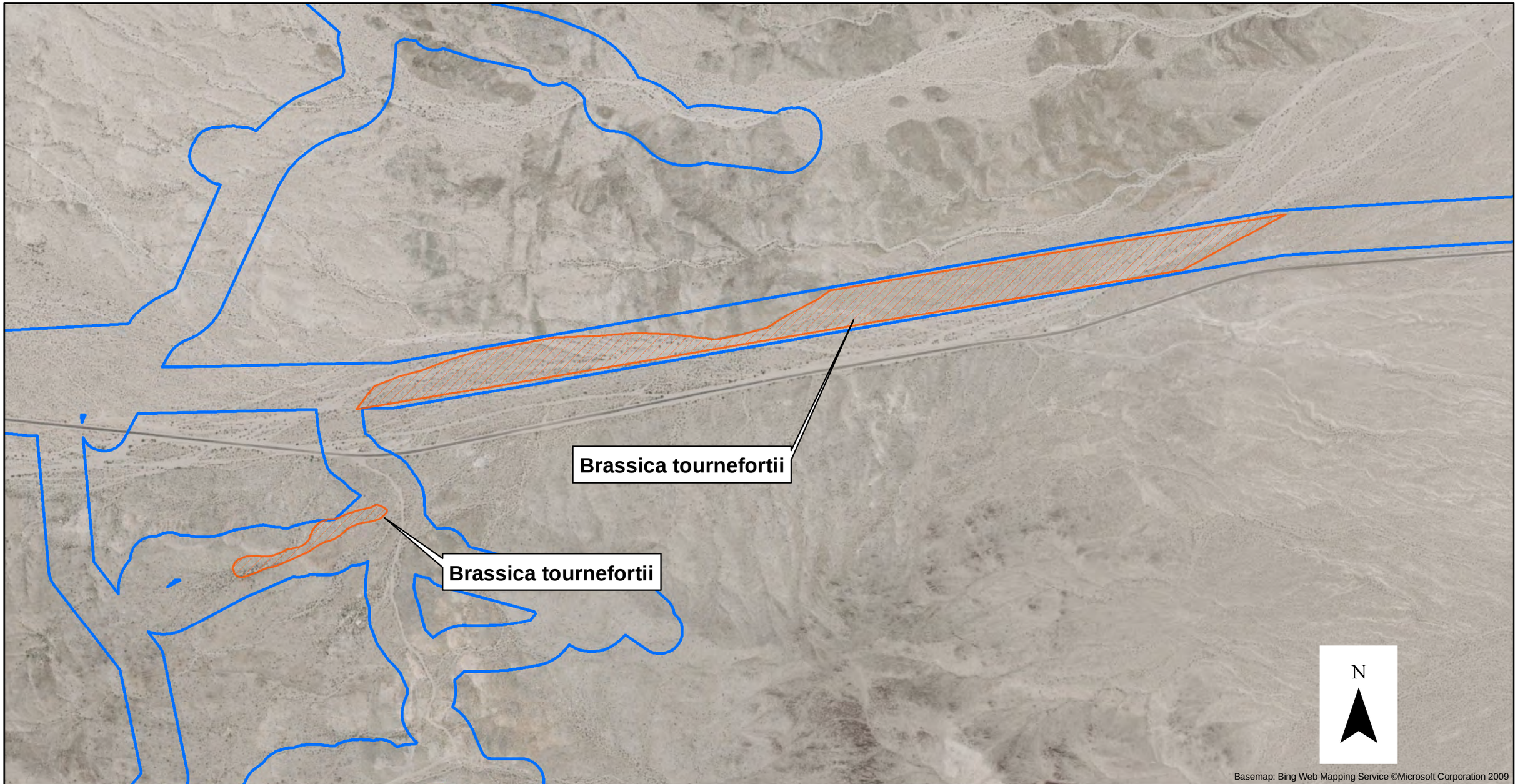

Legend

Brassica tournefortii
(species observed in these areas)

Survey Corridor
(200 ft. from centerline)

Searchlight Wind Farm

0 1,000 2,000 3,000 Feet

Scale 1:10,000

Project Number: 09-1034

Date: 11/17/2010

Plate 8
Brassica tournefortii

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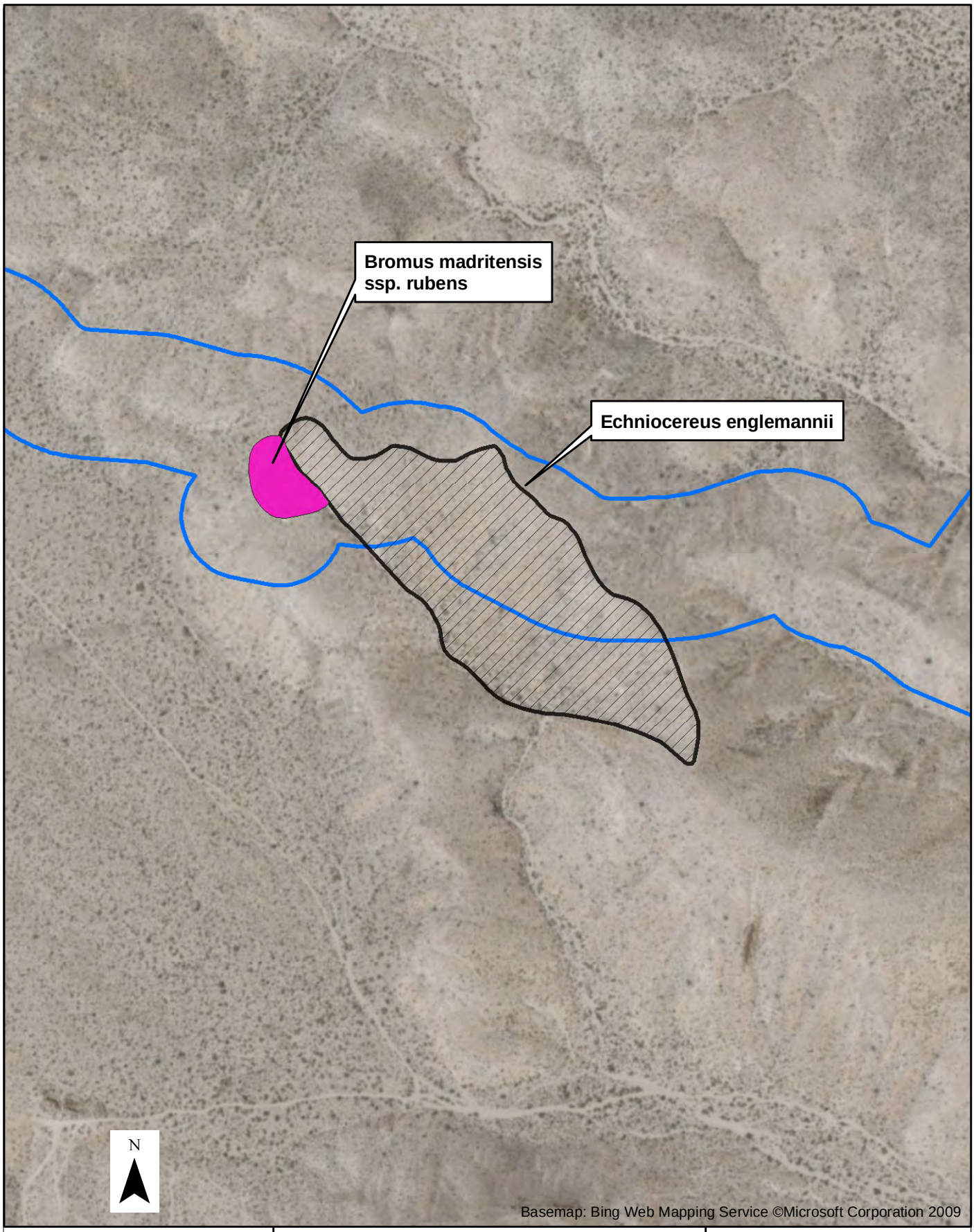

Legend

- Echinocereus engelmannii (species observed in these areas)
- Bromus madritensis ssp. rubens (species observed in these areas)
- Survey Corridor (200 ft. from centerline)

Searchlight Wind Farm

0 500 1,000 Feet

Scale 1:5,000

Project Number: 09-1034 Date: 11/17/2010

Plate 9
Echinocereus engelmannii
Bromus Madritensis ssp. rubens

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Table 1
Sensitive Vascular Plants
Searchlight Wind Farm Project
Clark County, Nevada

