



# Biological Survey Report

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## Geofortis Minerals Bureau of Land Management Pozzolan Mineral Claims Long Valley, Lassen County, California

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**Project No.** 062.18.001

**Date** September 27, 2018

**Revised** April 1, 2021

## Table of Contents

ACRONYMS.....	III
<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 <i>Project Description</i> .....	1
1.2 <i>Project Location</i> .....	1
<b>2 PRE-FIELD REVIEW .....</b>	<b>1</b>
2.1 <i>Previous Studies</i> .....	1
2.2 <i>Habitat Characterization</i> .....	2
2.2.1 <i>Geology</i> .....	2
2.2.2 <i>Soils</i> .....	2
2.2.3 <i>Ecological Site Description</i> .....	3
2.2.4 <i>Vegetation Landcover</i> .....	4
2.3 <i>Agencies Queried</i> .....	4
2.3.1 <i>U.S. Fish and Wildlife Service</i> .....	4
2.3.2 <i>Bureau of Land Management</i> .....	5
2.3.2.1 <i>Sensitive Plant Species</i> .....	5
2.3.2.2 <i>Sensitive Wildlife Species</i> .....	6
2.3.3 <i>California Department of Fish and Wildlife</i> .....	6
2.3.3.1 <i>Sensitive Plant Species</i> .....	7
2.3.3.2 <i>Sensitive Wildlife Species</i> .....	7
2.3.4 <i>Nevada Department of Wildlife</i> .....	8
2.4 <i>Identification of Target Species</i> .....	8
<b>3 SURVEY PROTOCOLS .....</b>	<b>10</b>
3.1 <i>Botanical Survey Protocol</i> .....	10
3.1.1 <i>Ecological Sites</i> .....	10
3.1.2 <i>Rare and Sensitive Plant Surveys</i> .....	11
3.1.3 <i>Noxious and Invasive Plant Surveys</i> .....	11
3.2 <i>Wildlife Survey Plans</i> .....	11
3.2.1 <i>Sensitive Species Surveys</i> .....	11
3.2.2 <i>Bird Count Surveys</i> .....	12
3.2.3 <i>Raptor Nest Investigation</i> .....	12
<b>4 SITE CHARACTERIZATION AND SURVEY RESULTS .....</b>	<b>12</b>
4.1 <i>Site Characterization</i> .....	12
4.1.1 <i>Sites</i> .....	13

4.1.2	Habitat Types .....	13
4.2	<b><i>Rare and Sensitive Plant Survey Results</i></b> .....	14
4.2.1	Target Species Observed .....	15
4.2.2	Habitat Observations .....	16
4.3	<b><i>Noxious Weeds Survey Results</i></b> .....	19
4.4	<b><i>Wildlife Survey Results</i></b> .....	19
4.5	<b><i>Habitat Assessment</i></b> .....	20
5	<b>REFERENCES</b> .....	24

### List of Tables

Table 2-1: Target Species for Biological Surveys.....	9
Table 4-1 Conservation status and Blooming Period for BLM California plant species potentially occurring in the project area. ....	15
Table 4-2: <i>Eriogonum ochrocephalum</i> var. <i>ochrocephalum</i> Populations by Project Area .....	16
Table 4-3: Summary of Botanical Target Species .....	17
Table 4-4 Conservation Status of BLM California Sensitive Animal Species Potentially Occurring in the Project Area. ....	20
Table 4-5: Summary of Habitat Assessment of Wildlife Target Species .....	20

### List of Appendices

APPENDIX A – Project Location Maps
APPENDIX B – NRCS Maps
APPENDIX C – Site Characterization
APPENDIX D – Survey Data
APPENDIX E – Resumes
APPENDIX F – Agency Responses and Data Sources

## ACRONYMS

AQI	Air Quality Index
BCC	Birds of Conservation Concern
BIOS	Biogeographic Information and Observations System
BLM	Bureau of Land Management
CDFW	California Department of Fish and Wildlife
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
ESA	Endangered Species Act
GBBO	Great Basin Bird Observatory
IPaC	Information for Planning and Consultation
MLRA	Major Land Resource Area
NDOW	Nevada Department of Wildlife
NNHP	Nevada Natural Heritage Program
NRCS	Natural Resources Conservation Service
SWReGAP	Southwest Regional Gap Analysis Program
UNR	University of Nevada, Reno
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service

## 1 INTRODUCTION

BEC Environmental, Inc. (BEC) was retained by Broadbent and Associates, Inc. (Broadbent) to provide biological support to assist Geofortis Minerals, LLC (Geofortis) in acquiring the necessary approvals from the Bureau of Land Management (BLM) for initiation of mining activities to occur on Federal and private land. This Survey Report summarizes all data from habitat characterization and biological survey efforts conducted to identify presence or absence of protected plants and animals potentially occurring on the site to support the assessment of potential effects the Project may have on plant and wildlife resources on and in the vicinity of the site. Racoon

### 1.1 Project Description

Geofortis plans to develop a 100-acre pozzolan mine consisting of mineral claims CAL MIN 120-126, 131, 132, 137, 138, and 159. Mine operations will run year-round and will follow a proposed three-phased schedule for excavations on undisturbed areas. Phase I will cover 35.3 acres and may produce 3.5 million cubic yards of pozzolan material. Phase II will cover 37.5 acres and could produce up to 4.9 million cubic yards of pozzolan material. Phase III will cover 27.4 acres and may produce 1.7 million cubic yards. It is estimated these mineral claims will produce 10.1 million cubic yards of pozzolan material. Along with ground disturbing activities with the mine, Geofortis is proposing to construct a new 1,000-foot-long access road.

Geofortis also plans to operate on previously-mined Ironcloud claims 11 and 12. This area is previously mined and encompasses 4.9 acres of disturbed area. The mine pit extends a maximum of 41.5 feet below the existing surface, averaging 16.5 feet below the existing surface. These mineral claims may produce a total of 140,000 cubic yards of pozzolan material.

### 1.2 Project Location

The mine sites would be developed on Federal and private land located in Township 23 North, Range 17 East, Mount Diablo Meridian in the Long Valley in southern Lassen County, California, approximately 2.0 miles west of the California-Nevada border (**Appendix A – Project Location Maps, Figure 1 – Geofortis Mines Vicinity Map**).

The northern-most site is the previously mined site (Existing Mine site) located in the East Half of Section 11, Township 23 North, Range 17 East approximately 0.03 miles west of U.S. Highway 395 and immediately adjacent to an existing, unnamed dirt access road (**Appendix A, Figure 2 – Geofortis Mines Site Map**).

The Phase I portion of the combined Phase I & II site is located in the Southeast Quarter of Section 11, Township 23 North, Range 17 East approximately 0.15 miles east of U.S. Highway 395. The Phase II portion of the combined Phase I & II site is located in the Northeast Quarter of Section 14, Township 23 North, Range 17 East approximately 0.05 miles east of U.S. Highway 395 (**Appendix A, Figure 2**).

The Phase III site is located in the Northwest Quarter of Section 14, Township 23 North, Range 17 East approximately 0.04 miles west of U.S. Highway 395 (**Appendix A, Figure 2**).

## 2 PRE-FIELD REVIEW

### 2.1 Previous Studies

BEC located Environmental Review and Approval documentation for the Existing Mine site from 2013. The Categorical Exclusion was for purchase of already mined materials at the site and did not contain any relevant biological or survey information (Categorical Exclusion Environmental Review and Approval,

2013). BEC was not able to identify any documentation of biological surveys previously conducted on or in the immediate vicinity of the Project site.

## **2.2 Habitat Characterization**

BEC biologists and botanist reviewed readily available geologic, soil, vegetation, and species data from sources including U.S. Geological Service (USGS), U.S. Department of Agriculture (USDA), U.S. Fish and Wildlife Service (USFWS), BLM, California Department of Fish and Wildlife (CDFW), and Nevada Department of Wildlife (NDOW). BEC biologists used the information collected to develop a preliminary characterization of the Project site and compiled a list of species of concern potentially present in the Project area.

### **2.2.1 Geology**

The geology of the Project area consists of northerly-trending, fault-block ranges, and intervening, drier basins. Lower elevation basins, slopes, and alluvial fans. Soils in the area transition upslope from mesic Aridisols to frigid Mollisols. The majority of the property is covered by alluvium, with some colluvial soils on the lowland hills (Griffith, et al., 2016).

### **2.2.2 Soils**

The Project site lies within Major Land Resource Area's (MLRA) 23 and 26. The Project area is included in the USDA Natural Resources Conservation Service (NRCS) Soil Survey Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties; and Susanville Area, Parts of Lassen and Plumas Counties, California. The predominant soils types are sandy loam, sandy clay loam, or gravelly sandy loam over mixed alluvium derived from granite, weathered or mixed. Soils are characterized as well drained (**Appendix B – NRCS Maps, Figure 3 – NRCS Soil Map**). The following map units were identified for the area.

#### **Corral-Glenbrook complex, 10 to 50 percent slopes**

Corral-Glenbrook soils are formed from colluvium derived from tuff and/or residuum weathered from tuff. Soil profile: 0-4 inches loam; 4-12 inches sandy clay loam; 12-60 inches weathered bedrock. Soils are well drained and classified as not prime farmland. This component is in the R023XF091CA Loamy Upland 9-12" P.Z. and R026XF053CA Shallow Granitic Upland 9-12" P.Z. ecological site. This soil type is present in the existing mine and Phase III of the Project.

#### **Galeppi sandy loam, 2 to 5 percent slopes, and 5-30 percent slopes**

Galeppi sandy loam soils are formed from fan remnants, alluvium derived from granite. Soil profile: 0-18 inches sandy loam; 18-36 inches sandy clay loam; 36-52 inches sandy loam; 52-60 inches loamy sand. Depth to root restrictive layer is greater than 80 inches. Soils are well drained and classified as not prime farmland. This component is in the R026XF051CA Granitic Fan 9-12" P.Z. and R026XF052CA Granitic Upland 9-12" P.Z. ecological sites. This soil type is present in Phase I, II and Phase III of the Project.

#### **Galeppi loamy coarse sand, 5-30 percent slopes**

Galeppi sandy loam soils are formed from fan remnants, alluvium derived from granite. Soil profile: 0-9 inches loamy coarse sand; 9-36 inches sandy clay loam; 36-52 inches sandy loam; 52-60 inches loamy sand. Depth to root restrictive layer is greater than 80 inches. Soils are well drained and classified as not prime farmland. This component is in the R026XF049CA Intermediate Mountains 6-12" P.Z. ecological site. This soil type is present in Phase I and II of the Project.

**Rough broken**

Rough broken soils are formed from alluvium. Soil profile: 0-15 inches variable material. There is no ecological site component associated with this soil type. This soil type is present in Phase I, II and Phase III of the Project.

**Reno sandy loam, 2-15 percent slopes**

Reno sandy loam soils are formed from alluvium derived from mixed and/or lacustrine deposits derived from mixed. The soil profile includes: 0-2 inches gravelly coarse sand; 2-10 inches sandy loam; 10-26 inches clay; 26-40 inches indurated; 40-60 inches very gravelly loamy sand. Soils are well drained and classified as not prime farmland. This component is in the R026XF047CA Hardpan Terrace ecological site. This soil type is present in Phase III of the Project.

**Barnard stony sandy loam, 2 to 15 percent slopes**

Barnard sandy loam soils are formed from alluvium derived from mixed. The soil profile includes: 0-3 inches sandy stone loam; 3-7 inches sandy loam; 7-11 inches sandy clay loam; 11-12 inches clay; 20-26 inches indurated; 26-60 inches very gravelly loamy coarse sand. Soils are well drained and classified as not prime farmland. The component is in the R023XF082CA Stony Loam 9-12" P.Z. ecological site. This soil type is present in Phase I and II of the Project.

**Galeppi sandy loam, 8 to 15 percent slopes**

Galeppi sandy loam soils are formed from fan remnants, piedmonts derived from mixed alluvium. Soil profile: 0-60 inches alluvium. Depth to root restrictive layer is greater than 60 inches. This component is in the R026XY010NV Loamy 10-12 P.Z. ecological site. This soil type is present in Phase III of the Project.

**2.2.3 Ecological Site Description**

Rangeland ecological sites are lands with specific soil and physical characteristics (i.e. topography, landform, precipitation) which result in specific types of vegetation and characterizes its ability to respond to management activities and natural disturbances. Eight ecological sites were identified as potentially occurring on the site (Loamy Upland 9-12" P.Z., Shallow Granitic Upland 9-12" P.Z., Granitic Fan 9-12" P.Z., Granitic Upland 9-12" P.Z., Intermediate Mountains 6-12" P.Z., Hardpan Terrace, Stony Loam 9-12" P.Z., and Loamy 10-12 P.Z.) (**Appendix B, Figure 4 – NRCS Ecological Site Map**). Descriptions for these ecological site classifications were not available for MLRA's 23 and 26 on the NRCS ESI site. However, biological resources associated with MLRA's 23 and 26 are described in Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (NRCS, 2006) as follows:

**MLRA 23**

This area supports a shrub-grass association. Big sagebrush, low sagebrush, rabbitbrush, needlegrasses, and squirreltail are common on the plateaus and mountains. Big sagebrush and basin wildrye are on bottom lands. Spiny hopsage and bud sagebrush are on the drier sites. Greasewood, saltbush, and saltgrass grow on salty and sodic soils in basins. Silver sagebrush grows on moist sites that have intermittent water, such as areas along the margin of playas. Western juniper is on rocky sites. Aspen groves occur on moist sites at high elevations, and isolated stands of Douglas-fir and whitebark pine also occur in the mountains.

**MLRA 26**

This area supports shrub-grass vegetation characterized by big sagebrush. Low sagebrush and Lahontan sagebrush occur on some soils. Antelope bitterbrush, squirreltail, desert needlegrass, Thurber needlegrass, and Indian ricegrass are important associated plants. Green ephedra,



Sandberg bluegrass, Anderson peachbrush, and several forb species also are common. Juniper-pinyon woodland is typical on mountain slopes. Shadscale is the typical plant in the drier parts of the area. Sedges, rushes, and moisture-loving grasses grow on the wettest parts of the wet flood plains and terraces. Basin wildrye, alkali sacaton, saltgrass, buffaloberry, black greasewood, and rubber rabbitbrush grow on the drier sites that have a high concentration of salts.

#### 2.2.4 Vegetation Landcover

USGS National Southwest Regional Gap Analysis Program (SWReGAP) vegetation community data was used to determine expected vegetation communities on the Project site. According to the Ecological System output, two vegetation communities are present within the Project area: Great Basin Pinyon-Juniper Woodland and Inter-Mountain Basins Big Sagebrush Shrubland.

##### **Inter-Mountain Basins Big Sagebrush Shrubland**

Inter-Mountain Basins Big Sagebrush Shrubland is the dominant ecological system within the site and is expected to occur throughout the Existing Mine site, Phase I, Phase II, and Phase III. Big sagebrush shrublands are one of the most widespread ecological systems in the western U.S., found in broad basins between mountain ranges, on plains and in foothills between 4,900 and 7,500 feet elevation. The soils are deep, well-drained, and not salty. The most important sages are *Artemisia tridentata* ssp. *Wyomingensis* (Wyoming big sagebrush) or *Artemisia tridentata* (basin big sagebrush); other common shrubs include *Purshia tridentata* (bitterbrush), *Chrysothamnus viscidiflorus* (rabbitbrush), or *Symphoricarpos oreophilus* (mountain snowberry). Shrubs are the dominant vegetation, with grasses making up less than 25% of the cover, distinguishing this from the Intermountain Basins Big Sagebrush Steppe system, which has higher grass cover. In recent years this system has been invaded by non-native annual grasses or weeds, in particular *Bromus tectorum* (cheatgrass), which changes the patterns of fire.