Scientific Name	Common Name	Ecology / Habitat type	Elevation Range (ft.)	Range of Recorded Survey Period	Documented Range	Habit	Expected Bloom Period	Sruvey Notes
Vascular Plants								
Anulocaulis leiosolenus var. leiosolenus	Sticky Ringstem	Found on gypsum soils of rolling hills and terraces in Mojave Desert scrub. Associated with *Arctomecon californiica.*	2,000 - 4,400		Southwest endemic of NV, AZ, & NM. Patchy distribution in Southwest NV. Known primarily east of Las Vegas in Frenchman and Muddy Mtns. And Gold Butte area.	Perennial Herb to 3.3 feet.	July to August	Not Detected. Soil structure not observed within the survey boundaries.
Arctomecon californica	Las Vegas Bearpoppy	Found in Mojave Desert Scrub and Salt Scrub environments on gypsum soils.	1,300 - 2,700		Endemic to the Eastern Mojave, Southeastern Nevada and Northwest Arizona.	Mound-forming perennial	April to May	Not Detected. Soil structure not observed within the survey boundaries.
Arctomecon merriamii	White Bearpoppy	Found in Mojave Desert Scrub and Salt Scrub environments often growing in limestone and/or dolomite soils. Found on ridges, rocky slopes, gravelly canyon washes, and old lakebeds derived from carbonate soils.	2000 - 6800		Mojave Endemic	Perennial Herb atop a stout taproot	April to June	Not Detected. Soil structure not observed within the survey boundaries.
Astragalus funerus	Black Woollypod	Dry,open scree, talus, or gravelly alluvium derived from light-colored volcanic crust mostly on east and south facing aspects. Rarely on west or north aspects.	3200 - 7680	March - June	Clark (?) and Nye Counties. Also recorded in CA.	Small Perennial Herb	Early Spring	Not Detected.
Astragalus geyeri var. triquetrus	Three-cornered Milkvetch	Open, deep sandy soils or dunes generally stabilized by vegetation and/or gravelly veneer.	1100 - 2400	February - May	Clark and Lincoln Counties, and AZ.	Annual	Late Winter, Early Spring	Not Detected.
Astragalus mohavensis var. hemigyrus	Halfing milkvetch	Carbonate soils and derivative soils on terraced hills and ledges, open slopes, and along washes in the creosote-bursage, blackbrush, and mix-shrub zone.	3000 - 5600	April - June	Clark, Lincoln and Nye County, and CA.	annual or short-lived perennial	Flowering Early Spring	Not Detected.
Astragalus mokiacensis	Mokiak milkvetch	Sandy soils, bluffs, cliff terraces, gullied badlands, disturbed areas along streams (Note: not yet reviewed)	2461 - 5020	March - April	Clark County, and AZ, UT	perennial herb with erect stems 1 -4 dm w/purple flwrs	blooming April to June	Not Detected.
Astragalus nyensis	Nye milkvetch	foothills of desert mtns., calcerous outwash fans and gravelly flats, sometimes sandy soils.	1100 -5600	April - May	Clark, Lincoln and Nye County	annual	Spring	Not Detected.
Calochortus striatus	Alkali Mariposa Lily	Moist alkali meadows around springs.	2100 - 3700	April - August	Clark and Nye Counties, and CA.	Small Perennial bulb	Spring	Not Detected.
Cylindropuntia multigeniculata	Blue Diamond Cholla	Found growing in a variety of soils, such as schist, limestone, basalt, and granite composites. Soil types include, sandy loam, gravels, coarse cobbled soils, silty alluvial fan terraces, decomposed granite and schist, and clays of volcanic origin. Plants prefer steep, dry, rocky slopes with little competition.		N/A	Clark County,Nv and Mojave County AZ	Perennial - Stem Succulent	April - May	Not Detected.
Dudleya pulverulenta (syn.Escheveria pulverulenta)	Chalk Liveforever	Rocky Slopes	2100 - 5512		Clark and Nye Counties NV., CA, AZ, and Mexico.	Perennial (Fleshy Succelent)		Not Detected.
Enceliopsis argophylla	Silverleaf Sunray	Dry, open, relatively barren area of gypsum badlands, volcanic gravels, loose sands within creosote bursage zone.	1165 - 2380	May	Clark County, AZ and NM.	Long lived perennial cushion.	Flowers continually	Not Detected.
Eremogone stenomeres	Meadow Valley Sandwort	Carbonate cliffs, ledges,canyon walls, and steep rocky slopes of all aspects above the Creosote Zone.	2900 - 3600	April - May	Clark and Lincoln Counties.	Long lived perennial cushion.	Spring (May)	Not Detected.
Eriogonum corymbosum var. nilesii	Las Vegas Buchwheat	On or near gypsum soils, often forming low mounds or outcrops in drainages and washes or in area of generally low relief.	1900 - 3839		Clark County, and UT	Shrub	August - November	Not Detected.
Eriogonum heermannii var. clokeyi	Clokey Buckwheat	Carbonate outcrops, talus, scree, gravelly washes and banks,	4000 - 6000	June - September	Clark and Nye Counties	Shrub	Late spring to summer	Not Detected.
Eriogonum viscidulum	Sticky Buckwheat	Deep loose, sandy soils in washes, flats, roadsides, steep aeolian slopes, and stabilized dune areas. Dependent upon deep sands or deep sand dunes.	1200 - 2200	April - June	Clark and Lincoln Conties and AZ.	annual	April - May	Not Detected.

Table 1
Sensitive Vascular Plants
Searchlight Wind Farm Project
Clark County, Nevada

Scientific Name	Common Name	Ecology / Habitat type	Elevation Range (ft.)	Range of Recorded Survey Period	Documented Range	Habit	Expected Bloom Period	Sruvey Notes
Vascular Plants								
Mentzelia polita	Polished Blazing Star	Limestone and gypsum soils. (Jepson Manual)	3936 - 4921		?	Perennial (12 31 cm)	April - May	Not Detected.
Penstemon albomarginatus	White-margined Beardtongue	Stabilized dunes, Sandy areas within Mojave scrub.	2750 - 5890	March - August	Clark and Nye Counties, and CA, AZ.	Perennial herb	March - May	Not Detected.
Penstemon bicolor ssp. Bicolor	Yellow Two-tone Beardtongue	Calcareous or carbonate soils in washes, roadsides, rock crevices, outcrops, or similar places receiving enhanced runoff.	2500 -5480	April - May	Clark County.	Perennial herb	Spring	Not Detected.
Penstemon bicolor ssp. Roseus	Rosy Two-toned Beardtongue	Rocky calcareous, granitic, or volcanic soils in washes, roadsides, scree outcrop bases, rock crevices or or similar places receiving enhanced runoff.	1800 - 4839	March - September	Clark and Nye Counties, AZ and CA.	Perennial herb	March - May	Not Detected.
Perityle intracata	Delicate Rock Daisy	Crevices and rubble of carbonate outcrops.	2620 - 6000	January - December	Clark, Lincoln, and Nye Counties, CA(?)	Subshrub	Late spring to late fall	Not Detected.
Porophyllum pygmaeum	Pygmy Poreleaf	Dry, open, relatively deep, rocky carbonate soils of alluvial fans and hillsides. Often in shallow depressions, low benches adjacent to minor drainages, or other moisture-enhanced micro sites.	4200 -6800	April - October	Clark and Lincoln Counties.	Rhizomatus perennial herb	Late spring	Not Detected.

Table 2
Observed Flora
Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
APIACEAE - Carrot Family					
Apiaceae	*Cymopterus multinervatus*	Purplenerve Springparsley	Sandy and rocky slopes	per	
APOCYNACEAE - Milkweed Family					
Apocynaceae	*Amsonia tomentosa*	woolly bluestar/amsonia	desert plains, canyons	subshrub	
ASCLEPIADACEAE - Milkweed Family					
Asclepiadaceae	*Asclepias nyctaginifolia*	Mojave milkweed	arroyos, dry slopes	per	Apocynaceae
Asclepiadaceae	*Asclepias subulata*	rush milkweed, ajamete	arroyos, washes	ann	Apocynaceae
ASTERACEAE - Sunflower Family					
Asteraceae	*Acamptopappus sphaerocephalus var. sphaerocephalus*	rayless goldenhead	gravelly/rocky slopes, flats, desert to juniper woodland	shrub	
Asteraceae	*Adenophyllum cooperi*	Cooper's dogweed/dyssodia	dry sandy slopes and washes	subshrb	
Asteraceae	*Adenophyllum porophylloides*	San Felipe dogweed/dyssodia	dry rocky hillsides, washes	subshrb	
Asteraceae	*Ambrosia dumosa*	burro-weed	creosote bush scrub	shrub	
Asteraceae	*Ambrosia eriocentra*	woolly bur-sage	dry washes and slopes	shrub	
Asteraceae	*Baccharis sergiloides*	desert baccharis	gravelly or sandy stream beds	shrub	
Asteraceae	*Baileya multiradiata*	desert marigold	desert roadsides, flats washes hillsides	ann/per	
Asteraceae	*Bebbia juncea var. aspera*	sweetbush	dry rocky slopes, desert plains, washes	shrub	
Asteraceae	*Brickellia atrctyloides var. arguta*	pungent brickellbush, spearleaf brickellia	rocky places	shrub	
Asteraceae	*Brickellia incana*	woolly brickellbush	sandy washes, flats	shrub	*Brickellia atrctyloides var. arguta*