##### **Great Basin Pinyon-Juniper Woodland**

Great Basin Pinyon-Juniper Woodland is expected to occur as the secondary ecological system throughout Phase I and II with smaller areas in the Existing Mine site and Phase III. Pinyon-Juniper Woodland occurs on dry mountain ranges of the Great Basin region and eastern foothills of the Sierra Nevada. They are found on warm, dry sites on mountain slopes, mesas, plateaus and ridges, above the valleys where sagebrush is dominant. Severe weather events occurring during the growing season, such as frosts and drought, are thought to limit the distribution of pinyon-juniper woodlands to a relatively narrow altitudinal zone. *Pinus monophylla* (singleleaf pinyon) and *Juniperus osteosperma* (Utah juniper), alone or mixed together, are the main trees. *Cercocarpus ledifolius* (curl-leaf mountain-mahogany) is also common with the pinyon-juniper. Shrubs and grasses may be abundant to absent all together. Typical species include *Arctostaphylos* sp. (manzanita), *Artemisia* sp. (sagebrush), *Coleogyne ramosissima* (blackbrush), *Quercus turbinella* (turbinella live oak), *Hesperostipa comata* (needle-and-thread grass), *Festuca idahoensis* (Idaho fescue), *Pseudoroegneria spicata* (bluebunch wheatgrass), *Leymus cinereus* (great basin Lyme grass), and *Poa fendleriana* (muttongrass).

### 2.3 Agencies Queried

**Appendix F** contains information obtained from the inquiries to agencies and other data sources.

#### 2.3.1 U.S. Fish and Wildlife Service

BEC biologists queried the USFWS Information for Planning and Consultation (IPaC) database on May 29, 2018, to gather information on Federally-listed Threatened, Endangered, and candidate species and critical habitat which may occur in the vicinity of the Project site. Results also included USFWS Birds of Conservation Concern (BCC) or birds that warrant special attention in the Project area.



Query results provided by the Reno Fish and Wildlife Office indicated two species listed under the Endangered Species Act (ESA) occur within the region and therefore may occur within the boundary of the biological survey area or may be affected by proposed Project activities: Lahontan cutthroat trout (Threatened) and North American wolverine (Proposed Threatened). No critical habitat was identified within the vicinity of the Project location.

Based on data collected during desktop habitat characterization activities, BEC biologists determined there to be a low likelihood of the Project impacting Lahontan cutthroat trout or North American wolverine. No permanent water feature occurs on or around the Project site; therefore, BEC did not consider Lahontan cutthroat trout to be a target species for biological surveys for this project. No alpine habitat occurs on or around the Project site; therefore, BEC did not consider North American wolverine to be a target species for biological surveys for this project.

The USFWS query results included two bird species potentially occurring in the Project vicinity which are on the USFWS BCC list: golden eagle and sage thrasher. Based on data collected during desktop habitat characterization activities, BEC biologists determined habitat to likely be present for both of the bird species listed on the USFWS IPaC report. They were considered target species for the bird count survey and their habitat needs were considered during the habitat characterization survey conducted for this project.

**Table 2-1: Target Species for Biological Surveys in Section 2.4** summarizes these BCC species considered for occurrence on the Project site. Survey results are summarized in **Section 4 – Site Characterization and Survey Results**.

### 2.3.2 Bureau of Land Management

BEC biologists accessed and reviewed the 2017 Final BLM NV Sensitive and Special Species Status List provided on the BLM website.

#### 2.3.2.1 Sensitive Plant Species

A BEC botanist reviewed plant species occurrences listed within the BLM Carson City District and determined which species may occur in the Project vicinity based on available soil and habitat characterization data for the area. A species was determined to have potential to occur within the Project site if its known or expected geographic range includes, or is in the vicinity of, the Project site or if its known or expected habitat is found within, or in the vicinity of, the Project site. It was also noted if the species was known or expected to be in detectable condition at the anticipated time of the survey.

Habitat descriptions for each species on this list were compiled from technical references, and other readily available web-based information such as the Nevada Natural Heritage Program (Nevada Natural Heritage Program, 2018), Calflora (Calflora, 2018), and California Native Plant Society (CNPS) Inventory of Rare Plants (California Native Plant Society, 2018). Species information and photographs were analyzed in conjunction with USGS SWReGAP vegetation community data (U.S. Department of the Interior - U.S. Geological Survey, 2018), soil surveys (U.S. Department of Agriculture, 2017), geologic maps (Mergner, 1978), ecological site descriptions (U.S. Department of Agriculture, 2017), and satellite imagery (Google Earth) to identify potential habitat for BLM Sensitive species within the survey area.

Species whose known distribution, habitat, or elevation range precluded their possible occurrence in the vicinity of the Project were generally not further considered, although some taxa with relatively low probability for occurrence were retained due to the incomplete state of knowledge of the habitat affiliations.

Based on this data, the BEC botanist determined the following species may be of concern and targets for botanical surveys for the Geofortis Mines site: *Astragalus pulsiferae* var. *pulsiferae* (Ames milkvetch), *Erythranthe carsonensis* (Carson Valley monkeyflower), *Ivesia webberi* (Webber ivesia), *Loeflingia squarrosa* ssp. *artemisiarum* (sagebrush pygmyweed), and *Oryctes nevadensis* (oryctes). **Table 2-1** summarizes these sensitive plants considered for occurrence on the Project site.

#### 2.3.2.2 Sensitive Wildlife Species

BEC biologists reviewed wildlife species (amphibian, arachnid, bird, fish, insect, mammal, mollusk, and reptile) occurrences listed within the BLM Carson City District and determined which species may occur in the Project vicinity based on available habitat characterization data for the area.

Based on lack of appropriate habitat on or in the vicinity of the Project area or the Project area being outside species range, BEC biologists eliminated all BLM-listed arachnids and mollusks, as well as the majority of amphibians, fish, and insects. Based on lack of alpine, sandy shoreline, wooded, coniferous pine, and dense riparian habitat, BEC biologists eliminated five additional BLM-listed bird species and eight additional BLM-listed mammal species.

Based on lack of apparent habitat observed during desktop studies, BEC biologists determined the American pika, dark kangaroo mouse, Lahontan cutthroat trout, monarch butterfly, northern rubber boa, pale kangaroo mouse, and western toad to have a low potential for occurrence in and around the Project site. They were not considered target species for the biological surveys for this project.

BEC biologists determined the following bird species have a low potential for occurrence in and around the Project location due to lack of nesting habitat but may use the area for foraging: Great Basin willow flycatcher, Lewis's woodpecker, mountain quail, and Sandhill crane. They were not considered target species for the biological surveys for this project.

BEC biologists determined the following bat species have a low potential for occurrence in and around the Project site due to lack of roosting habitat but may use the area for forage: big brown bat, Brazilian (Mexican) free-tailed bat, California myotis, canyon bat, fringed myotis, hoary bat, little brown bat, long-eared myotis, long-legged myotis, pallid bat, silver-haired bat, spotted bat, Townsend's big-eared bat, western small-footed myotis, and Yuma myotis. They were not considered target species for the biological surveys for this project.

Based on apparent presence of suitable habitat, BEC determined the following BLM Sensitive Species to be target species for the Geofortis Mines biological surveys: Brewer's sparrow, bald eagle, burrowing owl, desert horned lizard, ferruginous hawk, golden eagle, gray-crowned rosy-finch, Great Basin collared lizard, greater sage-grouse, loggerhead shrike, long-nosed leopard lizard, northern goshawk, peregrine falcon, pinyon jay, pocket gopher, pygmy rabbit, sage thrasher, short-eared owl, Sierra alligator lizard, and Swainson's hawk.

**Table 2-1** in **Section 2.4** summarizes these sensitive species considered for occurrence on the Project site.

#### 2.3.3 California Department of Fish and Wildlife

BEC biologists accessed the CDFW California Natural Diversity Database (CNDDDB) via Biogeographic Information and Observation System (BIOS) and RareFind 5 web applications on June 6, 2018, and CNPS Inventory of Rare and Endangered Plants of California.

#### 2.3.3.1 Sensitive Plant Species

A BEC botanist reviewed plant species occurrences listed within a nine-quadrat search area of the Project site and determined which species may occur in the Project vicinity based on available soil and habitat characterization data for the area. Query results generated a list of 27 plant species accounts in the nine-quadrat search area. Given the Project site is in eastern California, approximately 2.0 miles from the Nevada State line, NNHP potential species for Washoe County were also reviewed. A species was determined to have potential to occur within the Project site if its known or expected geographic range includes, or is in the vicinity of, the Project site or if its known or expected habitat is found within, or in the vicinity of, the Project site. It was also noted if it was known or expected to be in detectable condition at the anticipated time of the survey.

Habitat descriptions for each species on this list were compiled from technical references, and other readily available web-based information such as the NNHP, Calflora, and CNPS. Species information and photographs will be analyzed in conjunction with USGS SWReGAP vegetation community data, soil surveys (Soils Survey Staff NRCS 2013), geologic maps (USGS 1978), ecological site descriptions (Soils Survey Staff NRCS), and satellite imagery (Google Earth) to identify potential habitat for California state protected plant species within the Biological Study Area.

Species whose known distribution, habitat, or elevation range precluded their possible occurrence in the vicinity of the Project were generally not further considered, although some taxa with relatively low probability for occurrence were retained due to the incomplete state of knowledge of the habitat affiliations.

Based on this data, the BEC botanist determined the following species may be of concern and targets for surveys and habitat assessment for the Geofortis Mines site: *Astragalus lentiformis* (lens-pod milk-vetch), *Astragalus pulsiferae* var. *pulsiferae* (Ames milkvetch), *Eriastrum sparsiflorum* (few-flowered Eriastrum), *Erigeron eatonii* var. *nevadincola* (Nevada daisy), *Eriogonum ochrocephalum* var. *ochrocephalum* (ochre flowered buckwheat), *Ivesia webberi* (Webber ivesia), *Loeflingia squarrosa* ssp. *artemisiarum* (sagebrush pygmyweed), *Lupinus nevadensis* (Nevada lupine), *Rumex venosus* (winged dock), *Suaeda occidentalis* (western seablite), and *Viola purpurea* ssp. *aurea* (golden violet).

**Table 2-1** in **Section 2.4** summarizes these sensitive species considered for occurrence on the Project site.

#### 2.3.3.2 Sensitive Wildlife Species

BEC biologists reviewed wildlife species occurrences listed within a nine-quadrat search area and determined which species may occur in the Project vicinity based on available habitat characterization data for the area. Query results generated a list of 14 wildlife species accounts in the nine-quadrat search area. Four of the species were eliminated from consideration due to conservation status.

Based on lack of appropriate habitat on, or in the vicinity of, the Project area BEC biologists determined bank swallow and gray wolf are not likely to occur in the immediate vicinity of the Project and were eliminated as target species.

BEC biologists determined Townsend's big-eared bat has a low potential for occurrence in and around the Project site due to lack of roosting habitat but may use the area for foraging. They were not considered target species for this project.

Based on apparent presence of suitable habitat and occurrence reports from CFWS, BEC determined the following California State sensitive species to be considered target species for the biological surveys and bird count survey and their habitat needs were considered during the habitat characterization survey

conducted for this project: bald eagle, Brewer's sparrow, golden eagle, long-eared owl, prairie falcon, Swainson's hawk, and western white-tailed jackrabbit.

An occupied long-eared owl nest was within the nine-quadrat search area and was located within the 2.0-mile proposed survey area; therefore, BEC performed a raptor nest investigation to locate the reported nest within the 2.0-mile radius. The nest was last documented as being observed June 6, 1998.

**Table 2-1** in **Section 2.4** summarizes these sensitive species considered for occurrence on the Project site.

#### 2.3.4 Nevada Department of Wildlife

Due to proximity to the Nevada border, BEC biologists requested data from NDOW on May 24, 2018 for a list of protected wildlife resources in the vicinity of the Project. NDOW provided a response on May 25, 2018 and reported occupied mule deer and pronghorn antelope distribution exists throughout the Nevada portion of the 2.0-mile buffer area.

Although mule deer and pronghorn antelope are protected game species in Nevada, they are not listed as Sensitive by BLM; therefore, BEC noted signs of both species during survey activities but did not consider either species to be target species for this project.

NDOW reported greater sage-grouse habitat in the vicinity of the Project area to be primarily classified as General habitat by the Nevada Sagebrush Ecosystem Program. Other habitat also exists in the vicinity of the Project area. BEC biologists requested sensitive lek location data within a 4.0-mile radius of the site. NDOW reported no leks within the search radius; however, BEC considered greater sage-grouse to be a target species based on reported presence of general habitat on and around the Project site.

NDOW reported three raptor species have been directly observed in Nevada in the Project vicinity: Cooper's hawk, peregrine falcon, and red-tailed hawk. BEC biologists requested sensitive raptor nest location data within a 10-mile radius of the site. NDOW provided the sensitive species data on June 15, 2018, which identified three known raptor nests within the 10-mile search radius, none of which were within the 2.0-mile proposed survey area.

**Table 2-1** in **Section 2.4** summarizes these sensitive species considered for occurrence on the Project site.

### 2.4 Identification of Target Species

A summary of plant and animal species BEC biologists determined to be potentially present on site or within the 100-foot buffer (**Appendix A, Figure 2**) are outlined in **Table 2-1**. The Jepson Manual: Vascular Plants of California: Second Edition (Baldwin B. G., et al., 2012), Nevada Natural Heritage Program, and Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A (Cronquist A., Holmgren, Holmgren, & Reveal, 1997) were used in determining the bloom periods for each of the rare and sensitive plant species listed in **Table 2-1**.

Table 2-1: Target Species for Biological Surveys

Common Name	Scientific Name	Conservation Status	Blooming period
<b>Target Rare and Sensitive Plant Species</b>			
Ames milkvetch	<i>Astragalus pulsiferae</i> var. <i>pulsiferae</i>	BLM Sensitive; CNPS 1B.2	May – August
Carson Valley monkeyflower	<i>Erythranthe carsonensis</i>	BLM Sensitive	April – June
Few-flowered eriastrum	<i>Eriastrum sparsiflorum</i>	CNPS 4.3	May – July
Golden violet	<i>Viola purpurea</i> ssp. <i>aurea</i>	CNPS 2B2	April – June
Lens-pod milkvetch	<i>Astragalus lentiformis</i>	CNPS 1B.2	May – July
Nevada daisy	<i>Erigeron eatonii</i> var. <i>nevadincola</i>	CNPS 2B.3	May – July
Nevada lupine	<i>Lupinus nevadensis</i>	CNPS 4.3	April – June
Ochre flowered buckwheat	<i>Eriogonum ochrocephalum</i> var. <i>ochrocephalum</i>	CNPS 2B.2	May – June
Oryctes	<i>Oryctes nevadensis</i>	BLM Sensitive	April – June
Sagebrush pygmyweed	<i>Loeflingia squarrosa</i> ssp. <i>artemisiarum</i>	BLM Sensitive; CNPS 2B.2	April – early June
Webbers Ivesia	<i>Ivesia webberi</i>	USFWS Threatened; BLM Sensitive; CNPS 1B.1; NV CE	May – July
Western seablite	<i>Suaeda occidentalis</i>	CNPS 2B.3	June – September
Winged dock	<i>Rumex venosus</i>	CNPS 2B.3	May – June
<b>Target Rare and Sensitive Wildlife Species</b>			
<b>Birds/Raptors</b>			
Bald eagle	<i>Haliaeetus leucocephalus</i>	BLM Sensitive; USFWS BCC; CDFW FP	N/A
Brewer's sparrow	<i>Spizella breweri</i>	BLM Sensitive; USFWS BCC	N/A
Burrowing owl	<i>Athene cunicularia</i>	BLM Sensitive; USFWS BCC; CDFW SSC	N/A
Ferruginous hawk	<i>Buteo regalis</i>	BLM Sensitive; USFWS BCC; CDFW WL	N/A
Golden eagle	<i>Aquila chrysaetos</i>	BLM Sensitive; USFWS BCC; CDFW FP; CDFW WL	N/A
Gray-crowned rosy-finch	<i>Leucosticte tephrocots</i>	BLM Sensitive	N/A
Greater sage-grouse	<i>Centrocercus urophasianus</i>	BLM Sensitive; CDFW SSC	N/A
Loggerhead shrike	<i>Lanius ludovicianus</i>	BLM Sensitive; USFWS BCC; CDFW SSC	N/A
Long-eared owl	<i>Asio otus</i>	CDFW SSC	N/A
Northern goshawk	<i>Accipiter gentilis</i>	BLM Sensitive; USFWS BCC; CDFW SSC	N/A
Peregrine falcon	<i>Falco peregrinus</i>	BLM Sensitive; USFWS BCC; CDFW Fully Protected	N/A
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	BLM Sensitive; USFWS BCC	N/A