Table 2
Observed Flora
Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
Asteraceae	*Calycoseris parryi*	yellow tackstem	sandy to gravelly slopes, washes	ann	
Asteraceae	*Chaenactis carphoclinia var. carphoclinia*	pebble pincushion	open rocks or gravel	ann	
Asteraceae	*Chaenactis fremontii*	Fremont pincushion	open sand or gravel	ann	
Asteraceae	*Chaenactis macrantha*	Mojave pincushion	open (often calcareous) san or gravel	ann	
Asteraceae	*Chaenactis stevioides*	desert pincushion	open flats, slopes	ann	
Asteraceae	*Chrysothamnus paniculatus*	black-stem	gravelly washes	shrub	*Ericameria paniculata*
Asteraceae	*Encelia farinosa*	brittlebush, incienso	slopes, washes, flats	shrub	
Asteraceae	*Encelia frutescens*	button brittlebush	desert washes, flats, slopes, roadsides	shrub	
Asteraceae	*Encelia virginensis*	Virgin River brittlebush	desert flats, rocky slopes, roadsides	shrub	
Asteraceae	*Ericameria cooperi*	Cooper's goldenbush	rocky slopes/valleys, creosote-bush scrub, Joshua-tree wdland	shrub	
Asteraceae	*Ericameria laricifolia*	turpentine bush	rocky canyons, creosote bush scrub, pinyon/juniper woodlnd	shrub	
Asteraceae	*Ericameria paniculata*	black-stem	gravelly washes	shrub	
Asteraceae	*Erigeron concinnus var. concinnus*	Navajo fleabane, shaggy daisy	sandy to rocky slopes, crevices	per	
Asteraceae	*Eriophyllum wallacei*	wooly Easterbonnets	chaparral, sagebrush, desert scrub or woodland	ann	
Asteraceae	*Gutierrezia sarothrae*	broom snakeweed	grasslands, deserts, montane areas	subshrub	
Asteraceae	*Hymenoclea salsola*	cheesebush	dry flats, washes, fans	subshrub	*Ambrosia salsola*
Asteraceae	*Malacothrix coulteri*	snake's head	sandy open areas,coastal sage, grassland, deserts	ann	
Asteraceae	*Malacothrix glabrata*	desert dandelion	coarse soils in open areas or amoung shrubs	ann	

Table 2
Observed Flora
Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
Asteraceae	*Monoptilon bellidiforme*	daisy desertstar	sandy deserts, washes	ann	
Asteraceae	*Monoptilon bellioides*	Mojave desertstar	sandy deserts, washes	ann	
Asteraceae	*Perityle emoryi*	Emory rock-daisy	desert plains, slopes, washes	ann	
Asteraceae	*Peucephyllum schottii*	pygmy cedar	rocky slopes, often amoung boulders	shrub	
Asteraceae	*Porophyllum gracile*	odora	rocky slopes	subshrub	
Asteraceae	*Prenanthella exigua*	prenanthella	desert canyons & valleys, juniper woodland	ann	
Asteraceae	*Psilostrophe cooperi*	whitestem paperflower	dry plains, hillsides, washes	subshrub	
Asteraceae	*Rafinesquia neomexicana*	desert chicory	sandy or gravelly desert soils	ann	
Asteraceae	*Stephanomeria exigua*	wire lettuce	desert scrub, dry disturbed ground	ann/shrub	
Asteraceae	*Stephanomeria pauciflora*	wire lettuce	dry flats, deserts	per/subshrb	
Asteraceae	*Stylocline micropoides*	desert nest straw	stable rocky or sandy often calcareous soils	ann	
Asteraceae	*Tetradymia stenolepis*	Mojave cottonthorn/horsebrush	Joshua-tree woodland, creosote-bush scrub	shrub	
Asteraceae	*Trichoptilium incisum*	yellowdome	dry slopes, plains	ann/per	
Asteraceae	*Uropappus lindleyi*	Lindley's silverpuffs	rocky soils chaparral or grassy slopes	ann	
Asteraceae	*Viguiera parishii*	Parish's goldeneye	washes, dry, rocky slopes	shrub	*Bahiopsis parishii*
Asteraceae	*Xylorhiza tortifolia var. tortifolia*	Mojave aster	desert slopes, canyons	per/subshrb	

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Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
BORAGINACEAE - Borage Family					
Boraginaceae	*Amsinckia menziesii var. intermedia*	common fiddleneck	open disturbed areas	ann	
Boraginaceae	*Amsinckia tessellata var. tessellata*	bristly fiddleneck	sandy or gravelly areas, inland	ann	
Boraginaceae	*Cryptantha barbigera*		open, sandy to rocky soils	ann	
Boraginaceae	*Cryptantha circumscissa*	cushion cryptantha/catseye	sandy soils	ann	
Boraginaceae	*Cryptantha micrantha*	redroot cryptantha/catseye	sandy soils	ann	
Boraginaceae	*Cryptantha nevadensis*	Nevada cryptantha/catseye	sandy to gravelly soils	ann	
Boraginaceae	*Cryptantha petrocarya*	wingnut cryptantha	sandy to gravelly soils	ann	
Boraginaceae	*Pectocarya heterocarpa*		washes, roadsides, openings in creosote-bush shrub	ann	
Boraginaceae	*Pectocarya platycarpa*	broadfruit combseed	washes, roadsds creosote-bush scrub, joshua-tree woodlnd	ann	
Boraginaceae	*Pectocarya recurvata*	curvenut combseed	creosote-bush scrub, Joshua-tree woodland	ann	
Boraginaceae	*Plagiobothrys arizonicus*	Arizona popcornflower, blood weed	dry coarse soils in scrub or woodland	ann	
BRASSICACEAE - Mustard Family					
Brassicaceae	*Arabis pulchra var. gracilis*	beautiful/prince's rockcress	canyons, slopes, washes, limestone soils	per	
Brassicaceae	*Brassica tournefortii**	Asian/African mustard	roadsides, washes, open areas	ann	
Brassicaceae	*Caulanthus cooperi*	Cooper's wild cabbage/jewelflower	sandy or gravelly soils amonug shrubs	ann	
Brassicaceae	*Descurainia pinnata*	western/pinnate tansymustard	washes, slopes, often saline soils	ann	
Brassicaceae	*Draba cuneifolia*	wedgeleaf draba	open or disturbed areas	ann	
Brassicaceae	*Guillenia lasiophylla*	California mustard	dry open slopes, serpentine, burns	ann	

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Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
Brassicaceae	*Lepidium fremontii*	desert allysum/pepperweed	sandy washes, gravelly soils, rocky slopes & ridges	per	
Brassicaceae	*Lepidium lasiocarpum var lasiocarpum*	hairypod pepperweed	dry flats, washes, roadsides, sagebrush	ann	*Lepidium lasiocarpum ssp. lasiocarpum*
Brassicaceae	*Lesquerella tenella*	moapa bladderpod	sandy soils, washes slopes	ann	*Physaria tenella*
Brassicaceae	*Sisymbrium irio**	London rocket	disturbed areas, roadsides, orchards	ann	
Brassicaceae	*Sisymbrium orientale**	oriental mustard	disturbed areas	ann	
Brassicaceae	*Thysanocarpus curvipes*	lacepod/fringe pod, ribbed fringepod	grassy or brushy slopes, moist meadows	ann	
Brassicaceae	*Thysanocarpus laciniatus*	crenate/ narrow-leaved fringe pod	dry rocky slopes and ridges	ann	
CACTACEAE - Cactus Family					
Cactaceae	*Echinocactus polycephalus var. polycephalus*	cottontop,clustered barrel cactus	rocky hills, silty valleys		
Cactaceae	*Echinocereus engelmannii*	hedgehog cactus, Engelmann's hedgehog	dry habitats	shrub	
Cactaceae	*Ferocactus cylindraceus*	California barrel cactus	gravelly, rocky or sandy areas		
Cactaceae	*Mammillaria tetrancistra*	common fishhook cactus	creosote-bush scrub	per	
Cactaceae	*Cylindropuntia acanthocarpa var. coloradensis*	buckhorn cholla	creosote-bush scrub, joshua-tree woodland	shrub	*Cylindropuntia acanthocarpa var.*
Cactaceae	*Opuntia basilaris var. basilaris*	beavertail cactus/pricklypear	desert, chaparral, pinyon-juniper woodland	shrub	
Cactaceae	*Cylindropuntia bigelovii*	teddy-bear cholla	creosote-bush scrub	shrub	*Cylindropuntia bigelovii*
Cactaceae	*Cylindropuntia echinocarpa*	silver/golden cholla	dry habitats	shrub	*Cylindropuntia echinocarpa*
Cactaceae	*Opuntia erinacea*	old man cactus, hairy prickly-pear	creosote-bush shrub to pine srub	shrub	*Opuntia polyacantha var.*
Cactaceae	*Opuntia parishii*	club/ mat cholla	sandy flats	shrub	*Grusonia parishii*
Cactaceae	*Cylindropuntia ramosissima*	pencil cactus, diamond cholla	desert flats	shrub	*Cylindropuntia ramosissima*
Cactaceae	*Sclerocactus johnsonii*	Johnson pineapple cactus, pygmy barrel cactus	granitic areas, creosote-bush scrub		*Echinomastus johnsonii*