Common Name	Scientific Name	Conservation Status	Blooming period
Prairie falcon	<i>Falco mexicanus</i>	USFWS BCC; CDFW WL	N/A
Sage thrasher	<i>Gymnorhinus cyanocephalus</i>	BLM Sensitive; USFWS BCC	N/A
Short-eared owl	<i>Asio flammeus</i>	BLM Sensitive; USFWS BCC; CDFW SSC	N/A
Swainson's hawk	<i>Buteo swainsoni</i>	BLM Sensitive; USFWS BCC	N/A
<b>Reptiles</b>			
Desert horned lizard	<i>Phrynosoma platyrhinos</i>	BLM Sensitive	N/A
Great Basin collared lizard	<i>Crotaphytus bicinctores</i>	BLM Sensitive	N/A
Long-nosed leopard lizard	<i>Gambelia wislizenii</i>	BLM Sensitive	N/A
Sierra alligator lizard	<i>Elgaria coerulea palmeri</i>	BLM Sensitive	N/A
<b>Mammals</b>			
Pocket gopher	<i>Thomomys bottae</i>	BLM Sensitive	N/A
Pygmy rabbit	<i>Brachylagus idahoensis</i>	BLM Sensitive; CDFW SSC	N/A
Western white-tailed jackrabbit	<i>Lepus townsendii</i>	CDFW SSC	N/A

CNPS 1A = Plants presumed extirpated in California and either rare or extinct elsewhere; CNPS 1B = Plants rare, threatened, or endangered in California and elsewhere; CNPS 2A = Plants presumed extirpated in California but common elsewhere; CNPS 2B = Plants rare, threatened, or endangered in California but more common elsewhere; CNPS 3 = Review List: Plants about which more information is needed; CNPS 4 = Watch List: Plants of limited distribution;  
CDFW FP = Fully Protected Species; CDFW SSC = Species of Special Concern; CDFW WL = Watch List Species

### 3 SURVEY PROTOCOLS

#### 3.1 Botanical Survey Protocol

Field work to support the botanical resources of the Project were focused on three primary objectives. Biologists evaluated the area in comparison to the previously-defined ecological sites, described and mapped the vegetation communities and described the soils and topography. Special status plant surveys were conducted for those species identified as potentially present in the area. Noxious weeds observed in the area were inventoried. Prior to conducting field surveys, photos of available herbarium specimens were reviewed.

##### 3.1.1 Ecological Sites

During field surveys, biologists determined whether ecological conditions observed in the area reflect the descriptions from existing documents and summarized in **Section 2.2 – Habitat Characterization**. During the field visit, biologists:

1. Conducted a visual assessment of the surface soils and topography in comparison to the site description (no soil pits were dug).
2. Reviewed the dominant and subdominant plant species in the area in comparison to the site description.
3. Identified the boundaries of the various Ecological Sites in the area in comparison to the existing maps and refined the boundaries as needed.
4. Identified a representative location of each Ecological Site and collected representative photo at the location and described the observed condition of the Ecological Site, including a plant species list, level of disturbance and any substantial variances from the existing site descriptions.

### 3.1.2 Rare and Sensitive Plant Surveys

A survey was conducted for the species identified in Section 2.4 of this document. Prior to the field survey, the list of potentially-occurring plant species was reviewed and photographs and herbarium specimens available online via SEINet Portal Network (SEINet, 2018) and the Calflora on-line data source (Calflora, 2018) were carefully studied. Details on plant morphology and phenology specific to the target species was identified in taxonomic keys and literature including The Jepson Manual: Vascular Plants of California: Second Edition (Baldwin B. G., et al., 2012), Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A (Cronquist A., Holmgren, Holmgren, & Reveal, 1997), and Atlas of North American Astragalus (Barneby, 1964). These details were reviewed with all three botanists/biologists in the field prior to surveying.

BEC botanists/biologists conducted a 100 percent visual examination of all project areas. Once in the field, based on the density of *Artemisia tridentata* (big sagebrush) and other shrubs, it was determined that 10-meter (30-foot)-spaced parallel transects, running east/west direction, would be necessary for the majority of the Project site. This ensured all of the area between transects was visible, so that the smallest rare plant expected to occur could be seen. In disturbed (recently grazed and disturbed/mined areas), 15-meter (49-foot)-spaced transects were walked.

During the survey, all transects were recorded using GPS track logs and a species list was created. All sensitive plants encountered were mapped using a GPS unit (UTM coordinates) and the survey forms appropriate for that taxa were completed for each location of rare taxon encountered. Digital photos were taken of each sensitive plant location (BLM, 2009; U.S. Fish and Wildlife Service, 1996).

Survey results are summarized in **Section 4**.

### 3.1.3 Noxious and Invasive Plant Surveys

Weed species listed on the Noxious Weed List California Code of Regulations 4500 observed during the survey were documented (California Code of Regulations, 2016). If noxious weeds were observed in the Project area, biologists were to photograph the plants, map the infested area, and document the species observed, the approximate number or relative abundance of individual plants, and the phenological stage of the majority of the plants. Other invasive and non-native plant species observed within the Project site but not considered noxious weeds in the State of California were also documented.

Survey results are summarized in **Section 4**.

## 3.2 Wildlife Survey Plans

### 3.2.1 Sensitive Species Surveys

BEC performed a habitat characterization survey to confirm the presence or absence of available habitat for the identified BLM Sensitive species. BEC biologists traversed through the Project area enough to see a representative cross section of all the major habitats and topographic features. During the survey, biologists noted available habitat for the above-listed target wildlife species and the area was surveyed using methods for 100 percent visual coverage of the area. Transects were spaced approximately 10 meters (30 feet) apart, allowing biologists to visually inspect the entire area between transects. All signs and sightings of the target species encountered throughout the survey were noted and documented with digital photographs (when possible) and using GPS.

Survey results are summarized in **Section 4**.



### 3.2.2 Bird Count Surveys

Bird count surveys were conducted using field methodologies developed by the Great Basin Bird Observatory (GBBO), but were implemented during a single, two-day site visit rather than over multiple seasons. These surveys consisted of bird point-count transects that were habitat specific. Transects consisted of multiple points that were spaced 200-250 meters (656-820 feet) apart along each transect. No point was within 200 meters (656 feet) of another point, including points on other transects. Since the Project site consisted of generally homogenous habitat, no transect adjustments needed to be made.

Since the bird-count point survey only consisted of seventeen points, all points were able to be surveyed on one day. Surveys began at 5:30 AM. Survey teams consisted of two team members: one observer and one assistant observer who recorded all data. At each point-count location, the observer worked with the assistant to note all the species of birds seen and heard during a span of 10 minutes according to the GBBO protocol (Great Basin Bird Observatory, 2003). The 10 minutes was broken into three intervals consisting of 0 to 3 minutes, 3 to 5 minutes, and 5 to 10 minutes. The surveyor had to be confident in determining how far away the bird was, whether it was within 50 meters (164 feet), 50 to 100 meters (164 to 328 feet), or over 100 meters (328 feet) away from the point-count location. Birds seen or heard during the travel time between count-point locations and could be determined not to be a previously recorded specimen, were recorded as an incidental observation.

Survey results are summarized in **Section 4**.

### 3.2.3 Raptor Nest Investigation

CDFW identified one known raptor sighting, an active long-eared owl last observed on June 6, 1998, within a 2-mile radius of the Project location. Biologists traveled to the reported GPS location of the sighting and used binoculars to visually inspect the surrounding area for potential habitat and evidence of raptor nests.

Along with nest investigations, power lines or other potential perching or nesting sites within the Project area and the 2-mile radius were investigated for any signs of raptor nests.

Survey results are summarized in **Section 4**.

## 4 SITE CHARACTERIZATION AND SURVEY RESULTS

The Project area was surveyed on the July 29, 30, and 31, 2018, for occurrences and suitable habitat for sensitive plants, animals, and noxious weeds. During the survey, conditions were sunny with partial cloud coverage in the mornings. Wind was minimal throughout the survey period. On the morning of July 31, 2018, there was a sprinkle of rain along with heavier cloud coverage. Clouds cleared up mid-morning and the remainder of the day was sunny. Prior to, and throughout the survey period, northern Nevada and California experienced multiple forest fires, making for smoky conditions. The smoke was heavy and air quality ratings varied from Moderate to Unhealthy for Sensitive Groups based on the Air Quality Index (AQI).

### 4.1 Site Characterization

Field site characterization surveys were conducted on July 29 and 30, 2018. The three dominant habitat types were observed to be Disturbed Area, Inter-Mountain Basin Big Sagebrush Shrubland (Shrubland), and Great Basin Pinyon-Juniper Woodland (Woodland) (**Appendix C – Site Characterization, Photo Log 1**). All phases were similar in the habitat types present with the exception of levels of disturbance in each. In the Existing Mine, Inter-Mountain Basin Sagebrush Shrubland and Great Basin Pinyon-Juniper

Woodland were observed to be disturbed but recolonizing. (**Appendix C, Figure 5 through 7 – Site Characterizations**).

#### 4.1.1 Sites

Disturbed Area was the dominant habitat type on the Existing Mine site. Shrubland was the primary habitat re-establishing on the disturbed areas at the Existing Mine site. Shrubland was also present, predominantly on the upper, flatter elevations and the cut slopes within the mine pit areas. Remnants of Woodland occurred along the northeastern steep slopes adjacent to the access road into the existing mine site.

Woodland was the dominant habitat in Phase I and II. This habitat occupied the western edge and southern end of the phase. Shrubland was the secondary habitat in Phase I and II, occurring throughout much of the northern and northeastern portion.

Shrubland was the dominant habitat in Phase III, occurring along the eastern, western and southern portion. Woodland was the secondary habitat type in this area, predominantly in the northern and central portion. Phase III was observed to be disturbed by active cattle grazing, and therefore, dominated by *Bromus tectorum* (cheatgrass) and stunted/eaten shrubs throughout the southern portion of the site. The area was bisected by an ephemeral wash system.

#### 4.1.2 Habitat Types

Dominant species in the Shrubland areas include *Artemisia tridentata ssp. tridentata* (big sagebrush) with co-dominant *Tetradymia glabrata* (little leaf horsebrush). Other common shrubs include *Prunus andersonii* (desert peach), *Pursia tridentata* (bitterbrush), *Chrysothamnus viscidiflorus* (green rabbitbrush), *Pleiocanthus spinosus* (thorny skeletonweed), *Lupinus argentea* (silver lupine), and *Astragalus curvicaupus var. curvicaupus* (coiled locoweed). Grasses makeup approximately 25% of this habitat and include *Elymus cinereus* (Great Basin wild rye), *Poa thurberiana* (Thurber's needlegrass), *Hesperostipa comata* (thread and needle), *Festuca idahoensis* (Idaho fescue), and *Bromus tectorum* (cheatgrass). Present within this habitat, mostly in the center of the Phase I and II area, are small pockets with sparse vegetation and patches of *Juncus balticus* (Baltic rush) and *Erodium cicutarium* (red-stemmed filaree), indicating these areas potentially hold moisture longer than the surrounding more well-draining soils.

The Woodland habitat overstory was dominated by *Juniperus osterosperma* (Utah juniper) with scattered *Pinus jeffreyi* (Jeffrey pines). The understory and the areas between trees were similar to the Shrubland, dominated by *Artemisia tridentata ssp. tridentata* (big sagebrush). Exposed, white, sparsely vegetated soil areas are present within Woodland habitats, along the northwestern facing slope of Phase I and II, flat and eastern facing slopes in the central portion of Phase III, and on the cut slopes of the existing mine site. These areas contained a substance consistent in appearance and feel with clay within the top layer and correlate with the following soil types: Corral-Glenbrook complex, 15 to 50 percent slopes; Rough broken land; and Barnard stony sandy loam, 2 to 15 percent slopes soil types. These areas were dominated by *Penstemon speciosus* (showy penstemon) and buckwheat species including *Eriogonum microtheca var. ambiguum* (yellow-flowered buckwheat), *Eriogonum caespitosum* (matted wild buckwheat), and *Eriogonum ochrocephalum var. ochrocephalum* (white woolly buckwheat). At the southeastern end of Phase I and II and central areas of Phase III, similar areas were present, but contained more exposed gravel on the surface. The primary vegetation in these areas was sparsely scattered *Streptanthus cordatus* (heartleaf twistflower), *Penstemon speciosus* (showy penstemon), *Cordylanthus ramosus* (cushy bird's beak), and *Juncus balticus* (Baltic rush).

Soft bottom wash systems were present within the buffer area at the northeast corner, at the proposed access road, and along the southwestern edge of the buffer, in the Phase I and II area. These varied in width from 4 to 15 feet wide and had scoured, eroded slopes. Two similar drainage courses were present on the Phase III site. Vegetation within the bottom and adjacent sandy deposits of these drainages is sparse, with an occasional annual *Ambrosia acanthicarpa* (burr-sage), *Eriogonum vimineum* (wicker-stem buckwheat), and *Iva axillaris* (povertyweed). Shrubland species were present on slopes in the wash system and included an occasional *Heterotheca villosa* var. *minor* (hairy false goldenaster) and *Dieteria canescens* (hoary aster).

Various levels of disturbance were present in all areas of the Project. These areas had been previously disturbed and were either compacted and void of most vegetation or dominated by native and non-native ruderal (growing on waste ground) species. Species present included *Grindelia camporum* (Great Valley gumweed), *Elymus repens* (quackgrass), *Melilotus albus* (white sweetclover), *Polygonum aviculare* ssp. *neglectum* (prostrate knotweed), *Bromus tectorum* (cheatgrass), *Tribulus terrestris* (puncturevine), *Agropyron cristatum* (crested wheatgrass), and *Sisymbrium altissimum* (tumble mustard).

#### 4.2 Rare and Sensitive Plant Survey Results

Rare and sensitive plant surveys were conducted on July 29 and 30, 2018. All plant species observed were documented and can be found in **Appendix D – Survey Data, Table 1 – Plant Species Observed**.

Species samples unidentifiable in the field, but with the necessary vegetative and/or reproductive parts for identification, were collected for subsequent species identification/verification using a stereo microscope in the office. Only one species collected was not identifiable to the species level due to its vegetative state: *Epilobium* sp.

All plants of genera similar to the potentially sensitive plant species were identified to species when floral parts were present or in good condition, with one exception. One low-growing *Eriogonum* with relatively larger ovate leaves was not identified because flowers were not present; however, the leaves are not of that of the target sensitive *Eriogonum*, therefore, it is not of concern. Because two of the potential sensitive species to occur on the site were *Astragalus*, all three *Astragalus* species observed were identified to species, ruling out the presence of both target sensitive *Astragalus* species. One species, *Eriastrum signatum* (maroon-spotted woollystar), was common throughout all areas of the Project site and buffers but was clearly identified as not being the target *Eriastrum*.

#### Subsequent Review of BLM California List of Sensitive Plant Species

Upon subsequent review of the BLM California list of sensitive plant species suspected or known to occur in the adjacent Eagle Lake District, 22 species were identified that could potentially occur on the project site. Of these 22, 11 of these species were on the Calflora and Nevada District BLM Sensitive species list evaluated as part of the original pre-survey review. The remaining 11 species were determined to potentially occur in the project area and are listed below:

*Astragalus argophyllus* var. *argophyllus* (Silverleaf milk-vetch)  
*Dalea ornate* (ornate Dalea)  
*Gratiola heterosephala* (Boggs Lake hedge hyssop)  
*Mimulus evanescens* (*Erythranthe inflatula*) (Ephemeral monkeyflower)  
*Oreostemma elatum* (Plumas Valley aster)  
*Pedicularis centranthera* (dwarf lousewort)  
*Penstemon sudans* (Susanville Penstemon)  
*Phacelia inundata* (Playa Phacelia)  
*Rorippa columbiae* (Columbia yellowcress)  
*Stipa exigua* (little ricegrass)

*Thelypodium howellii* var. *howellii* (Howell's thelypodium)

However, after evaluation of ecological and habitat requirements, the botanist ruled out 7 of the 11 species from potentially occurring on the project area due to lack of suitable habitat, soils, and/or known elevational range. It was determined that suitable habitat was present within the project area for the following three species: *Dalea ornata*, *Pedicularis centranthera*, and *Penstemon sudans*. These species were not surveyed for specifically during the original sensitive plant survey in 2018, however, they were not observed and are not expected to be present. Surveys were conducted during the appropriate blooming period for *Penstemon sudans*, but outside the blooming period for *Dalea ornata* (June) and *Pedicularis centranthera* (April-June). Only one common species of *Penstemon* was observed and keyed to species, ruling out the presence of these target species *Penstemon sudans*.

*Dalea* and *Pedicularis* have distinctive leaves and most likely would still have fruits present during the time of the survey, so it is likely, if they were present, the botanists would have observed the leaves and recognized the *Pedicularis* to genus and family (and possibly genus) for the *Dalea*. All but two species observed (*Epilobium* and one *Eriogonum*, as stated in section above) were identified to species. No *Dalea* or *Pedicularis* species were observed during the surveys.

Table 4-1 Conservation status and Blooming Period for BLM California plant species potentially occurring in the project area.

Common Name	Scientific Name	Conservation Status	Blooming period
Dwarf lousewort	<i>Pedicularis centranthera</i>	BLM CA Sensitive; CNPS 2B.3	April - June
Ornate Dalea	<i>Dalea ornata</i>	BLM CA Sensitive; CNPS 2B.1	June
Susanville Penstemon	<i>Penstemon sudans</i>	BLM CA Sensitive; CNPS 1B.3	June - July

CNPS 1A = Plants presumed extirpated in California and either rare or extinct elsewhere; CNPS 1B = Plants rare, threatened, or endangered in California and elsewhere; CNPS 2A = Plants presumed extirpated in California but common elsewhere; CNPS 2B = Plants rare, threatened, or endangered in California but more common elsewhere; CNPS 3 = Review List: Plants about which more information is needed; CNPS 4 = Watch List: Plants of limited distribution;

#### 4.2.1 Target Species Observed

During the field survey, BEC biologists observed only one of the target sensitive species. Several patches of *Eriogonum ochrocephalum* var. *ochrocephalum* (white woolly buckwheat), a species rated CNPS 2B.2, which is rare, threatened or endangered in California but more common elsewhere were observed. On August 10, 2018, Arnold Tiehm, herbarium curator and botanist, of University of Nevada-Reno, verified the species by photograph and description via a phone conversation and email. All of the plants observed occurred in patches on the exposed white soils described as the Corral-Glenbrook complex, 15 to 50 percent slopes, rough broken land, and Barnard stony sandy loam, 2 to 15 percent slopes. These soil types are defined as having a clay layer in the upper 10 inches to hold moisture and occur in all areas of the Project site, including the existing mined area. This species is quite variable in presence of glands and other identifying features and is similar to more common species in its range and the Project area.

A second survey was conducted on August 13, 2018, by the BEC-contracted botanist Jeannette Halderman, to map the boundary of, estimate number of individuals present in, and photograph each population. All plants observed were mapped using a GPS unit (UTM coordinates) (**Appendix D, Figure 8 – Locations of *Eriogonum ochrocephalum* Populations**). California Native Species Field Survey

Form was completed for each population. Digital photos were taken of each population location showing habitat type, representative growth patterns, and individual species (**Appendix D, Photo Log 2**).

Approximately 5,800 individuals of *Eriogonum ochrocephalum* var. *ochrocephalum* (white woolly buckwheat) documented within the Project area, including proposed project and buffer areas. **Table 4-2: *Eriogonum ochrocephalum* var. *ochrocephalum* Populations by Project Area** describes the population by Project Area. Due to the matted growth form, it was difficult to discern what an individual plant was when the plants formed a large mat; therefore, for purposes of this survey, the plant was considered an individual as a seedling or matted growth form if it was separated from another individual or matted growth form by bare soil or another species of plant. All populations contained individuals of all phenotypic stages including vegetative, flowering and seeding. In all project areas, this species occurs on eroded or areas where the topsoil has been removed to expose the subsoils composed of high clay-like content, providing favorable growing conditions for white woolly buckwheat.

**Table 4-2: *Eriogonum ochrocephalum* var. *ochrocephalum* Populations by Project Area**

Project Area	Population #	Estimated # individuals	% in Project Area	% in Buffer
Phase I & II	1	175	95	5
Phase I & II	2	4	50	50
Phase I & II	3	75	5	95
Phase I & II	4	1500	50	50
Phase I & II	5	45	100	0
Existing Mine	6	3500	50	50
Phase III	7	500	10	90
Phase III	8	50	100	0

#### 4.2.2 Habitat Observations

Habitat for potentially occurring sensitive species was documented and is noted in **Table 4-3: Summary of Botanical Target Species** as to whether or not it was present and/or observed. The typical habitat for a sensitive species to occur in was determined by looking through many reference guides including The Jepson Manual: Vascular Plants of California: Second Edition (Baldwin B. G., et al., 2012), Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A (Cronquist A., Holmgren, Holmgren, & Reveal, 1997), and Atlas of North American Astragalus (Barneby, 1964).

During the field survey, BEC biologists evaluated areas of potential habitat for the Federally threatened *Ivesia webberi* (Webber's ivesia). *Ivesia webberi* (Webber's Ivesia) is a low spreading, perennial forb that has distinguishable greenish-gray foliage and dark red, wiry stems (Baldwin B. G., et al., 2012) (Cronquist, Holmgren, Holmgren, & Reveal, 1997). The leaves create a cluster around the base of the stems with the leaflets crowding the tip of the stems. The inflorescence is flat-topped in a head-like shaped cluster with 5-15 flowers per group. Flowers are bright yellow with 5 stamens and petals that are smaller than the sepals. After the plant flowers and begins to seed, the whole plant becomes tinged with a reddish color making it distinctive in the field. Flowering season begins in May and can extend to the beginning of July, with fruiting beginning in June and going thru the end of July. *Ivesia webberi* typically occurs on flats, benches or terraces above or adjacent to large valleys, that do not receive an accumulation of loose sediment from upslope. *Ivesia webberi* typically inhabits soils that are considered shallow, clay soils that are rocky on the surface. These soils are derived from volcanic and andesitic rock. This plant



tends to grow in soils that are wet in the spring but dry out as the summer progresses. The root system of perennial forbs is perfect for surviving in clay-like soils. Because the typical habitat for *Ivesia webberi* is moist for part of the year but otherwise dry and rocky, it is usually found with very specific co-dominant plants including *Artemisia arbuscula* (little sagebrush) and *Elymus elymoides* (squirreltail) in association with *Antennaria dimorpha* (low pussytoes), *Balsamorhiza hookeri* (Hooker's balsamroot), *Erigeron bloomeri* (scabland fleabane), *Lewisia rediviva* (bitter root) and *Viola beckwithii* (Beckwith's violet).

*Ivesia webberi* was not found on the Project site during the botanical surveys, and the Project site did not possess the appropriate quality habitat for this species. The dominant shrub on the Project site was *Artemisia tridentata* (big sagebrush) not *Artemisia arbuscula*, which was not observed on the site. The lack of *Ivesia webberi* could be explained by the absence of moist, deep clay soils with rocky surfaces preferred by the species. A couple of relatively flat areas that appeared to stay moist longer than the surrounding site, evidenced by the presence of Baltic rush, were observed in patches in the center of Phase I and II. Exposed clay soils were present on the west-facing slopes of Phase I and II, however, only a couple *Antennaria dimorpha* plants were present. *Antennaria dimorpha* were present in a pocket on a northeast facing slope in Phase I and II as well, however, this area was walked thoroughly and *Ivesia webberi* was not observed.

The biologists did not visit a reference population; however, an herbarium specimen was reviewed prior to the site survey. During the 100% visual survey of the Project site, if present, *Ivesia webberi* would have been identifiable and differentiated from other perennials due to its unique leaves, growth form and flower stalks, and the reddish-tinge it takes on near the end of the growing season.

**Table 4-3: Summary of Botanical Target Species**

Common Name	Scientific Name	Habitat	Habitat Present/Species Observed?
<b>Target Rare and Sensitive Plant Species</b>			
Ames milkvetch	<i>Astragalus pulsiferae</i> var. <i>pulsiferae</i>	Sandy or rocky soils (frequently granitic), often occurring with pines or sagebrush, 1,400 meters	Habitat present; Species not observed
Carson Valley monkeyflower	<i>Erythranthe carsonensis</i>	Bluffs and badlands derived from fluviolacustrine silt, volcanic ash, or diatomite deposits, sometimes perched on dark basaltic slopes, in the shadscale, mixed-shrub, and lower sagebrush zones, 1,400-1,580 meters	No habitat present
Dwarf lousewort	<i>Pedicularis centranthera</i>	Sagebrush scrub, alluvial fans; 1300 – 1500 meters	Low quality suitable habitat. Species not observed. No <i>Pedicularis</i> species observed.
Few-flowered eriastrum	<i>Eriastrum sparsiflorum</i>	Chaparral, Cismontane woodland, Great Basin scrub, Joshua tree woodland, Mojave Desert scrub, Pinyon and juniper woodland; granitic, sandy, usually openings, 1,075-1,710 meters	Habitat present; Species not observed
Golden violet	<i>Viola purpurea</i> ssp. <i>aurea</i>	Great Basin scrub, Pinyon and juniper woodland, sandy slopes, 1,000-2,300 meters, known from Mammoth Lakes and Bridgeport, CA	Low quality suitable habitat present; Species not observed
Lens-pod milkvetch	<i>Astragalus lentiformis</i>	Great Basin scrub, Lower montane coniferous forest; dry sandy soil; volcanic sandy, 1,450-1,910 meters	Habitat present; Species not observed

Common Name	Scientific Name	Habitat	Habitat Present/Species Observed?
Nevada daisy	<i>Erigeron eatonii</i> <i>var. nevadincola</i>	Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland; rocky, 1,400-2,900 meters	Habitat present; Species not observed
Nevada lupine	<i>Lupinus nevadensis</i>	Great Basin scrub, Pinyon and juniper woodland; Hillsides, valleys, with sagebrush, 1,000-3,000 meters	Habitat present; Species not observed
Ochre flowered buckwheat	<i>Eriogonum ochrocephalum</i> <i>var. ochrocephalum</i>	Great Basin scrub, Pinyon and juniper woodland; volcanic or clay, 1,200-2,400 meters	Habitat present; Species present, approximately 5,800 plants observed
Ornate Dalea	<i>Dalea ornata</i>	Open, rocky hillsides, Northern Juniper Woodland; sandy slopes; 1400 meters	Low quality habitat present; Species not observed.
Oryctes	<i>Oryctes nevadensis</i>	Annual may be sensitive to rainfall to germinate; Deep loose sand of stabilized dunes, washes, and valley flats, on various slopes and aspects, variously associated with <i>Psoralea polydenius</i> , <i>Tetradymia tetrameres</i> , <i>T. glabrata</i> , <i>Sarcobatus vermiculatus</i> , <i>S. baileyi</i> , <i>Atriplex canescens</i> , <i>A. confertifolia</i> , <i>Krascheninnikovia lanata</i> , <i>Grayia spinosa</i> , <i>Eriogonum nummularia</i> , <i>Achnatherum hymenoides</i> , <i>Hesperostipa comata</i> , <i>Oenothera deltoides</i> , <i>Cymopterus corrugatus</i> , <i>Penstemon arenarius</i> , <i>Gilia micromeria</i> , <i>Astragalus geyeri</i> , <i>Phacelia bicolor</i> , <i>Nama densum</i> , <i>N. aretioides</i> , etc., 1,189-1,486 meters	No habitat present
Sagebrush pygmyweed	<i>Loeflingia squarrosa</i> ssp. <i>artemisiarum</i>	Fine, deep, often granitic, sandy soils of valley flats and dunes in the sagebrush and possibly mixed-shrub zones, usually in openings among sagebrush. Desert dunes, Great Basin scrub, Sonoran Desert scrub, 700-2,295 meters	Habitat present; Species not observed
Susanville Penstemon	<i>Penstemon sudans</i>	Open, rocky, igneous soils in sagebrush scrub, yellow-pine and montane forests 1,200 – 2,200 meters	Low quality habitat present; Species not observed. All Penstemon keyed to species.
Webbers Ivesia	<i>Ivesia webberi</i>	Shallow shrink-swell clay soils with a gravelly surface layer over volcanic, generally andesitic bedrock, on mid-elevation benches and flats, usually co-dominating with <i>Artemisia arbuscula</i> and <i>Elymus elymoides</i> in association with <i>Antennaria dimorpha</i> , <i>Balsamorhiza hookeri</i> , <i>Erigeron bloomeri</i> , <i>Lewisia rediviva</i> , <i>Viola beckwithii</i> , etc., 1,219-1,806 meters	Low quality habitat present; Species not observed
Western seablite	<i>Suaeda occidentalis</i>	Dry, sandy places, 1,200-1,800 meters	Limited suitable habitat in sandy areas along drainages; Species not observed
Winged dock	<i>Rumex venosus</i>	Great Basin scrub (sandy), 1,200-1,800 meters	Limited suitable habitat in sandy areas along drainages; Species not observed



### 4.3 Noxious Weeds Survey Results

Numerous non-native plant species were observed during the field survey and were documented and indicated using an asterisk on the Species List in **Appendix D, Table 1**. However, only one species listed on the Noxious Weed List California Code of Regulations 4500 was observed. *Elymus repens* (quackgrass) is considered a Category B listed noxious weed which are weeds that are generally established in scattered populations in some counties of the State. *Elymus repens*, a perennial, rhizomous species, was introduced from Eurasia. It is known to occur in disturbed areas in most soil types throughout California (mostly northern and coastal) to eastern U.S., between 0 – 1,800 meters elevation. This species was observed scattered in a small disturbed area adjacent to and on the west side of Highway 395, within the proposed access road buffer of Phase III. Approximately 10-30 plants, in vegetative, flowering and seed stages, were observed.

### 4.4 Wildlife Survey Results

Prior to the field survey, the list of potentially-occurring rare and sensitive wildlife species was reviewed.

While completing the 100 percent visual examination of all project areas for the botanical surveys, biologists recorded all incidental wildlife sightings. Throughout the three days of surveys, biologists saw unidentified roosting nighthawk, black-tailed jackrabbits, cottontails, Western fence lizards, and a common garter snake. No rare or sensitive wildlife species, nor signs of their presence, were seen during the surveys. No large mammals were seen during survey, but sign was observed. Numerous hoof and paw prints were present, along with scat indicating the presence of livestock and horses, as well as deer or antelope and various-sized canids.

A variety of birds were observed during the bird count surveys. No rare or sensitive bird species were seen or heard during the survey. **Appendix D, Table 2 – List of Bird Species Observed** provides the list of birds observed during the bird count surveys and **Figure 9 – Locations of Bird Count Point Surveys** provides a map of the bird count locations.

No raptors or raptor nests were observed during surveys within the Project area or within the 2-mile buffer as described in Section 3.2.3. Biologists specifically searched the location of the 1998 observation of the long-eared owl nest or any sign. No indications of the nest were observed.