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Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
CAMPANULACEAE - Bellflower Family					
Campanulaceae	*Nemacladus glanduliferus var. orientalis*	glandular threadplant	rocky slopes, sandy soils, washes	ann	*Nemacladus orientalis*
Campanulaceae	*Nemacladus rubescens*		dry, sandy or gravelly soils	ann	
CARYOPHYLLACEAE - Pink Family					
Caryophyllaceae	*Arenaria macradenia v macradenia*	desert sandwort	dry rocky slopes, alluvial deposits, often on carbonates	per	*Eremogone macrodenia var. macrodenia*
CHENOPODIACEAE - Goosefoot Family					
Chenopodiaceae	*Grayia spinosa*	spiny hop-sage	sandy to gravelly soils, shrubland, pinyon/juniper woodlnd	shrub	
Chenopodiaceae	*Krascheninnikovia lanata*	winter fat	rocky to clay soils, flats to gentle slopes	shrub	
Chenopodiaceae	*Salsola tragus**	Russian thistle, tumbleweed	disturbed areas	ann	
CUCURBITACEAE - Gourd Family					
Cucurbitaceae	*Cucurbita palmata*	coyote melon/gourd	sandy areas	vine	
CUSCUTACEAE - Dodder Family					
Cuscutaceae	*Cuscuta denticulata*	desert dodder	on herbs or shrubs, creosote bush scrub, joshua-tree wdlnd	ann	
EPHEDRACEAE - Ephedra Family					
Ephedraceae	*Ephedra nevadensis*	Nevada ephedra/Morman tea	creosote-bush scrub, Joshua-tree woodland	shrub	
Ephedraceae	*Ephedra viridis*	green ephedra	sagebrush, creosote-bush scrub, joshua tree woodland	shrub	

Table 2
Observed Flora
Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
EUPHORBIACEAE - Spurge Family					
Euphorbiaceae	*Chamaesyce albomarginata*	rattlesnake weed	dry slopes	per	
Euphorbiaceae	*Chamaesyce micromera*		sandy places	ann/per	
Euphorbiaceae	*Chamaesyce polycarpa*	smallseed sandmat	dry sandy slopes & flats	per	
Euphorbiaceae	*Ditaxis neomexicana*	common ditaxis	creosote-bush scrub	ann/per	
FABACEAE - Legume Family					
Fabaceae	*Acacia greggii*	catclaw	flats, washes	shrub/tree	*Senegalia greggii*
Fabaceae	*Astragalus acutirostris*		sandy or gravelly areas	ann	
Fabaceae	*Astragalus didymocarpus var. dispermus*	two-seeded/dwarf white milkvetch	sandy or gravelly areas	ann	
Fabaceae	*Astragalus layneae*	widow's milkvetch	sandy flats, washes	per	
Fabaceae	*Astragalus lentiginosus var. fremontii*	Fremont's milkvetch	open sand, gravel	ann/per	
Fabaceae	*Astragalus nuttallianus var. imperfectus*	turkey peas	sandy or gravelly flats or washes	ann	
Fabaceae	*Dalea mollis*	hairy prairieclover	creosote bush flats, washes, roadsides	ann	
Fabaceae	*Lotus humistratus*	hill lotus, foothill deervetch, maresfat	dry gravely or sandy slopes & ridges	ann	
Fabaceae	*Lotus strigosus*	strigose trefoil, bishop lotus	dry sandy or gravelly slopes or flats	ann	
Fabaceae	*Lupinus concinnus*	bajada lupine	open or disturbed areas, burns	ann	
Fabaceae	*Lupinus sparsiflorus*	Coulter's lupine	washes, sandy areas	ann	
Fabaceae	*Psorothamnus fremontii var. fremontii*	Fremont's indigo-bush/false dalea	granite and volcanic slopes, flats, canyons	shrub	

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FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
GERANIACEAE - Geranium Family					
Geraniaceae	*Erodium cicutarium**	red-stemmed filaree	disturbed grassy slopes, pastures	ann	
Geraniaceae	*Erodium texanum*	Texas storksbill	dry open sites, shrubland	ann/bien	
HYDROPHYLLACEAE - Waterleaf Family					
Hydrophyllaceae	*Eucrypta chrysanthemifolia var. bipinnatifida*	spotted hideseed	cliffs, rocky slopes, crevices, washes	ann	Boraginaceae
Hydrophyllaceae	*Eucrypta micrantha*	desert hideseed/eucrypta	rocky crevices, washes, slopes	ann	Boraginaceae
Hydrophyllaceae	*Nama demissum var. demissum*	desert purple mat	sandy or gravelly flats	ann	Boraginaceae
Hydrophyllaceae	*Phacelia crenulata var.*	caterpillarweed, purple stem phacelia	sandy to gravelly washes, slopes	ann	Boraginaceae
Hydrophyllaceae	*Phacelia cryptantha*	hiddenflower/limestone phacelia	gravelly or rocky slopes, canyons	ann	Boraginaceae
Hydrophyllaceae	*Phacelia distans*	distant/common phacelia	clay or rocky soils, slopes	ann	Boraginaceae
Hydrophyllaceae	*Phacelia fremontii*	Fremont's phacelia	sandy or gravelly soils, shrubland, grassland	ann	Boraginaceae
Hydrophyllaceae	*Phacelia perityloides*	Rock phacelia	crevices on cliffs, rocky, often calcareous slopes	ann/per	Boraginaceae
Hydrophyllaceae	*Phacelia rotundifolia*	roundleaf phacelia	rocky slopes, cervices, ledges creosote scrub, pinyon/Juniper	ann	Boraginaceae

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Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
KRAMERIACEAE - Rhatany Family					
Krameriaceae	*Krameria erecta*	pima rhatany, purple heather	dry rocky ridges, slopes	shrub	
Krameriaceae	*Krameria grayi*	white rhatany	dry rocky or sandy areas, esp. lime soils	shrub	
LAMIACEAE - Mint Family					
Lamiaceae	*Hyptis emoryi*	desert Lavender	gravelly, sandy washes, canyons, desert shrubland	shrub	
Lamiaceae	*Salazaria mexicana*	Mexican bladder sage	sandy to gravelly slopes, washes, shrubland, woodland	shrub	
Lamiaceae	*Salvia columbariae*	chia	dry disturbed areas	ann	
Lamiaceae	*Salvia dorii var. piilosa*	hairy/purple sage	desert slopes, washes	shrub	
LILIACEAE - Lily Family					
Liliaceae	*Calochortus kennedyi var. kennedyi*	desert mariposa	heavy or rocky soils, creosote-bush scrub, pinyon/juniper	per	
Liliaceae	*Dichelostemma capitatum ssp. capitatum*	blue dicks	grassy slopes	per corm	
Liliaceae	*Yucca baccata*	banana yucca	dry joshua tree woodland	shrub	
Liliaceae	*Yucca brevifolia*	Joshua tree	desert flats & slopes	tree	
Liliaceae	*Yucca schidigera*	Mojave yucca	chaparral, creosote-bush scrub	shrub	

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FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
LOASACEAE - Loasa Family					
Loasaceae	*Eucnide urens*	desert rock nettle/stingbush	cliffs, rocky slopes, washes	subshrb	
Loasaceae	*Mentzelia albicaulis*	whitestem blazingstar	shrubland to pinyon/juniper, gravel fans, washes	ann	
Loasaceae	*Mentzelia tricuspis*	spinyhair stickleaf, desert blazingstar	sandy or gravelly slopes in creosote-bush scrub	ann	
Loasaceae	*Mentzelia veatchiana*	Veatch's blazingstar, whitestem stickleaf	sandy grassland, shrubland, oak/pine woodland	ann	
MALVACEAE - Mallow Family					
Malvaceae	*Eremalche rotundifolia*	desert five-spot	dry desert scrub	ann	
Malvaceae	*Sphaeralcea ambigua*	desert globemallow, apricot mallow	desert scrub	ann	
NYCTAGINACEAE - Four O'Clock Family					
Nyctaginaceae	*Allionia incarnata*	trailing four-o-clock, windmills	creosote bush scrub	ann/per	
Nyctaginaceae	*Mirabilis bigelovii var. bigelovii*	Bigelow's four o'clock, desert wishbone bush	rocky places	per/subshrb	
Nyctaginaceae	*Mirabilis multiflora*	desert four o'clock	dry rocky or sandy areas	per	
OLEACEAE - Olive Family					
Oleaceae	*Menodora scoparia*	desert olive, broom twinberry	rocky slopes, canyons	per/shrub	
Oleaceae	*Menodora spinescens*	spiny menodora/desert olive	rocky slopes, canyons	shrub	
ONAGRACEAE - Evening primrose Family					
Onagraceae	*Camissonia boothii ssp.*			ann	
Onagraceae	*Camissonia brevipes ssp.*	golden suncup	sandy slopes, washes, alluvial fans	ann	
Onagraceae	*Camissonia chamaenerioides*	longcapsule/willow herb suncup	sandy slopes, flats, desert scrub	ann	
Onagraceae	*Camissonia claviformis ssp. claviformis*	browneyes	alluvial slopes, flats, ceosote-bush scrub	ann	
Onagraceae	*Camissonia refracta*	narrowleaf suncup	sandy slopes, flats, desert scrub	ann	