Burrowing owls were not observed within the project area. No burrows suitable for their use were present and no other sign of this species were observed.

Sage-grouse were not observed during surveys, nor was sage-grouse sign observed.

Neither pygmy rabbits nor sign of their presence were observed in the project area.

### Subsequent Review of BLM California List of Sensitive Animal Species

Subsequent to the completion of field surveys, biologists reviewed the 2014 BLM California list of sensitive animal species suspected or known to occur in the adjacent Eagle Lake District to assess if any of these species may be present in the project area. Seven additional species were identified that were not of the previous list (**Table 4-4 Conservation Status of BLM California Sensitive Animal Species Potentially Occurring in the Project Area.**)

**Table 4-4 Conservation Status of BLM California Sensitive Animal Species Potentially Occurring in the Project Area.**

Common Name	Scientific Name	Conservation Status
<b>Target Rare and Sensitive Wildlife Species</b>		
<b>Birds/Raptors</b>		
Bank swallow	<i>Riparia riparia</i>	BLM Sensitive
California Spotted Owl	<i>Strix occidentalis occidentalis</i>	BLM Sensitive; CDFW SSC
Swainson's hawk	<i>Buteo swainsoni</i>	BLM Sensitive; USFWS BCC
Tricolored blackbird	<i>Agelaius tricolor</i>	BLM Sensitive; CDFW SSC
<b>Reptiles</b>		
California mountain kingsnake	<i>Lampropeltis zonata</i>	BLM Sensitive
Northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	BLM Sensitive
<b>Mammals</b>		
Pacific fisher	<i>Martes pennant (pacifica) DPS</i>	BLM Sensitive; CDFW SSC;

CDFW FP = Fully Protected Species; CDFW SSC = Species of Special Concern; CDFW WL = Watch List Species

In reviewing this list of additional species of concern, and the species observed during the field surveys, the biologists confirmed most of these species were not observed in the project area. The only species the biologists could not confirm was not observed in the project area is the northern sagebrush lizard. A few lizards were observed during the field efforts, but the identification of the species was not possible.

#### 4.5 Habitat Assessment

Potential habitat for potentially occurring sensitive species was documented and is summarized in **Table 4-5: Summary of Habitat Assessment of Wildlife Target Species** as to whether or not it was present and/or observed. The typical habitat for a sensitive species was determined by reviewing many reference guides including Nevada Natural Heritage Program, Sibley Field Guide to Birds of Western North America (Sibley, 2003) and Hawks from Every Angle (Liguori, 2005). The habitat requirements and assessment of habitat in the project area are summarized in the **Table 4-5**.

**Table 4-5: Summary of Habitat Assessment of Wildlife Target Species**

Common Name	Scientific Name	Habitat	Habitat Present?
<b>Target Rare and Sensitive Wildlife Species</b>			
<b>Birds/Raptors</b>			
Bald eagle	<i>Haliaeetus leucocephalus</i>	Near lakes, reservoirs, rivers, marshes, and coasts; scattered breeding occurrences in Northern Nevada. Use of tall trees are used for nesting and hunting.	Low quality habitat present; Species and sign not observed
Bank swallow	<i>Riparia riparia</i>	Prefer wet, open areas and tend to stay away from forested areas. Uses sandbanks as nesting areas.	No habitat present; Species and sign not observed
Brewer's sparrow	<i>Spizella breweri</i>	Arid sagebrush steppe; winter occupies sagebrush shrublands similar to breeding grounds, as well as a range of desert scrub habitats consisting mainly of saltbush and creosote.	Habitat present; Species and sign not observed

Common Name	Scientific Name	Habitat	Habitat Present?
Burrowing owl	<i>Athene cunicularia</i>	Live in open habitats with sparse vegetation such as prairie, pastures, desert or shrub steppe. In parts of their range they are closely associated with prairie dogs and ground squirrels, whose burrows they use for nests; breed throughout Nevada in salt desert scrub, Mojave shrub and some sagebrush habitats; winters mostly frequently in the southern half of Nevada but has been recorded throughout the state during all months.	Low quality habitat present; Species not observed; ; No burrows or other sign observed.
California spotted owl	<i>Strix occidentalis occidentalis</i>	Preferred habitat coniferous woodlands or older forests with larger trees and multi-layered canopy. Nests are typically found in areas with high canopy cover.	Low quality to no habitat present; Low quality foraging habitat present; No nesting habitat present due to absence of dense, older forests with high canopy cover; Species and sign not observed
Ferruginous hawk	<i>Buteo regalis</i>	Preferred habitat arid and semiarid grassland regions; open, level, or rolling prairies; foothills or middle elevation plateaus largely devoid of trees; and cultivated shelterbelts or riparian corridors.	No habitat present; Species and sign not observed
Golden eagle	<i>Aquila chrysaetos</i>	Open country, especially around mountains, hills, and cliffs; uses a variety of habitats ranging from arctic to desert, including tundra, shrublands, grasslands, coniferous forests, farmlands and areas along rivers and streams.	Low quality habitat present; Species and sign not observed
Gray-crowned rosy-finch	<i>Leucosticte tephrocots</i>	Breeds in alpine areas, usually near snow fields or glaciers, talus, rockpiles, and cliffs; winters in open country, including mountain meadows, shrublands, roadsides, towns, cultivated areas, rocky hillsides, and margins of dry ditches.	Low quality habitat present; Species and sign not observed
Greater sage-grouse	<i>Centrocercus urophasianus</i>	Sagebrush steppe; nests in areas with relatively dense cover from big sagebrush; may use areas with rabbitbrush, greasewood, and grassy areas; leks are located in clear areas such as broad ridgetops, dry lakebeds, grassy swales.	Low quality habitat present; Low quality of foraging habitat present due to lack of dense sagebrush cover; No nesting habitat present. No suitable lek habitat present; Species and sign not observed
Loggerhead shrike	<i>Lanius ludovicianus</i>	Open country with short vegetation and well-placed shrubs or low trees particularly those with spines or thorns; frequently using pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses.	Habitat present; Species and sign not observed
Long-eared owl	<i>Asio otus</i>	Wooded areas with dense vegetation needed for roosting and nesting, along with open areas for hunting. Uses forest edges and brush fields for night hunting.	Habitat present; Species and sign not observed; Previously documented active nest (1998) could not be located.

Common Name	Scientific Name	Habitat	Habitat Present?
Northern goshawk	<i>Accipiter gentilis</i>	Nest in mature and old-growth forests with more than 60% closed canopy; often builds nests near breaks in the canopy, such as a forest trail or opening created by a downed tree, and prefers sites with a creek, pond or lake nearby. It will hunt in riparian corridors and in open habitat such as sagebrush steppes.	No habitat present; Species and sign not observed
Peregrine falcon	<i>Falco peregrinus</i>	Breed in open landscapes with cliffs for nest sites; nesting at elevations up to 12,000 ft. as well as along rivers and coastlines or in cities. Migration and winter in nearly any open habitat with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains.	No habitat present; Species and sign not observed
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	Pinyon-Juniper woodland, sagebrush, scrub oak, and chaparral communities, and sometimes in pine forests; specialized for feeding on pine seeds.	Habitat present; Species and sign not observed
Prairie falcon	<i>Falco mexicanus</i>	Preferred landscapes are cliffs adjacent to arid valleys with low vegetation. Forage over a variety of sagebrush, salt desert and Mojave Desert scrub, along with being seen over agricultural lands during winter months. Nests are typically on south facing aspects.	Low quality habitat present; Species and sign not observed
Sage thrasher	<i>Gymnorhinus cyanocephalus</i>	Breeds exclusively in shrub steppe habitats; requires relatively dense ground cover for concealment, but also using some bare ground for foraging and for getting around on their feet. Use of arid and semiarid open country with scattered bushes, grasslands and open pinyon-juniper woodlands.	Habitat present; Species and sign not observed
Short-eared owl	<i>Asio flammeus</i>	Live in large, open areas with low vegetation, including prairie and coastal grasslands, meadows, savanna, tundra, marshes, dunes and agricultural areas; winter habitat is similar, but is more likely to include large open areas within woodlots, stubble fields, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets.	Low quality habitat present; Species and sign not observed
Swainson's hawk	<i>Buteo swainsoni</i>	Favors open habitats for foraging; pastures, crops, or perched atop adjacent fence posts and overhead sprinkler systems; they rely on scattered stands of trees near agricultural fields and grasslands for nesting sites.	No habitat present; Species and sign not observed
Tricolored blackbird	<i>Agelaius tricolor</i>	Typically found in open country, farmlands, and marshes. Preferred nesting habitat are marshes.	No habitat present; Species and sign not observed

Common Name	Scientific Name	Habitat	Habitat Present?
<b>Reptiles</b>			
California mountain kingsnake	<i>Lampropeltis zonata</i>	Found in a variety of habitat including coniferous forests, riparian woodlands, chaparrals, and coastal scrubs. Most commonly found near cover that is provided by rocks or boulders near streams or lake shores.	Low quality habitat present; Species and sign not observed
Desert horned lizard	<i>Phrynosoma platyrhinos</i>	Typically found in open sandy areas in deserts, chaparral, grassland, often near ant hills. Often seen basking on asphalt roads or low rocks in the morning or afternoon.	Low quality habitat present; Species not observed
Great Basin collared lizard	<i>Crotaphytus bicinctores</i>	Occurs mainly in xeric, sparsely vegetated rocky areas, on alluvial fans, lava flows, hillsides, rocky plains, and in canyons; perches atop rocks and hides under rocks and be found from sea level to 7,500 ft.	Habitat present; Species not observed
Long-nosed leopard lizard	<i>Gambelia wislizenii</i>	Found in sandy and gravelly desert and semidesert areas with scattered shrubs or other low plants, especially areas with abundant rodent burrows; occurs from seal level to approximately 6,000 ft.	Low quality habitat present; Species not observed
Northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	Found in a wide range of habitats but prefers sagebrush and other low shrublands with minimal grass coverage.	Habitat present; Species possibly observed – Biologist observed multiple lizards but could not confirm species.
Sierra alligator lizard	<i>Elgaria coerulea palmeri</i>	Found only in the Sierra Nevada and immediately adjacent ranges in the western part of the state. Generally found in cooler, damper places in a variety of forested habitats and montane chaparral. Also found in grassy grown-over areas at margins of woodlands, in clear-cuts, near streams, rock outcrops, and talus.	No habitat present; Species not observed
<b>Mammals</b>			
Pacific fisher	<i>Martes pennant (pacifica) DPS</i>	Found primarily in dense coniferous or mixed forests. Prefers old growth forests with large canopies. Will generally find shelter in rotting trees, hollowed out trees, rock crevices, and dens of other animals. If trees are used as shelters, they are typically very large in diameter. On November 7, 2019, USFWS proposed to list this distinct population segment of this species as a threatened species under the Endangered Species Act.	No habitat present due to absence of dense, older forests coniferous or mixed forest; Species and sign not observed Species and sign not observed;
Pocket gopher	<i>Thomomys bottae</i>	Associated with a wide range of vegetation and soil types. Residents of open habitats and meadows, where soils are deep enough to maintain permanent burrow systems.	Low quality habitat present; Species and sign not observed
Pygmy rabbit	<i>Brachylagus idahoensis</i>	Found primarily on big sagebrush dominated plains where brush is tall and dense. Deep loamy-type soils are required for burrowing. Depends on sagebrush for food and shelter throughout the year.	No habitat present due to lack of dense, tall sagebrush; Species and sign not observed
Western white-tailed jackrabbit	<i>Lepus townsendii</i>	Prefers open grasslands and sagebrush plains. At higher elevations found in open areas adjacent to pine forests and in alpine tundra.	Habitat present; Species and sign not observed.



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## ***APPENDIX A***

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### Project Location Maps



Figure 1 - Geofortis Mines Vicinity Map  
Long Valley  
Lassen County, California

0 5 10 20 30  
Miles

bec environmental, inc.  
Environmental Services





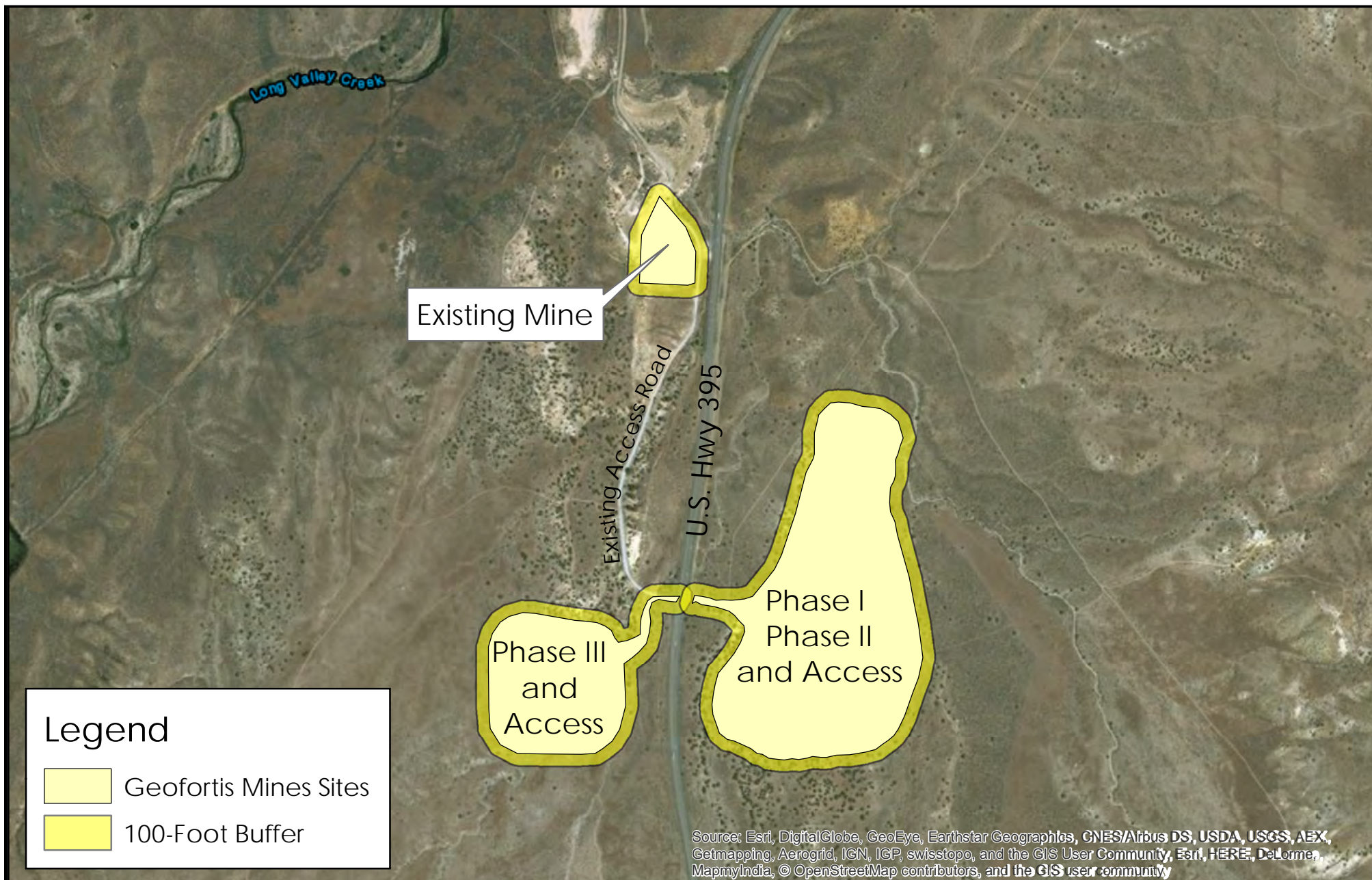


Figure 2 - Geofortis Mines Site Map

Long Valley  
Lassen County, California

0 625 1,250 2,500 3,750 5,000

Feet

**bec environmental, inc.**

Environmental Services

N



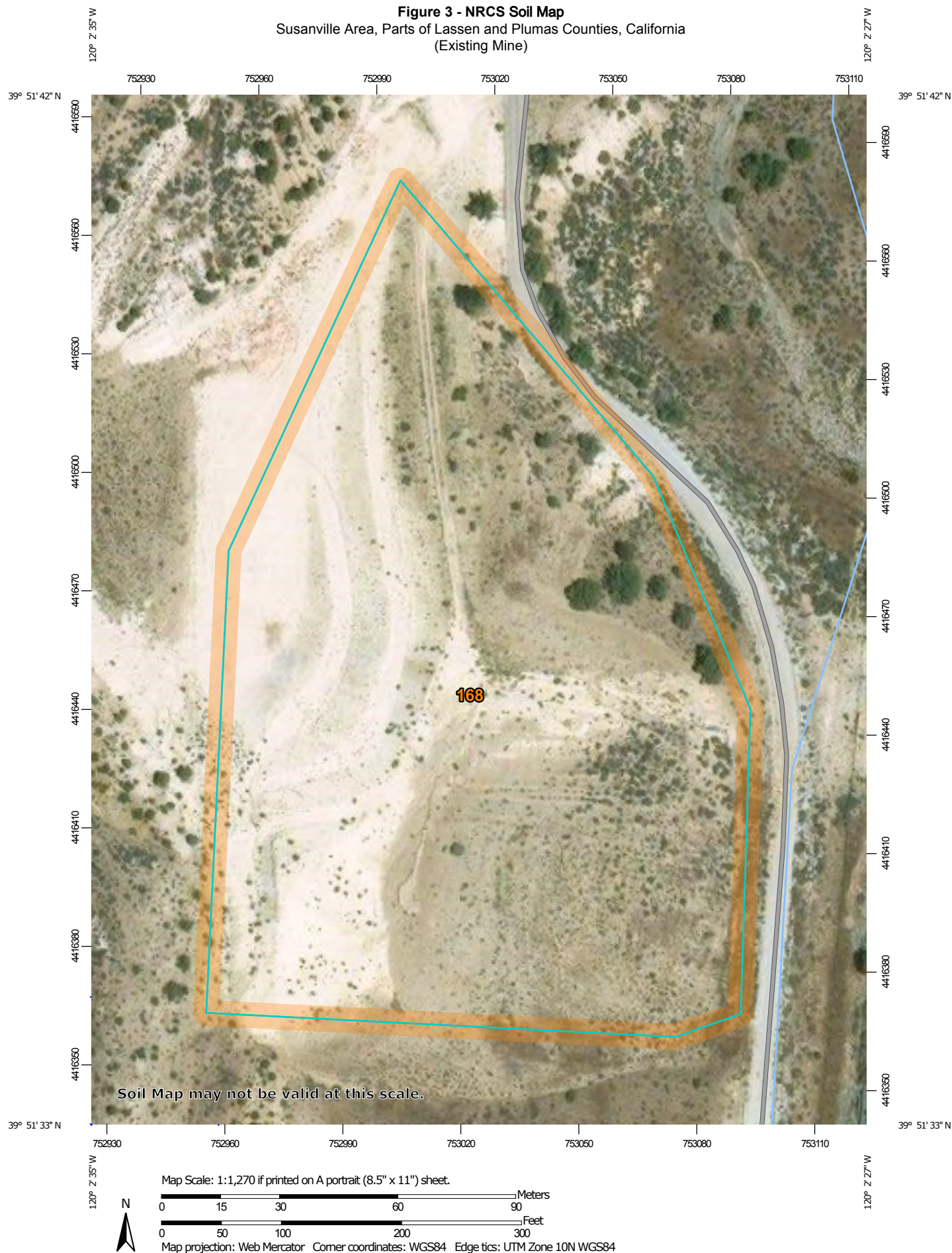
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## ***APPENDIX B***

### NRCS Maps




**Figure 3 - NRCS Soil Map**  
 Susanville Area, Parts of Lassen and Plumas Counties, California  
 (Existing Mine)



Soil Map—Susanville Area, Parts of Lassen and Plumas Counties, California  
(Existing Mine)

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Susanville Area, Parts of Lassen and Plumas Counties, California

Survey Area Data: Version 8, Sep 13, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 4, 2014—Nov 17, 2016

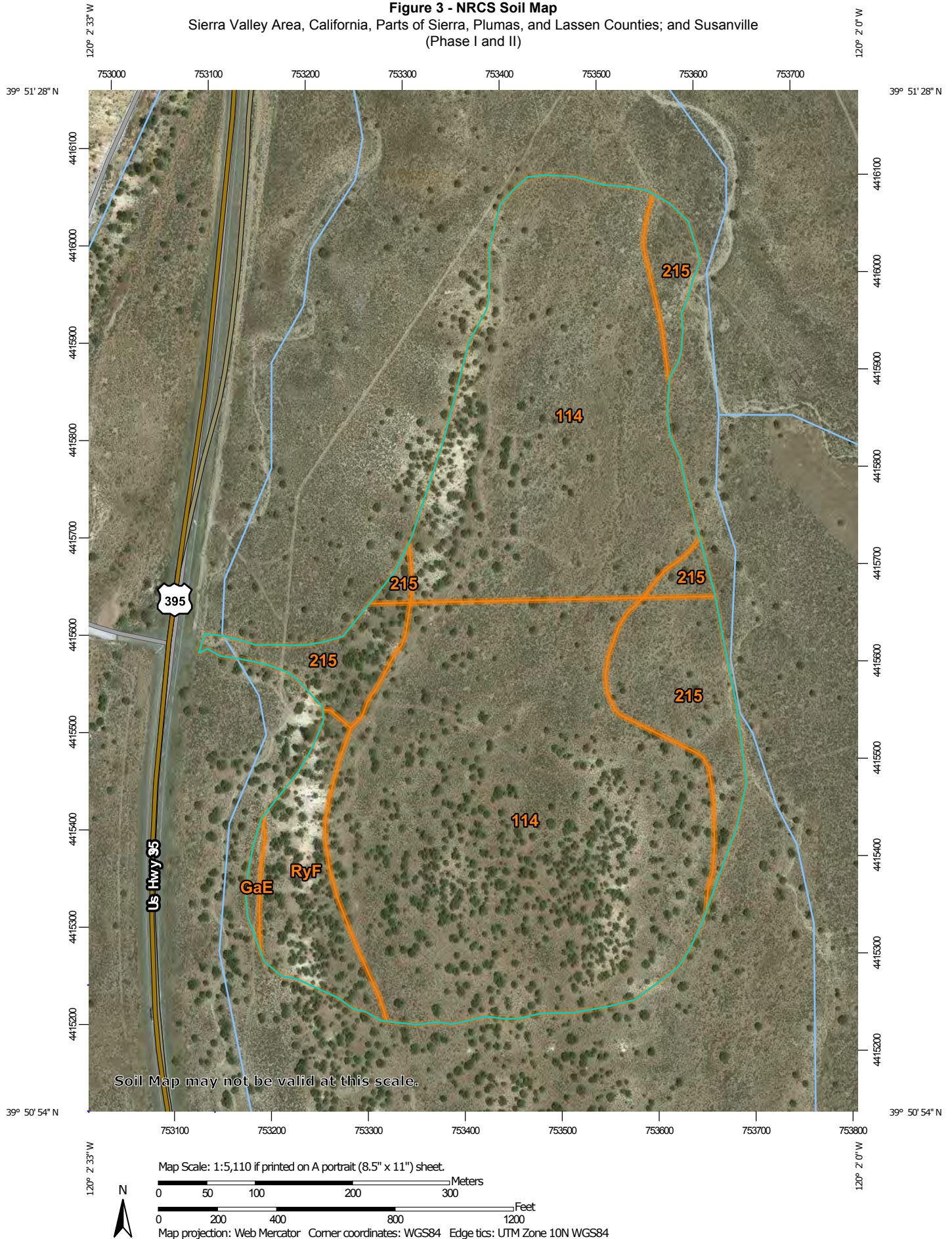
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend - Existing Mine


Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
168	Corral-Glenbrook complex, 15 to 50 percent slopes	5.4	100.0%
<b>Totals for Area of Interest</b>		<b>5.4</b>	<b>100.0%</b>

**Figure 3 - NRCS Soil Map**  
 Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties; and Susanville  
 (Phase I and II)



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties

Survey Area Data: Version 11, Sep 8, 2017

Soil Survey Area: Susanville Area, Parts of Lassen and Plumas Counties, California

Survey Area Data: Version 8, Sep 13, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 4, 2014—Nov 17, 2016

## MAP LEGEND

## MAP INFORMATION

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



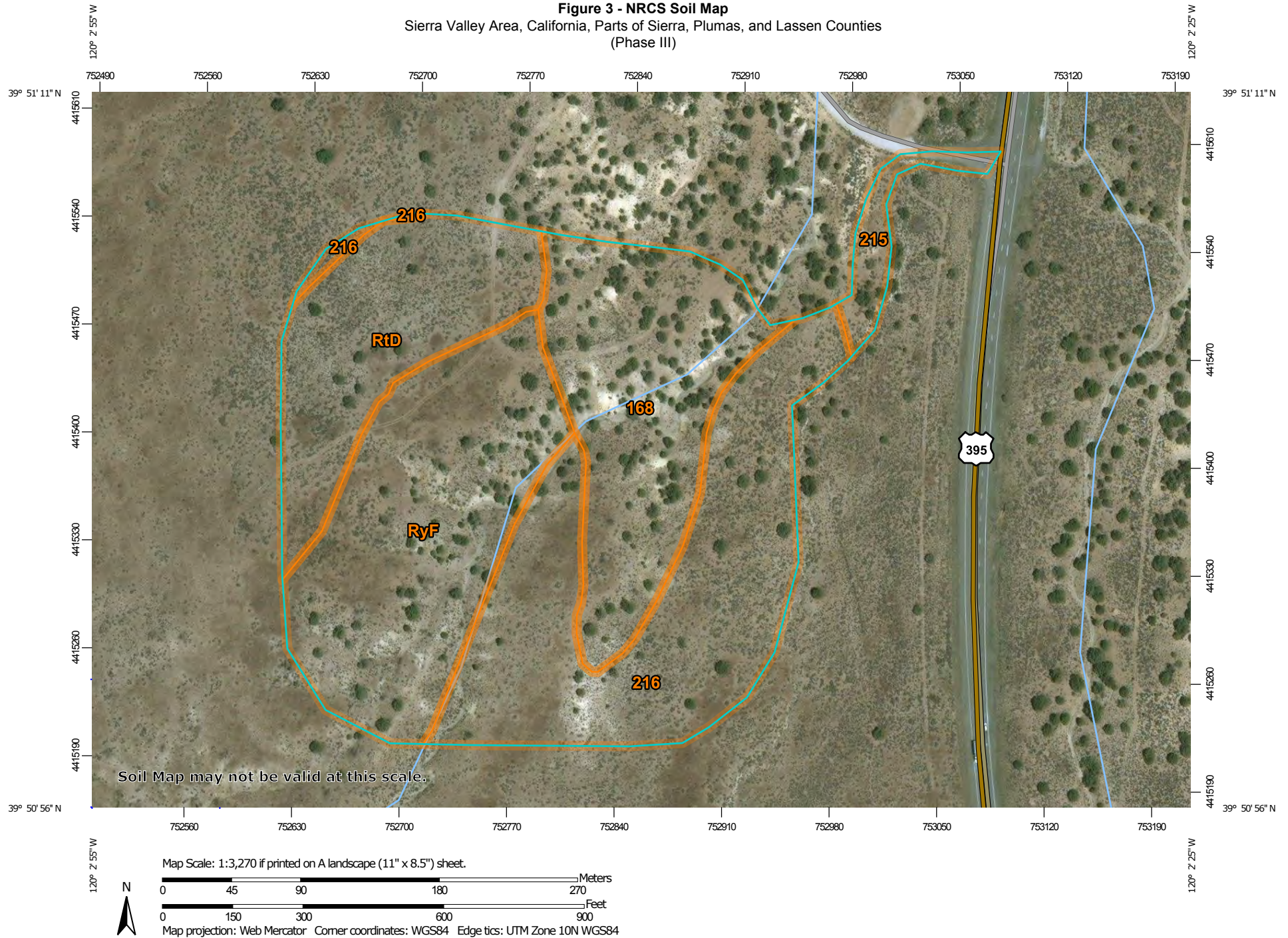


## Map Unit Legend - Phase I and II

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
114	Barnard stony sandy loam, 2 to 15 percent slopes	34.1	47.1%
215	Galeppi sandy loam, 2 to 5 percent slopes	7.7	10.6%
GaE	Galeppi loamy coarse sand, 5 to 30 percent slopes	0.3	0.5%
RyF	Rough broken land	4.8	6.7%
<b>Subtotals for Soil Survey Area</b>		<b>47.0</b>	<b>64.8%</b>
<b>Totals for Area of Interest</b>		<b>72.5</b>	<b>100.0%</b>

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
114	Barnard stony sandy loam, 2 to 15 percent slopes	23.1	31.9%
215	Galeppi sandy loam, 2 to 5 percent slopes	2.4	3.2%
<b>Subtotals for Soil Survey Area</b>		<b>25.5</b>	<b>35.2%</b>
<b>Totals for Area of Interest</b>		<b>72.5</b>	<b>100.0%</b>

**Figure 3 - NRCS Soil Map**  
Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties  
(Phase III)






Soil Map—Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties  
(Phase III)


## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties

Survey Area Data: Version 11, Sep 8, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 4, 2014—Nov 17, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend - Phase III


Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
168	Corral-Glenbrook complex, 15 to 50 percent slopes	6.0	22.3%
215	Galeppi sandy loam, 2 to 5 percent slopes	0.8	2.8%
216	Galeppi sandy loam, 5 to 30 percent slopes	8.2	30.7%
RtD	Reno sandy loam, 2 to 15 percent slopes	4.6	17.0%
RyF	Rough broken land	7.3	27.1%
<b>Totals for Area of Interest</b>		<b>26.8</b>	<b>100.0%</b>

**Figure 4 - NRCS Ecological Site Map**  
 Rangeland—Susanville Area, Parts of Lassen and Plumas Counties, California  
 (Existing Mine)





## MAP LEGEND

### Area of Interest (AOI)



 Area of Interest (AOI)

### Soils



#### Soil Rating Polygons

 R023XF091CA  
 Not rated or not available

#### Soil Rating Lines

 R023XF091CA  
 Not rated or not available






#### Soil Rating Points

 R023XF091CA  
 Not rated or not available


### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Susanville Area, Parts of Lassen and Plumas Counties, California  
Survey Area Data: Version 8, Sep 13, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 4, 2014—Nov 17, 2016