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FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
OROBANCHACEAE - Broom-Rape Family					
Orobanchaceae	*Orobanche cooperi*	Broom-Rape	sandy flats, washes, on Asteraceae	ann/per	
PAPAVERACEAE - Poppy Family					
Papaveraceae	*Eschscholzia glyptosperma*	desert golden poppy	desert washes, flats, slopes	ann	
Papaveraceae	*Eschscholzia minutiflora*	pygmy golden poppy	desert washes, flats, slopes	ann	
PLANTAGINACEAE - Plantain Family					
Plantaginaceae	*Plantago ovata*	desert indianwheat	gravelly soils, desert, sagebrush, coastal strand	ann	
POACEAE - Grass Family					
Poaceae	*Achnatherum hymenoides*	indian ricegrass	dry well drained soils, desert shrubland, pinyon/juniper	per	
Poaceae	*Achnatherum speciosum*	desert needlegras	rocky slopes, canyons, washes	per	
Poaceae	*Aristida purpurea var. nealleyi*	Nealley three-awn	dry slopes, plains, shrubland	per	
Poaceae	*Cynodon dactylon**	bermuda grass	waste places	per	
Poaceae	*Bromus madritensis ssp. rubens**	foxtail chess, red brome	disturbed areas	ann	
Poaceae	*Erioneuron pulchellum*	fluff grass	sandy to rocky desert shrubland, woodland	per	
Poaceae	*Muhlenbergia porteri*	bush muhly	amoung boulders or shrubs, rocky slopes, cliffs	per	
Poaceae	*Pleuraphis rigida*	big galleta	dry open flats, washes, sandunes, scrub, woodland	per	
Poaceae	*Triden muticus*	slim tridens	dry, rocky, gen limestone soils, creosote-bush shrubland, pinyon/juniper woodland	per	
Poaceae	*Schismus barbatus**	old han schismus	dry, open, generally disturbed areas	ann	

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FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
POLEMONIACEAE - Phlox Family					
Polemoniaceae	*Eriastrum eremicum ssp. eremicum*	desert woollystar/eriastrum	open areas in sandy soils	ann	
Polemoniaceae	*Gilia brecciarum ssp. brecciarum*	Nevada gilia	sandy flats in open shrubland, woodland	ann	
Polemoniaceae	*Gilia scopulorum*		semi-shaded rocky ravines	ann	
Polemoniaceae	*Langloisia setosissima ssp. setosissima*	Great Basin/bristly langloisia	desert washes, flats, slopes gravelly to sandy soil	ann	
Polemoniaceae	*Leptosiphon aureus ssp. aureus*	golden desert trumpets	desert flats	ann	*Leptosiphon aureus ssp. aureus*
Polemoniaceae	*Leptosiphon aureus ssp. decorus*	white desert trumpets	desert flats	ann	*Leptosiphon aureus ssp. decorus*
Polemoniaceae	*Linanthus demissus*	desertsnow, desert linanthus	limestone soils, desert pavement, sandy areas	ann	
Polemoniaceae	*Linanthus dichotomus*	evening snow	drying open areas, esp serpentine	ann	
Polemoniaceae	*Loeseliastrum schottii*	Schott's calico	desert washes, flats, slopes, sandy to gravelly	ann	
POLYGONACEAE - Buckwheat Family					
Polygonaceae	*Chorizanthe brevicornu*	brittle spineflower	desert scrub, sagebrush, juniper woodland	ann	
Polygonaceae	*Chorizanthe rigida*	spiny-herb, devil's spineflower, spiny chorizanthe	desert scrub, pavement	ann	
Polygonaceae	*Eriogonum angulosum*	anglestem buckwheat	dry open places, sand or clay	ann	
Polygonaceae	*Eriogonum deflexum var. deflexum*	flat-topped/flatcrown buckwheat	sand	ann	

Table 2
Observed Flora
Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
Polygonaceae	*Eriogonum deflexum var. rectum*	flat-topped buckwheat	sand	ann/shrub	
Polygonaceae	*Eriogonum fasciculatum var. polifolium*	California buckwheat		shrub	
Polygonaceae	*Eriogonum gracillimum*	rose & white buckwheat	clay to gravel	ann	
Polygonaceae	*Eriogonum inflatum*	desert trumpet	dry sand or gravel	ann/per	
Polygonaceae	*Eriogonum maculatum*	spotted buckwheat	gravel to clay soils	ann	
Polygonaceae	*Eriogonum nidularium*	birdnest buckwheat	sand or gravel flats, washes	ann	
Polygonaceae	*Eriogonum palmerianum*	Palmer's buckwheat	sand or gravel	ann	
Polygonaceae	*Eriogonum plumatella*	yucca/flattop buckwheat	dry sloopes & washes	shrub	
Polygonaceae	*Eriogonum pusillum*	yellow-turbans	sand or gravel	ann	
Polygonaceae	*Eriogonum thomasii*	Thomas buckwheat	sand or gravel	ann	
Polygonaceae	*Oxytheca perfoliata*	roundleaf puncturebract	sandy to rocky creosote-bush or pinyon scrub	ann	
RANUNCULACEAE - Buttercup Family					
Ranunculaceae	*Delphinium parishii ssp. parishii*	Parish's/desert larkspur	desert scrub, juniper woodland	per	
ROSACEAE - Rose Family					
Rosaceae	*Coleogyne ramosissima*	blackbush	dry open slopes, creosote bush scrub, pinyon/ juniper	shrub	
Rosaceae	*Prunus fasciculata var. fasciculata*	desert almond	slopes canyons, washes. Shrubland, woodland	shrub	

Table 2
Observed Flora
Searchlight Wind Farm Project
Clark County, Nevada

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT TYPE	LIFE CYCLE TYPE	Proposed Jepson 2nd Ed. Changes
RUBIACEAE - Madder Family					
Rubiaceae	*Galium stellatum var. eremicum*	Munz's/starry bedstraw	rocky slopes	shrub	
SCROPHULARIACEAE - Figwort Family					
Scrophulariaceae	*Antirrhinum filipes*	twining snapdragon	on shrubs & debris, gen in washes	ann	Plantaginaceae
Scrophulariaceae	*Mimulus bigelovii*	monkey flower	rocky desert slopes, margins of washes	ann/shrub	
SOLANACEAE - Nightshade Family					
Solanaceae	*Datura sp.*	Jimson weed		ann-per	
Solanaceae	*Lycium andersonii*	Anderson's wolfberry	gravelly or rocky slopes, washes	shrub	
Solanaceae	*Lycium cooperi*	Cooper's box thorn/wolfberry/peach thorn	sandy to rocky flats, washes	shrub	
Solanaceae	*Nicotiana obtusifolia*	desert tobacco	gravelly or rocky washes, slopes	ann/small tree	
Solanaceae	*Physalis crassifolia*	yellow nightshade groundcherry	gravelly to rocky flats, washes, slopes	per/subshrb	
VISCACEAE - Mistletoe Family					
Viscaceae	*Phoradendron californicum*	desert mistletoe	deserts on Acacia, Cercidium, Larrea(rare), Olneya, Prosopis	shrub	
ZYGOPHYLLACEAE - Caltrop Family					
Zygophyllaceae	*Larrea tridentata*	creosote bush	desert scrub	shrub	

* indicates species considered to be a weed (non-native, introduced, or naturalized)

Table 3

Cacti Yucca Count Estimates

Searchlight Wind Farm Project

Clark County, Nevada

	BSA 1			BSA 2		
	N=18	Mean	SE	N=8	Mean	SE
Yucca brevifolia		47.98	5.48		16.04	7.40
Yucca schidigera		95.64	9.18		24.49	6.44
Cylindropuntia acanthocarpa var. coloradensis		30.94	6.69		3.92	1.66
Opuntia basilaris var. basilaris		3.76	0.71		2.23	1.20
Sclerocactus johnsonii		0.25	0.13		0.00	0.00
Cylindropuntia echincarpa		0.14	0.07		0.36	0.16
Echinocactus polycephalus var. polycephalus		0.88	0.79		0.00	0.00
Mammalaria tetrancistra		0.06	0.06		0.04	0.04
Ferrocactus cylindraceus		0.00	0.00		0.80	0.52
Echinocereus engelmannii		0.38	0.26		0.07	0.07
Grusonia parishii		0.23	0.23		0.00	0.00
Cylindropuntia bigelovii		0.00	0.00		0.00	0.00
Cylindropuntia ramosissima		0.00	0.00		0.00	0.00

BSA = Botanical Survey Area

Mean = Average Estimated Number / Acre : (Calculated as the average # of a given species estimated per acre per transect for a given survey area)

SE = Standard Error

N = Sample Size = Number of Transects sampled within a Survey Area

Table 3

Cacti Yucca Count Estimates

Searchlight Wind Farm Project

Clark County, Nevada

	BSA 3			BSA 4		
	N=6	Mean	SE	N=9	Mean	SE
Yucca brevifolia		0.00	0.00		0.00	0.00
Yucca schidigera		8.87	3.42		9.26	2.54
Cylindropuntia acanthocarpa var. coloradensis		2.28	0.83		0.00	0.00
Opuntia basilaris var. basilaris		11.45	5.40		0.78	0.32
Sclerocactus johnsonii		0.00	0.00		0.18	0.18
Cylindropuntia echincarpa		1.88	0.87		0.27	0.11
Echinocactus polycephalus var. polycephalus		0.00	0.00		0.00	0.00
Mammalaria tetrancistra		0.00	0.00		0.00	0.00
Ferrocactus cylindraceus		2.05	1.13		0.53	0.22
Echinocereus engelmannii		0.10	0.10		0.00	0.00
Grusonia parishii		0.00	0.00		0.00	0.00
Cylindropuntia bigelovii		6.36	4.48		0.00	0.00
Cylindropuntia ramosissima		0.00	0.00		0.00	0.00

BSA = Botanical Survey Area

Mean = Average Estimated Number / Acre : (Calculated as the average # of a given species estimated per acre per transect for a given survey area)

SE = Standard Error

N = Sample Size = Number of Transects sampled within a Survey Area

Table 3

Cacti Yucca Count Estimates

Searchlight Wind Farm Project

Clark County, Nevada

	BSA 5			BSA 6		
	N=14	Mean	SE	N=14	Mean	SE
Yucca brevifolia		0.00	0.00		0.00	0.00
Yucca schidigera		32.65	2.79		12.46	1.77
Cylindropuntia acanthocarpa var. coloradensis		2.09	0.83		0.27	0.24
Opuntia basilaris var. basilaris		3.13	0.98		0.34	0.17
Sclerocactus johnsonii		0.20	0.10		0.06	0.06
Cylindropuntia echincarpa		0.14	0.06		0.05	0.03
Echinocactus polycephalus var. polycephalus		0.34	0.14		0.14	0.07
Mammalaria tetrancistra		0.04	0.04		0.00	0.00
Ferrocactus cylindraceus		0.00	0.00		0.00	0.00
Echinocereus engelmannii		0.28	0.13		0.00	0.00
Grusonia parishii		0.00	0.00		0.00	0.00
Cylindropuntia bigelovii		0.00	0.00		0.00	0.00
Cylindropuntia ramosissima		1.29	0.84		0.11	0.00

BSA = Botanical Survey Area

Mean = Average Estimated Number / Acre : (Calculated as the average # of a given species estimated per acre per transect for a given survey area)

SE = Standard Error

N = Sample Size = Number of Transects sampled within a Survey Area

Table 3

Cacti Yucca Count Estimates

Searchlight Wind Farm Project

Clark County, Nevada

	All BSA's combined		
	N=69	Mean	SE
Yucca brevifolia		14.38	2.97
Yucca schidigera		38.92	4.93
Cylindropuntia acanthocarpa var. coloradensis		9.21	2.34
Opuntia basilaris var. basilaris		3.04	0.63
Sclerocactus johnsonii		0.14	0.05
Cylindropuntia echincarpa		0.32	0.10
Echinocactus polycephalus var. polycephalus		0.33	0.21
Mammalaria tetrancistra		0.03	0.02
Ferrocactus cylindraceus		0.34	0.13
Echinocereus engelmannii		0.17	0.08
Grusonia parishii		0.06	0.06
Cylindropuntia bigelovii		0.55	0.42
Cylindropuntia ramosissima		0.29	0.18

BSA = Botanical Survey Area

Mean = Average Estimated Number / Acre : (Calculated as the average # of a given species estimated per acre per transect for a given survey area)

SE = Standard Error

N = Sample Size = Number of Transects sampled within a Survey Area

Appendix A – NRCS Soils Descriptions

Soils descriptions obtained from the online Soil Web Survey of the United States Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS) website; http://websoilsurvey.nrcs.usda.gov/app/

100—Newera association

Map Unit Setting

- *Elevation:* 2,560 to 4,300 feet
- *Mean annual precipitation:* 5 to 7 inches
- *Mean annual air temperature:* 57 to 66 degrees F
- *Frost-free period:* 180 to 270 days

Description of Newera

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from volcanic and metamorphic rock

Properties and qualities

- *Slope:* 4 to 15 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Somewhat excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.4 inches)

Typical profile

- *0 to 2 inches:* Very gravelly sandy loam
- *2 to 6 inches:* Very gravelly sandy clay loam
- *6 to 16 inches:* Bedrock

Description of Newera, Steep

Setting

- *Landform:* Hills

- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from volcanic and metamorphic rock

Properties and qualities

- *Slope:* 15 to 50 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Somewhat excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Very low (about 0.4 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly sandy loam
- *2 to 6 inches:* Very gravelly sandy clay loam
- *6 to 16 inches:* Bedrock

110—Tenwell-Crosgrain association

Map Unit Setting

- *Elevation:* 2,660 to 3,710 feet
- *Mean annual precipitation:* 5 to 8 inches
- *Mean annual air temperature:* 57 to 70 degrees F
- *Frost-free period:* 200 to 270 days

Description of Tenwell

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Summit
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 4 percent
- *Depth to restrictive feature:* 20 to 35 inches to duripan
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Rare
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)

- *Available water capacity:* Very low (about 2.5 inches)

Typical profile

- *0 to 1 inches:* Very gravelly loamy coarse sand
- *1 to 4 inches:* Gravelly sandy loam
- *4 to 9 inches:* Sandy loam
- *9 to 22 inches:* Gravelly sandy clay loam
- *22 to 60 inches:* Cemented material

Description of Crosgrain

Setting

- *Landform:* Fan remnants
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium derived from metamorphic rock

Properties and qualities

- *Slope:* 4 to 15 percent
- *Depth to restrictive feature:* 6 to 14 inches to duripan; 21 to 24 inches to duripan
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.9 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly fine sandy loam
- *2 to 11 inches:* Very gravelly loam
- *11 to 24 inches:* Cemented material
- *24 to 60 inches:* Cemented material

120—Crosgrain-Tenwell association

Map Unit Setting

- *Elevation:* 2,920 to 3,510 feet
- *Mean annual precipitation:* 5 to 8 inches
- *Mean annual air temperature:* 57 to 70 degrees F
- *Frost-free period:* 200 to 270 days

Description of Crosgrain

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Summit
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium derived from metamorphic rock

Properties and qualities

- *Slope:* 2 to 8 percent
- *Depth to restrictive feature:* 6 to 14 inches to duripan; 21 to 24 inches to duripan
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.9 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly fine sandy loam
- *2 to 11 inches:* Very gravelly loam
- *11 to 24 inches:* Cemented material
- *24 to 60 inches:* Cemented material

Description of Tenwell

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Summit
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 4 percent
- *Depth to restrictive feature:* 20 to 35 inches to duripan
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Rare
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Available water capacity:* Very low (about 2.5 inches)

Typical profile

- *0 to 1 inches:* Very gravelly loamy coarse sand
- *1 to 4 inches:* Gravelly sandy loam
- *4 to 9 inches:* Sandy loam
- *9 to 22 inches:* Gravelly sandy clay loam
- *22 to 60 inches:* Cemented material

134—Newera-Nipton association

Map Unit Setting

- *Elevation:* 2,720 to 4,430 feet
- *Mean annual precipitation:* 5 to 9 inches
- *Mean annual air temperature:* 57 to 66 degrees F
- *Frost-free period:* 180 to 270 days

Description of Newera, Steep

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from volcanic and metamorphic rock

Properties and qualities

- *Slope:* 15 to 50 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Somewhat excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Very low (about 0.4 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly sandy loam
- *2 to 6 inches:* Very gravelly sandy clay loam
- *6 to 16 inches:* Bedrock

Description of Nipton

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Summit
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from metavolcanics

Properties and qualities

- *Slope:* 30 to 50 percent
- *Surface area covered with cobbles, stones or boulders:* 3.0 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Somewhat excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Very low (about 0.3 inches)
- *0 to 1 inches:* Extremely gravelly sandy loam
- *1 to 5 inches:* Very gravelly sandy loam
- *5 to 15 inches:* Bedrock

140—Haleburu extremely gravelly sandy loam, 4 to 15 percent slopes

Map Unit Setting

- *Elevation:* 2,400 to 3,400 feet
- *Mean annual precipitation:* 4 to 7 inches
- *Mean annual air temperature:* 61 to 70 degrees F
- *Frost-free period:* 240 to 300 days

Description of Haleburu

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from volcanic rock

Properties and qualities

- *Slope:* 4 to 15 percent
- *Surface area covered with cobbles, stones or boulders:* 7.0 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 10 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.6 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly sandy loam
- *2 to 11 inches:* Very gravelly sandy loam
- *11 to 21 inches:* Bedrock

146—Haleburu-Nipton association

Map Unit Setting

- *Elevation:* 2,790 to 3,800 feet
- *Mean annual precipitation:* 4 to 9 inches
- *Mean annual air temperature:* 57 to 70 degrees F
- *Frost-free period:* 180 to 300 days

Description of Haleburu

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from volcanic rock

Properties and qualities

- *Slope:* 15 to 50 percent
- *Surface area covered with cobbles, stones or boulders:* 7.0 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 10 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.6 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly sandy loam
- *2 to 11 inches:* Very gravelly sandy loam
- *11 to 21 inches:* Bedrock

Description of Nipton

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope

- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from metavolcanics

Properties and qualities

- *Slope:* 15 to 50 percent
- *Surface area covered with cobbles, stones or boulders:* 5.0 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Somewhat excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Very low (about 0.3 inches)

Typical profile

- *0 to 1 inches:* Extremely gravelly sandy loam
- *1 to 5 inches:* Very gravelly sandy loam
- *5 to 15 inches:* Bedrock

147—Haleburu-Nipton association, dry

Map Unit Setting

- *Elevation:* 2,400 to 4,500 feet
- *Mean annual precipitation:* 4 to 9 inches
- *Mean annual air temperature:* 57 to 70 degrees F
- *Frost-free period:* 180 to 300 days

Description of Haleburu

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from volcanic rock

Properties and qualities

- *Slope:* 15 to 50 percent
- *Surface area covered with cobbles, stones or boulders:* 7.0 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 10 percent

- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.6 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly sandy loam
- *2 to 11 inches:* Very gravelly sandy loam
- *11 to 21 inches:* Bedrock

Description of Nipton

Setting

- *Landform:* Hills
- *Landform position (two-dimensional):* Summit
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from metavolcanics

Properties and qualities

- *Slope:* 4 to 15 percent
- *Surface area covered with cobbles, stones or boulders:* 3.0 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Somewhat excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Very low (about 0.3 inches)

Typical profile

- *0 to 1 inches:* Extremely gravelly sandy loam
- *1 to 5 inches:* Very gravelly sandy loam
- *5 to 15 inches:* Bedrock

148—Haleburu-Seanna association

Map Unit Setting

- *Elevation:* 1,800 to 3,940 feet
- *Mean annual precipitation:* 4 to 7 inches
- *Mean annual air temperature:* 61 to 70 degrees F
- *Frost-free period:* 200 to 300 days

Description of Haleburu

Setting

- *Landform:* Hills

- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Colluvium and/or residuum weathered from volcanic rock

Properties and qualities

- *Slope:* 15 to 50 percent
- *Surface area covered with cobbles, stones or boulders:* 7.0 percent
- *Depth to restrictive feature:* 4 to 14 inches to lithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 10 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.6 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly sandy loam
- *2 to 11 inches:* Very gravelly sandy loam
- *11 to 21 inches:* Bedrock

Description of Seanna

Setting

- *Landform:* Mountains
- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Residuum weathered from granite

Properties and qualities

- *Slope:* 15 to 50 percent
- *Surface area covered with cobbles, stones or boulders:* 5.0 percent
- *Depth to restrictive feature:* 7 to 14 inches to paralithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.6 inches)

Typical profile

- *0 to 2 inches:* Extremely cobbly coarse sandy loam
- *2 to 10 inches:* Very gravelly sandy loam
- *10 to 20 inches:* Bedrock

160—Lanip-Kidwell association

Map Unit Setting

- *Elevation:* 2,360 to 5,000 feet
- *Mean annual precipitation:* 5 to 7 inches
- *Mean annual air temperature:* 57 to 63 degrees F
- *Frost-free period:* 180 to 270 days

Description of Lanip

Setting

- *Landform:* Fan remnants
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 4 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Rare
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Moderate (about 6.8 inches)

Typical profile

- *0 to 1 inches:* Very gravelly sandy loam
- *1 to 15 inches:* Gravelly loam
- *15 to 39 inches:* Clay loam
- *39 to 48 inches:* Gravelly sandy loam
- *48 to 60 inches:* Very gravelly sandy loam

Description of Kidwell

Setting

- *Landform:* Fan remnants
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium derived from volcanic rock

Properties and qualities

- *Slope:* 2 to 4 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Occasional
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 25 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Moderate (about 7.7 inches)

Typical profile

- *0 to 1 inches:* Very gravelly sandy loam
- *1 to 9 inches:* Gravelly sandy loam
- *9 to 15 inches:* Gravelly sandy clay loam
- *15 to 31 inches:* Gravelly sandy clay loam
- *31 to 60 inches:* Gravelly sandy loam

450—Arizo association

Map Unit Setting

- *Elevation:* 1,870 to 4,030 feet
- *Mean annual precipitation:* 5 to 7 inches
- *Mean annual air temperature:* 57 to 70 degrees F
- *Frost-free period:* 180 to 300 days

Description of Arizo

Setting

- *Landform:* Fan aprons
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
- *Depth to water table:* More than 80 inches

- *Frequency of flooding:* Very rare
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 5 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Low (about 3.0 inches)

Typical profile

- *0 to 2 inches:* Very gravelly loamy sand
- *2 to 6 inches:* Sand
- *6 to 60 inches:* Stratified very gravelly coarse sand to extremely gravelly sand

Description of Arizo, Frequently Flooded

Setting

- *Landform:* Drainageways
- *Down-slope shape:* Linear
- *Across-slope shape:* Concave
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 0 to 2 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Frequent
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 5 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 3.0 inches)

Typical profile

- *0 to 6 inches:* Extremely gravelly coarse sandy loam
- *6 to 60 inches:* Stratified very gravelly coarse sand to extremely gravelly sand

550—Cheme-Riverbend-Carrizo association

Map Unit Setting

- *Elevation:* 850 to 3,020 feet
- *Mean annual precipitation:* 3 to 5 inches
- *Mean annual air temperature:* 69 to 77 degrees F
- *Frost-free period:* 300 to 360 days

Description of Cheme

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Summit
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Alluvium derived from fanglomerate

Properties and qualities

- *Slope:* 4 to 15 percent
- *Depth to restrictive feature:* 7 to 20 inches to duripan; 30 to 50 inches to paralithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 25 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 12.0
- *Available water capacity:* Very low (about 0.9 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly sandy loam
- *2 to 6 inches:* Very gravelly loam
- *6 to 18 inches:* Extremely gravelly sandy loam
- *18 to 42 inches:* Cemented material
- *42 to 60 inches:* Bedrock

Description of Riverbend

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Summit
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 20 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 1.0

- *Available water capacity:* Very low (about 2.4 inches)

Typical profile

- *0 to 3 inches:* Extremely gravelly coarse sandy loam
- *3 to 10 inches:* Very gravelly coarse sand
- *10 to 60 inches:* Stratified extremely gravelly coarse sand to very gravelly loamy coarse sand

Description of Carrizo

Setting

- *Landform:* Inset fans
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 8 percent
- *Surface area covered with cobbles, stones or boulders:* 2.0 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very high (19.98 to 99.90 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Rare
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 10 percent
- *Maximum salinity:* Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 2.4 inches)

Typical profile

- *0 to 7 inches:* Very cobbly coarse sand
- *7 to 60 inches:* Stratified extremely gravelly coarse sand to very gravelly sand

570—Carrizo association

Map Unit Setting

- *Elevation:* 560 to 3,120 feet
- *Mean annual precipitation:* 3 to 5 inches
- *Mean annual air temperature:* 69 to 77 degrees F
- *Frost-free period:* 300 to 360 days

Description of Carrizo

Setting

- *Landform:* Fan aprons
- *Down-slope shape:* Linear

- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very high (19.98 to 99.90 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Very rare
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 10 percent
- *Maximum salinity:* Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 2.5 inches)

Typical profile

- *0 to 2 inches:* Extremely gravelly coarse sand
- *2 to 10 inches:* Gravelly coarse sand
- *10 to 60 inches:* Stratified extremely gravelly coarse sand to very gravelly sand

Description of Carrizo, Rarely Flooded

Setting

- *Landform:* Inset fans
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 8 percent
- *Surface area covered with cobbles, stones or boulders:* 2.0 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very high (19.98 to 99.90 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Rare
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 10 percent
- *Maximum salinity:* Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 2.4 inches)

Typical profile

- *0 to 7 inches:* Very cobbly coarse sand
- *7 to 60 inches:* Stratified extremely gravelly coarse sand to very gravelly sand

662—Crosgrain-Arizo association

Map Unit Setting

- *Elevation:* 2,200 to 3,280 feet
- *Mean annual precipitation:* 5 to 8 inches
- *Mean annual air temperature:* 57 to 70 degrees F
- *Frost-free period:* 180 to 300 days

Description of Crosgrain

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Backslope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Mixed alluvium derived from metamorphic rock

Properties and qualities

- *Slope:* 4 to 15 percent
- *Depth to restrictive feature:* 6 to 14 inches to duripan; 21 to 24 inches to duripan
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 0.9 inches)

Typical profile

- *0 to 1 inches:* Extremely gravelly loam
- *1 to 11 inches:* Very gravelly loam
- *11 to 24 inches:* Cemented material
- *24 to 60 inches:* Cemented material

Description of Arizo

Setting

- *Landform:* Drainageways
- *Down-slope shape:* Linear
- *Across-slope shape:* Concave
- *Parent material:* Mixed alluvium

Properties and qualities

- *Slope:* 2 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Frequent
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 5 percent
- *Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum:* 5.0
- *Available water capacity:* Very low (about 3.0 inches)

Typical profile

- *0 to 6 inches:* Extremely gravelly coarse sandy loam
- *6 to 60 inches:* Stratified very gravelly coarse sand to extremely gravelly sand

Appendix B

Relevant Laws

Nevada Revised Statutes Title 47 – Chapter 527

The following is a copy of the statute accessed at the Nevada State Legislatures web site located at the web address listed below:

http://www.leg.state.nv.us/NRS/NRS-527.html#NRS527Sec060.

TITLE 47 - FORESTRY; FOREST PRODUCTS AND FLORA

CHAPTER 527 - PROTECTION AND PRESERVATION OF TIMBERED LANDS, TREES, AND FLORA

NRS 527.060 Definitions. As used in NRS 527.060 to 527.120, inclusive, unless the context otherwise requires:

1. "Cactus" includes any member of the Cactaceae family.
2. "Christmas tree" includes any evergreen tree or part thereof cut and removed from the place where grown without the foliage being removed.
3. "Yucca" includes any member of the genus Yucca.

(Added to NRS by 1957, 318; A 1977, 778)

NRS 527.070 Notice required for removal or possession for commercial purposes; registration and permit.