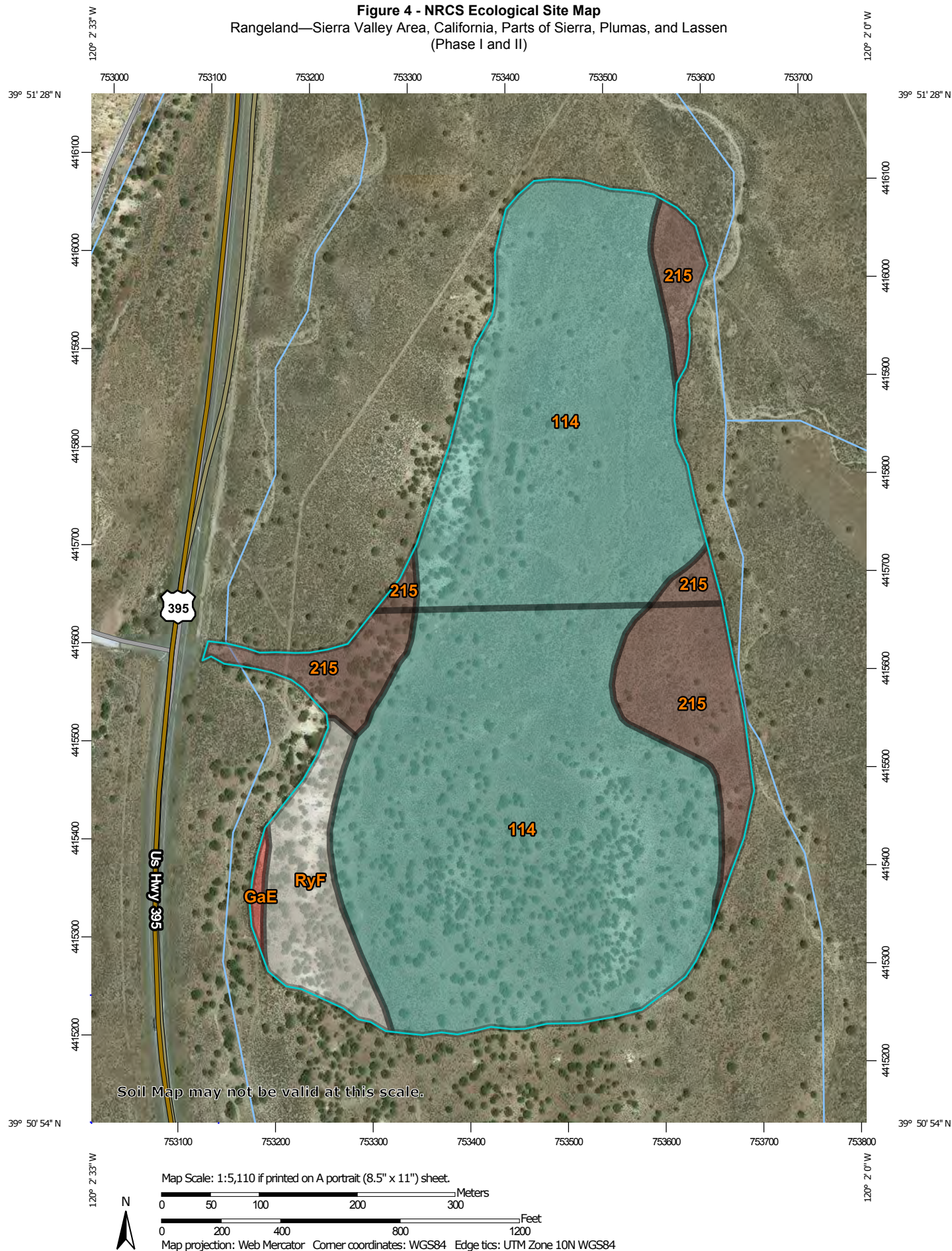
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## All Ecological Sites — Rangeland Existing Pit

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
168	Corral-Glenbrook complex, 15 to 50 percent slopes	Corral (60%)	R023XF091CA — LOAMY UPLAND 9-12"	5.4	100.0%
		Glenbrook (20%)	R026XF053CA — SHALLOW GRANITIC UPLAND 9-12"		
		Calpine (8%)	R021XE181CA — GRANITIC FAN 12-16"		
		Galeppi (7%)	R026XF052CA — GRANITIC UPLAND 9-12" P.Z.		
		Glenbrook, very bouldery (5%)	R026XF053CA — SHALLOW GRANITIC UPLAND 9-12"		
Totals for Area of Interest				5.4	100.0%




**Figure 4 - NRCS Ecological Site Map**  
 Rangeland—Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen  
 (Phase I and II)






## MAP LEGEND

### Area of Interest (AOI)





 Area of Interest (AOI)

### Background





 Aerial Photography

### Soils





#### Soil Rating Polygons

-  R023XF082CA
-  R026XF049CA
-  R026XF051CA
-  Not rated or not available


#### Soil Rating Lines

-  R023XF082CA
-  R026XF049CA
-  R026XF051CA
-  Not rated or not available






#### Soil Rating Points

-  R023XF082CA
-  R026XF049CA
-  R026XF051CA
-  Not rated or not available

### Water Features

 Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties  
Survey Area Data: Version 11, Sep 8, 2017

Soil Survey Area: Susanville Area, Parts of Lassen and Plumas Counties, California  
Survey Area Data: Version 8, Sep 13, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

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## MAP LEGEND

## MAP INFORMATION

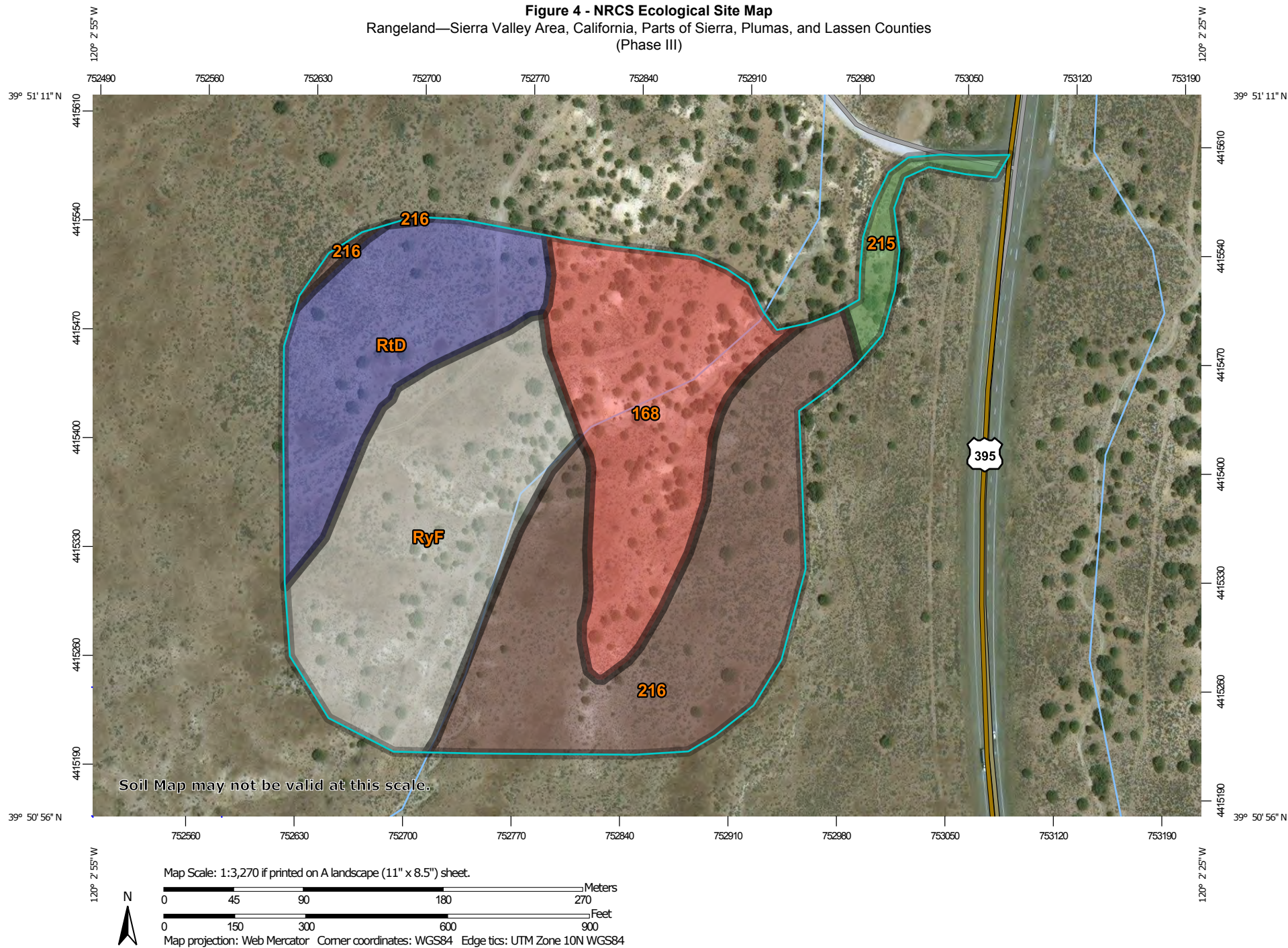
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## All Ecological Sites — Rangeland Phase I and II

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
114	Barnard stony sandy loam, 2 to 15 percent slopes	Barnard (70%)	R023XF082CA — STONY LOAM 9-12"	34.1	47.1%
		Calpine (10%)	R021XE181CA — GRANITIC FAN 12-16"		
		Galeppi (10%)	R026XF052CA — GRANITIC UPLAND 9-12" P.Z.		
		Hunnton (10%)	R023XF082CA — STONY LOAM 9-12"		
215	Galeppi sandy loam, 2 to 5 percent slopes	Galeppi (80%)	R026XF051CA — GRANITIC FAN 9-12"	7.7	10.6%
		Calpine (5%)	R021XE181CA — GRANITIC FAN 12-16"		
		Modoc (5%)	R021XE186CA — LOAMY TERRACE 12-16"		
		Mottsville (5%)	R026XF051CA — GRANITIC FAN 9-12"		
		Springmeyer (5%)	R023XF091CA — LOAMY UPLAND 9-12"		
GaE	Galeppi loamy coarse sand, 5 to 30 percent slopes	Galeppi (85%)	R026XF049CA — INTERMEDIATE MOUNTAINS, 6-12"	0.3	0.5%
		Unnamed (10%)			
		Unnamed (5%)			
RyF	Rough broken land	Rough broken land (95%)		4.8	6.7%
		Unnamed (5%)			
Subtotals for Soil Survey Area				47.0	64.8%
Totals for Area of Interest				72.5	100.0%

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
114	Barnard stony sandy loam, 2 to 15 percent slopes	Barnard (70%)	R023XF082CA — STONY LOAM 9-12"	23.1	31.9%
		Calpine (10%)	R021XE181CA — GRANITIC FAN 12-16"		
		Galeppi (10%)	R026XF052CA — GRANITIC UPLAND 9-12" P.Z.		
		Hunnton (10%)	R023XF082CA — STONY LOAM 9-12"		
215	Galeppi sandy loam, 2 to 5 percent slopes	Galeppi (80%)	R026XF051CA — GRANITIC FAN 9-12"	2.4	3.2%
		Calpine (5%)	R021XE181CA — GRANITIC FAN 12-16"		
		Modoc (5%)	R021XE186CA — LOAMY TERRACE 12-16"		
		Mottsville (5%)	R026XF051CA — GRANITIC FAN 9-12"		
		Springmeyer (5%)	R023XF091CA — LOAMY UPLAND 9-12"		
Subtotals for Soil Survey Area				25.5	35.2%
Totals for Area of Interest				72.5	100.0%


**Figure 4 - NRCS Ecological Site Map**  
 Rangeland—Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties  
 (Phase III)










## MAP LEGEND

### Area of Interest (AOI)






 Area of Interest (AOI)

### Soils






#### Soil Rating Polygons

-  R023XF091CA
-  R026XF047CA
-  R026XF051CA
-  R026XF052CA
-  Not rated or not available


#### Soil Rating Lines

-  R023XF091CA
-  R026XF047CA
-  R026XF051CA
-  R026XF052CA
-  Not rated or not available

#### Soil Rating Points




-  R023XF091CA
-  R026XF047CA
-  R026XF051CA
-  R026XF052CA
-  Not rated or not available

### Water Features


 Streams and Canals

### Transportation

-  Rails
-  Interstate Highways

-  US Routes
-  Major Roads
-  Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

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## All Ecological Sites — Rangeland Phase III

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
168	Corral-Glenbrook complex, 15 to 50 percent slopes	Corral (60%)	R023XF091CA — LOAMY UPLAND 9-12"	6.0	22.3%
		Glenbrook (20%)	R026XF053CA — SHALLOW GRANITIC UPLAND 9-12"		
		Calpine (8%)	R021XE181CA — GRANITIC FAN 12-16"		
		Galeppi (7%)	R026XF052CA — GRANITIC UPLAND 9-12" P.Z.		
		Glenbrook, very bouldery (5%)	R026XF053CA — SHALLOW GRANITIC UPLAND 9-12"		
215	Galeppi sandy loam, 2 to 5 percent slopes	Galeppi (80%)	R026XF051CA — GRANITIC FAN 9-12"	0.8	2.8%
		Calpine (5%)	R021XE181CA — GRANITIC FAN 12-16"		
		Modoc (5%)	R021XE186CA — LOAMY TERRACE 12-16"		
		Mottsville (5%)	R026XF051CA — GRANITIC FAN 9-12"		
		Springmeyer (5%)	R023XF091CA — LOAMY UPLAND 9-12"		
216	Galeppi sandy loam, 5 to 30 percent slopes	Galeppi (80%)	R026XF052CA — GRANITIC UPLAND 9-12" P.Z.	8.2	30.7%
		Barnard (5%)	R023XF082CA — STONY LOAM 9-12"		
		Calpine (5%)	R021XE181CA — GRANITIC FAN 12-16"		
		Glenbrook (5%)	R026XF053CA — SHALLOW GRANITIC UPLAND 9-12"		

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
		Indiano (5%)	R026XF052CA — GRANITIC UPLAND 9-12" P.Z.		
RtD	Reno sandy loam, 2 to 15 percent slopes	Reno (85%)	R026XF047CA — HARDPAN TERRACE	4.6	17.0%
		Rough broken land (5%)			
		Unnamed (5%)			
		Unnamed (5%)			
RyF	Rough broken land	Rough broken land (95%)		7.3	27.1%
		Unnamed (5%)			
Totals for Area of Interest				26.8	100.0%

## ***APPENDIX C***

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### Site Characterization

**Photo 1**



Inter-Mountain Basins Big Sagebrush Phase I/II.

**Photo 2**



Wash running thru Phase I/II.

**Photo 3**



Great Basin Pinyon-Juniper Woodland Phase I/II.

**Photo 4**



Sagebrush mixed with grasses throughout Phase III.

**Photo 5**



Wash running thru Phase III.

**Photo 6**



Pinyon-Juniper Woodland throughout Phase III.



**Photo 7**



Previously disturbed area within Existing Site.

**Photo 8**



Existing Site with Pinyon-Juniper woodland.

**Photo 9**



Undisturbed vegetation on Existing Site.