1. For the purpose of NRS 527.060 to 527.120, inclusive, the removal or possession of Christmas trees, cacti or yucca for commercial purposes means the removal or possession of six or more of such plants in any 1 calendar day or the removal or possession of less than six of such plants each for 7 or more consecutive calendar days, except removal or possession of the plants for scientific or educational purposes with the permission of the owner of the plants.
2. A person proposing to remove or possess any Christmas tree, cactus or yucca for commercial purposes on any state, county or privately owned lands shall notify the State Forester Firewarden. Upon receipt of such notice the State Forester Firewarden shall provide the person with registration forms, and such forms must be completed and returned to the State Forester Firewarden at least 10 days before removal or possession of the plant. If it appears to the State Forester Firewarden that the person who has registered is entitled to remove or possess the plant, he shall issue a permit to ship the plant, and a sufficient number of tags so that each plant may be tagged if the source of the plants to be removed or possessed is not federal land.

(Added to NRS by 1957, 318; A 1977, 779)

NRS 527.080 Shipping permits.

1. Christmas trees, cacti or yucca which are removed or possessed for commercial purposes in Nevada and which are to be transported by railroad or other means to other localities in or out of the State of Nevada must be accompanied by a shipping permit issued by the State Forester Firewarden, or his duly authorized agent.
2. Christmas trees, cacti or yucca which are shipped into the State of Nevada must be accompanied by a shipping permit if required by the laws of the state of origin, or by a duly notarized permit or contract

signed by the landowner, or his authorized agent, showing the origin by legal land description and the number of plants in the lot being transported.

(Added to NRS by 1957, 318; A 1977, 779)

NRS 527.090 Tag required; fee.

1. All Christmas trees, cacti or yucca removed or possessed for commercial purposes must have attached thereto a tag issued by the State Forester Firewarden, by the Bureau of Land Management or by the United States Forest Service.

2. The State Forester Firewarden may charge a reasonable fee for each tag to help defray costs to the State for enforcement of the laws regulating removal or possession of Christmas trees, cacti or yucca. Money collected by the State Forester Firewarden shall be deposited in the appropriate fund of the State Forester Firewarden.

(Added to NRS by 1957, 319; A 1963, 55; 1977, 779)

NRS 527.100 Unlawful acts; regulations of State Forester Firewarden.

1. Except as otherwise provided by law, it is unlawful for any person, firm, company or corporation, his, its or their agent or agents, willfully or negligently to cut, destroy, mutilate, remove or possess any Christmas tree, cactus, yucca or branches thereof, or knowingly transport or sell any Christmas tree, cactus, yucca or its branches from any of the lands owned by or under the jurisdiction of the State of Nevada or its counties, or on any reserved or unreserved lands owned by the United States, or from any privately owned lands, without written permission from the legal owner, or his duly authorized agent, specifying locality by legal land description and number of plants to be removed or possessed.

2. For the purpose of sustaining productivity and preservation of the water-supplying functions of Nevada forest lands, the State Forester Firewarden shall adopt such reasonable regulations governing removal or possession of Christmas trees, cacti or yucca as are deemed necessary.

3. This section does not apply to necessary cutting or trimming of such plants if done for maintenance of electric power lines, telephone lines or other property of a public utility, or to a logging operation.

(Added to NRS by 1957, 319; A 1961, 108; 1977, 780, 1167)

NRS 527.110 Confiscation of plants unlawfully removed or possessed; sale; disposition of proceeds.

1. Except as provided in subsection 3, the State Forester Firewarden, or his duly authorized agent, officials of the United States Forest Service or of the Bureau of Land Management, and peace officers are hereby authorized to confiscate Christmas trees, cacti or yucca which are removed or possessed in a manner not authorized by law. Plants which are confiscated shall be sold to the highest bidder therefor, by the sheriff of the county wherein the plants were confiscated. The sale shall be held by the sheriff in a like manner as on an execution.

2. If it is determined that the plants originated on privately owned lands, the owner thereof shall be notified of the sale, and the proceeds of the sale, after deducting the costs thereof, shall be paid over to the owner.

3. If the owner of the lands cannot be determined, or if the plants originated on state lands, the State Forester Firewarden may dispose of the plants without selling them to the highest bidder. If the plants are sold, the net proceeds of sale shall be deposited in the State General Fund.

4. If the plants originated on land owned by the Government of the United States, the net proceeds shall be paid over to the federal agency administering the lands.

(Added to NRS by 1957, 319; A 1961, 107; 1977, 780)

NRS 527.120 Penalty. Every person who violates any provision of NRS 527.060 to 527.110, inclusive, not otherwise punishable, is guilty of a misdemeanor.

(Added to NRS by 1957, 319; A 1967, 609; 1971, 1463; 1977, 780; 1979, 1486)

SEARCHLIGHT WIND POWER PROJECT— SENSITIVE PLANT SPECIES FIELD GUIDE

Bruce Lund Feb 2010

Anulocaulis leisolenus v leisolenus
Sticky Ringsterm

Arctomecon californica
Las Vegas Bearpoppy

Arctomecon merriamii
White Bearpoppy

Astragalus geyeri v triquetrus
Three-cornered milkvetch

Sand substrate in low creosote– bursage
1500-2200 ft

Astragalus nyensis
Nye milkvetch

Sand substrate in low, creosote-bursage
1500-2200 ft

Astragalus funereus
Black woollypod

Black hairs on fused petals; steep gravelly slopes of volcanic tuff or limestone. 3200-7500 ft

Astragalus mohavensis v hemigyrus
Half-ring milkvetch

Limestone outcrops or gravels on hillsides. Open dry habitat.
Creosote-bursage > Blackbrush communities 3000-5600 ft

Astragalus mokiacensis
Mokiak milkvetch

Sand substrate on bluffs, terraces, badlands. 2400-5020 ft. Fruit pod ascending. Need both flowering and fruit stage to separate from ***A. pruessi.***

Mapped locations of the Mokiak milkvetch

- Presumed extant

Enceliopsis argophylla
Silverleaf Sunray

Dry gypsum badlands and eroded gypsum. Especially near Lake Mead. Often along roads.

1165-22380 ft

Calochortus striatus
Alkali Mariposa Lily

Moist alkaline meadows around springs in Red Rock Canyon NCA and Ash Meadows. 2100-3700 ft.

Mentzelia polita
Polished Blazing Star

Leaves flat, not revolute; stems and branches thick, ivory white; seeds prominently winged.

Around base of Spring Mts. Dry gypsum-clay outcrops with scattered vegetation of Atriplex canescens, Ephedra torreyana, Tetradymia canescens. 1430-1650 ft.

Has been confused with *M. memorabalis*

Dudleya pulverulenta
Chalk Liveforever

Rocky slopes and cliffs in foothills of desert mountains. Succulent in the Crassulaceae .
2100-5500 ft

Penstemon albomarginatus
White-margined beardtongue

Sand deposits in dry lakebeds, wash bottoms, and sandy slopes. 1500-3600 ft.

Pale herb with opposite,white-margined leaves.

Penstemon bicolor spp roseus AND P. b. bicolor
Rosy two-toned AND Yellow two-toned penstemon

Calcerous or carbonate soils in active gravel washes, rock outcrops. Creosote-bursage , blackbrush, to mixed scrub communities. 2500-5480 ft. Around base of Spring Mts and McCullough Range.

Eriogonum corymbosum v nilesii
Las Vegas Buckwheat

Robust shrub with yellow flowers in Oct-Nov. Fine textured gypsum or sandy-clay soils. 1900-3840 ft.

Eriogonum heermannii v clokeyi
Clokey buckwheat

Densely branched shrub on limestone outcrops, talus, scree and gravelly banks in creosote-bursage, saltbush , and blackbrush communities. 4000-6000 ft. This has round and unribbed stems which separate it from the more common ***E. h. v sulcatum*** which has ribbed (sulcate) stems.

Eriogonum viscidulum
Sticky buckwheat

Small annual of sandy soils in washes, roadsides, and dunes. 1200-2200 ft

Examine stems and leaves with hand lens to see wind blown sand grains sticking to them.

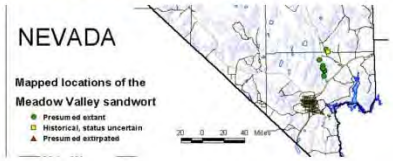
Porophyllum gracile
Pygmy poreleaf

Perennial herb. Dry open rocky carbonate soils of alluvial fans and hillsides, often in shallow depressions adjacent to minor drainages with extra moisture. 4200-8800 ft

Ermogone (Arenaria) stenomeres
Meadow Valley sandwort

Limestone cliffs, ledges, and rocky slopes in Creosote-bursage community. Typical Arenaria with linear stiff paired leaves. Petals white, sepals linear. 2900—3600 ft.

Capsule shorter than sepals, pointed narrow sepals , linear petals



Cylindropuntia (Opuntia) multigeniculata
Blue Diamond Cholla

Prefers steep dry, rocky slopes. Low, often mat forming plant. Densely covered with spines. Flowers green-yellow. Spines quite whitish compared to other chollas. 3300-4700 ft.

Perityle intricate
Nevada or Delicate Rock Daisy

This is a generic Perityle image— no specific image on line. Usually on limestone outcrops. Subshrub. Leaves w/o petioles, blades linear, margins entire; No ray flowers, yellow disc flowers, Similar to ***P. megalocephala.***