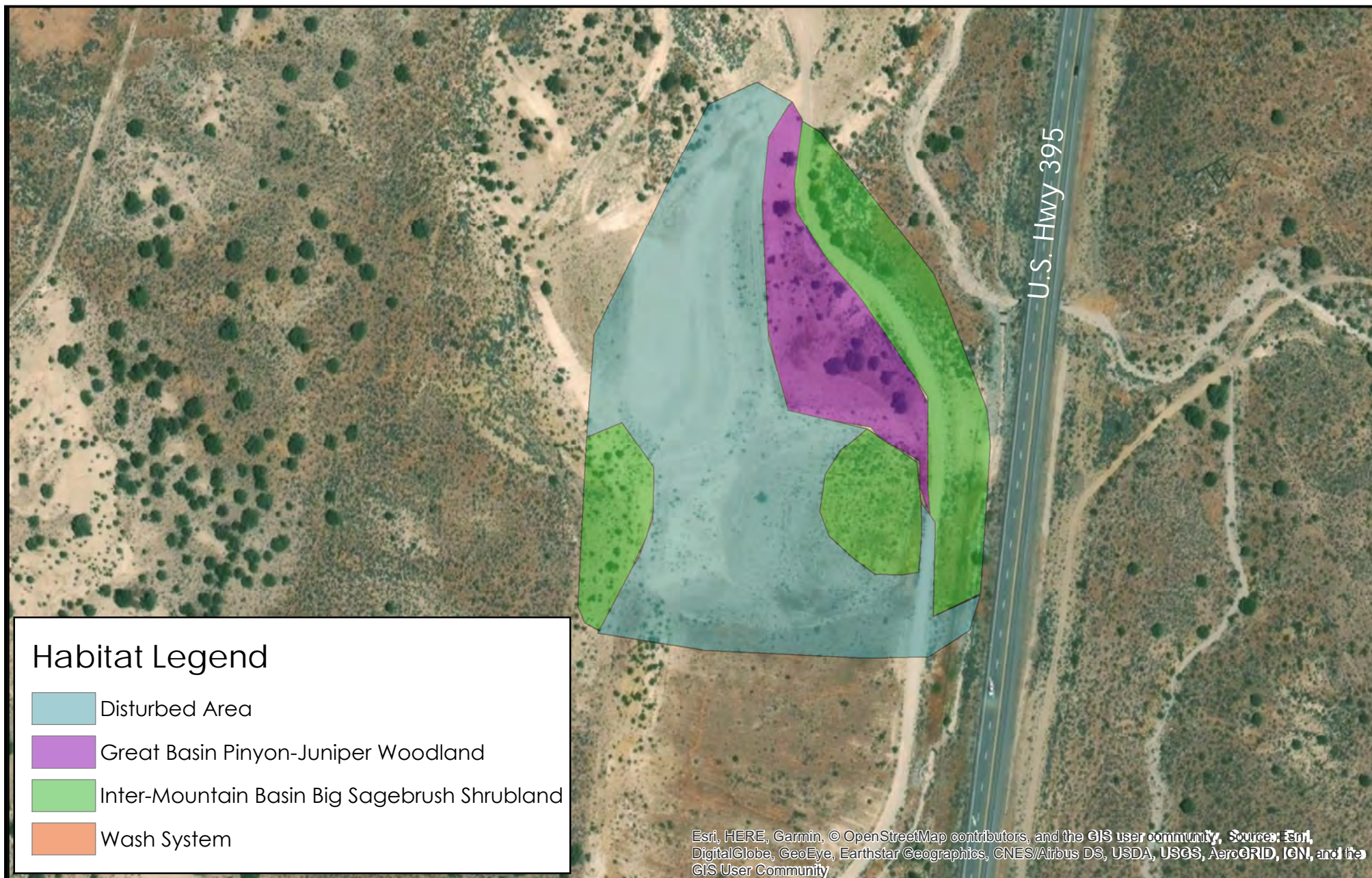


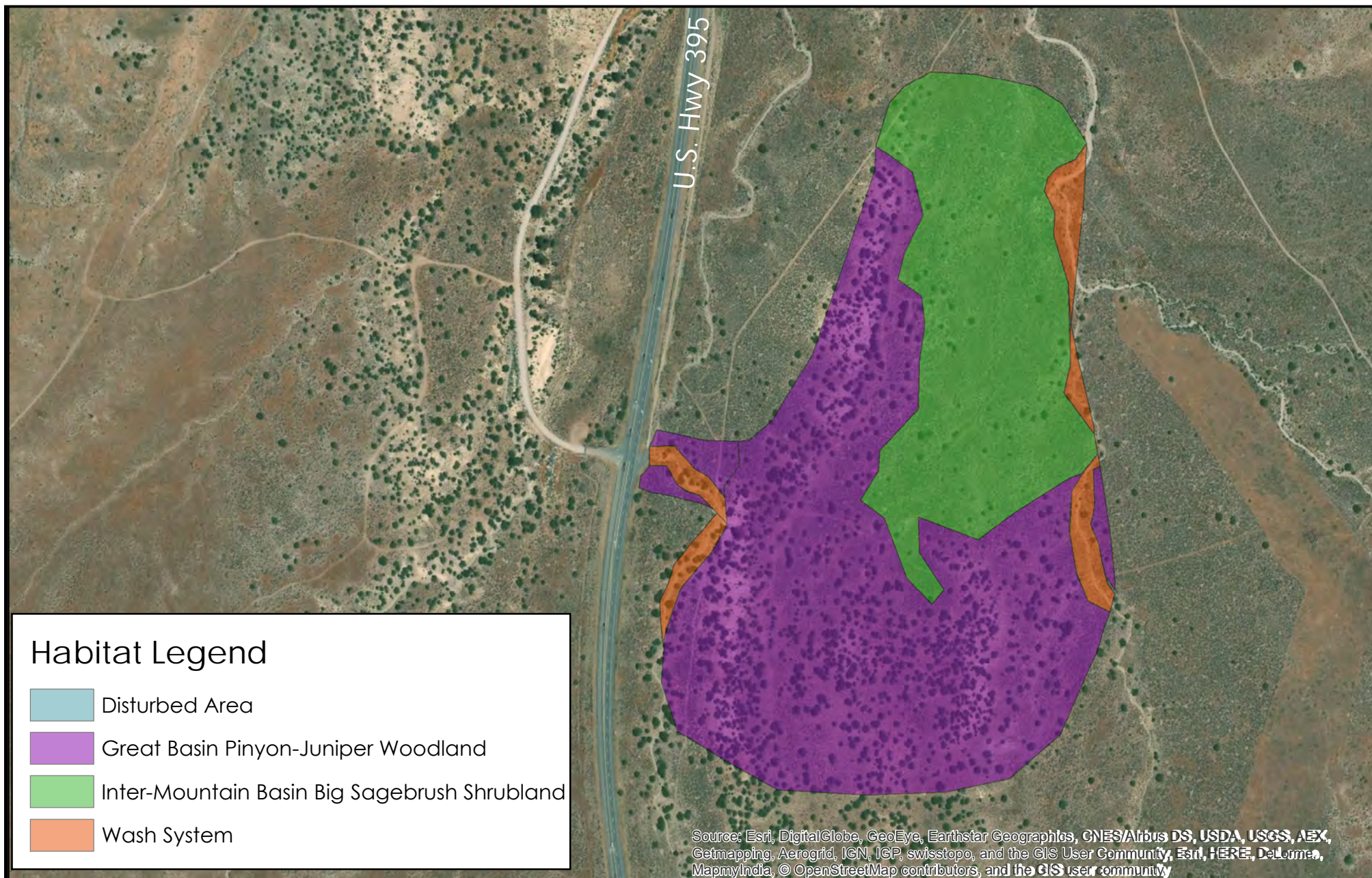
Figure 5 - Site Characterization of Existing Mine  
Geofortis Mines  
Lassen County, CA

0 100 200 400 600  
Feet

bec environmental, inc.  
Environmental Services







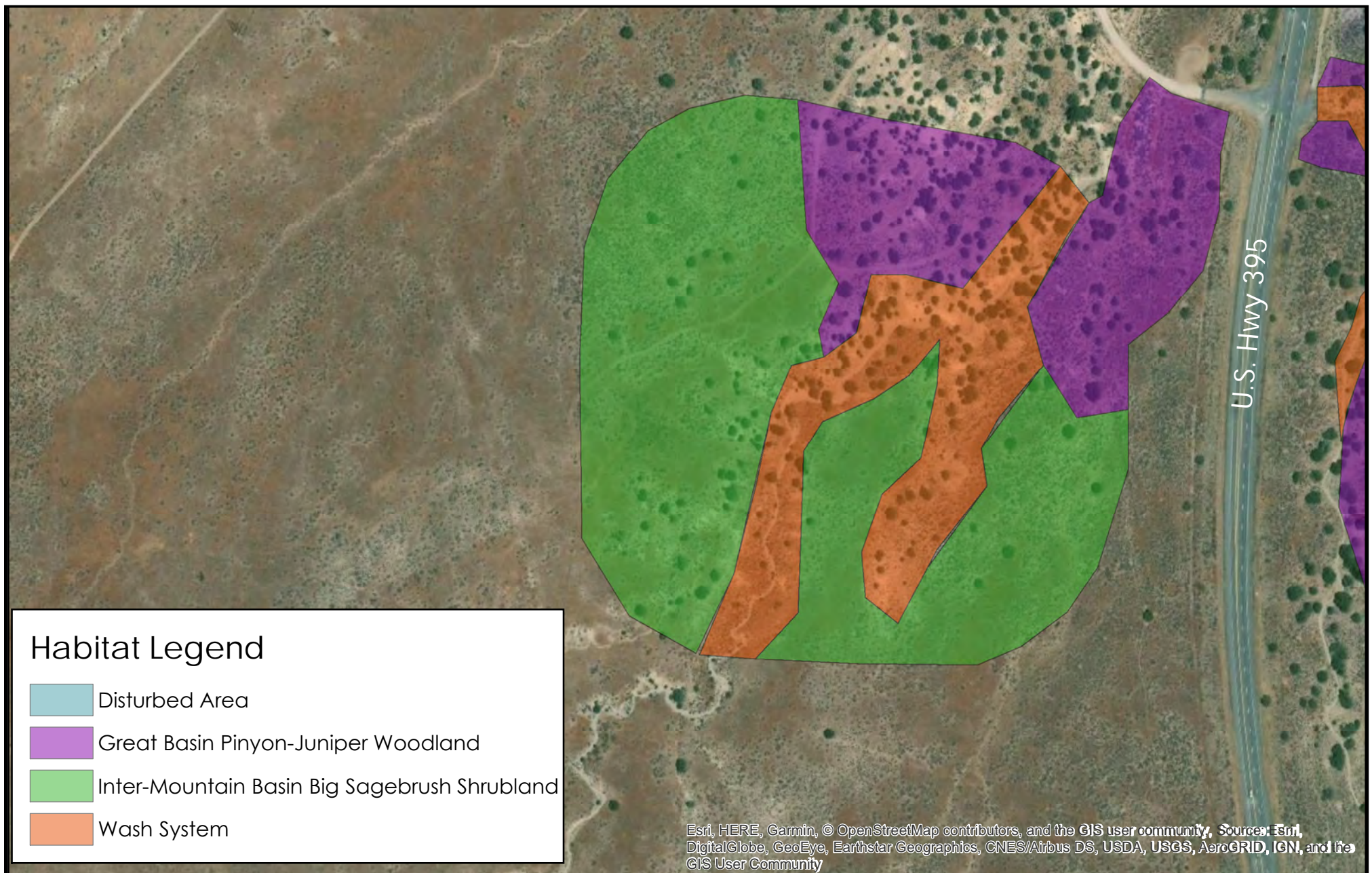
**Figure 6 - Site Characterization of  
Phase I and II  
Geofortis Mines  
Lassen County, CA**

0 262.5 525 1,050 1,575  
Feet

**bec environmental, inc.**  
Environmental Services







**Figure 7 - Site Characterization of Phase III**

Geofortis Mines  
Lassen County, CA

0 150 300 600 900  
Feet

**bec environmental, inc.**  
Environmental Services

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***APPENDIX D***  
Survey Data



**Table 1. Plant Species Observed**

\*Non-native species

**Gymnosperms**

**Cupressaceae - Cypress Family**

*Juniperus osterosperma* Utah juniper

**Pinaceae - Pine Family**

*Pinus jeffreyi* Jeffrey pine

**Angiosperms - Dicots Adoxaceae**

**Asteraceae (Compositae) - Sunflower Family**

<i>Achillea millefolium</i>	Common yarrow
<i>Ambrosia acanthicarpa</i>	Annual bur-sage
<i>Antennaria dimorpha</i>	Gray cushion pussytoes
<i>Artemisia tridentata ssp. tridentata</i>	Big sagebrush
<i>Blepharipappus scaber</i>	Rough eyelash weed
<i>Chaenactis douglasii</i>	Dusty maidens
<i>Chrysothamnus viscidiflorus</i>	Green rabbitbrush
<i>Crepis occidentalis</i>	Western hawksbeard
<i>Dieteria canescens</i>	Hoary aster
<i>Ericameria nauseosa</i>	Rubber rabbitbrush
<i>Erigeron aphanactis</i>	Rayless shaggy fleabane
<i>Erigeron pumilus var. intermedius</i>	Shaggy fleabane
<i>Eriophyllum lanatum var. integrifolium</i>	Common woolly sunflower
<i>Grindelia camporum</i>	Common gumplant
<i>Heterotheca villosa var. minor</i>	Hairy false goldenaster
<i>Iva axillaris</i>	Povertyweed
* <i>Lactuca serriola</i>	Prickly lettuce
<i>Lagophylla ramosissima</i>	Common hairleaf
<i>Pleiocanthus spinosus</i>	Thorny skeletonweed
<i>Tetradymia glabrata</i>	Little leaf horsebrush
* <i>Tragopogon dubius</i>	Yellow salsify

**Brassicaceae (Cruciferae) - Mustard Family**

<i>Boechera pinetorum</i>	Woodland rockcress
* <i>Sisymbrium altissimum</i>	Tumble mustard
<i>Streptanthus cordatus</i>	Heartleaf jewelflower

**Chenopodiaceae - Goosefoot Family**

* <i>Chenopodium album</i>	White pigweed
* <i>Salsola tragus</i>	Russian thistle

**Elaeagnaceae – Oleaster Family**

<i>Elaeagnus angustifolia</i>	Russian olive
-------------------------------	---------------

**Ephedraceae – Mormon Tea Family**

<i>Ephedra viridis</i>	Green ephedra
<b>Fabaceae (Leguminosae) - Legume Family</b>	
<i>Astragalus curvicaupus var. curivcaupus</i>	Coiled locoweed
<i>Astragalus filipes</i>	Basalt milkvetch
<i>Astragalus purshii</i>	Pursh's milkvetch
<i>Lupinus argenteus</i>	Silver lupine
* <i>Melilotus albus</i>	White sweetcover
<b>Geraniaceae - Gooseberry Family</b>	
* <i>Erodium cicutarium</i>	Red stemmed filaree
<b>Loasaceae – Loasa Family</b>	
<i>Mentzelia laevicaulis</i>	Giant blazingstar
<b>Onagraceae - Evening Primrose Family</b>	
<i>Epilobium sp.</i>	Willow-herb
<i>Gayophytum diffusum</i>	Groundsmoke
<b>Orabanchaceae – Broomrape Family</b>	
<i>Aphyllon corymbosa</i>	Flat topped broom rape
<i>Cordylanthus ramosus</i>	Bushy bird's beak
<b>Papaveraceae - Poppy Family</b>	
<i>Argemone munita</i>	Prickly poppy
<b>Paeoniaceae - Peony Family</b>	
<i>Paeonia brownii</i>	Western peony
<b>Plantaginaceae - Plantain Family</b>	
<i>Penstemon speciosus</i>	Showy penstemon
<b>Polemoniaceae - Phlox Family</b>	
<i>Eriastrum signatum</i>	Maroon-spotted Eriastrum
<b>Polygonaceae - Buckwheat Family</b>	
<i>Eriogonum caespitosum</i>	Matted wild buckwheat
<i>Eriogonum microtheca var. ambiguum</i>	Yellow flowered wild buckwheat
<i>Eriogonum ochrocephalum ochrocephalum</i>	White woolly buckwheat
<i>Eriogonum vimineum</i>	Wicker-stem buckwheat
* <i>Polygonum aviculare ssp. neglectum</i>	Prostrate knotweed
<b>Rosaceae - Rose Family</b>	
<i>Cercocarpus ledifolius</i>	Cut leaf mountain mahogany
<i>Prunus andersonii</i>	Desert peach
<i>Purshia tridentata</i>	Antelope brush
<b>Solanaceae – Nightshade Family</b>	
* <i>Solanum triflorum</i>	Cut-leaved nightshade
<b>Zygophyllaceae – Caltrop Family</b>	
* <i>Tribulus terrestris</i>	Puncturevine
<b>Angiosperms -Monocots</b>	
<b>Juncaceae - Rush Family</b>	

*Juncus balticus*

**Poaceae (Gramineae) - Grass Family**

\**Agropyron cristatum*

\**Bromus tectorum*

*Elymus cinereus*

*Elymus elymoides*

\**Elymus repens*

*Festuca idahoensis*

*Poa secunda*

*Stipa comata*

*Stipa hymenoides*

*Stipa thurberiana*

Baltic rush

Crested wheatgrass

Cheat grass

Great Basin wild rye

Squirreltail

Quackgrass

Idaho fescue

Secund bluegrass

Needle-and-thread grass

Indian rice grass

Thurber's needlegrass



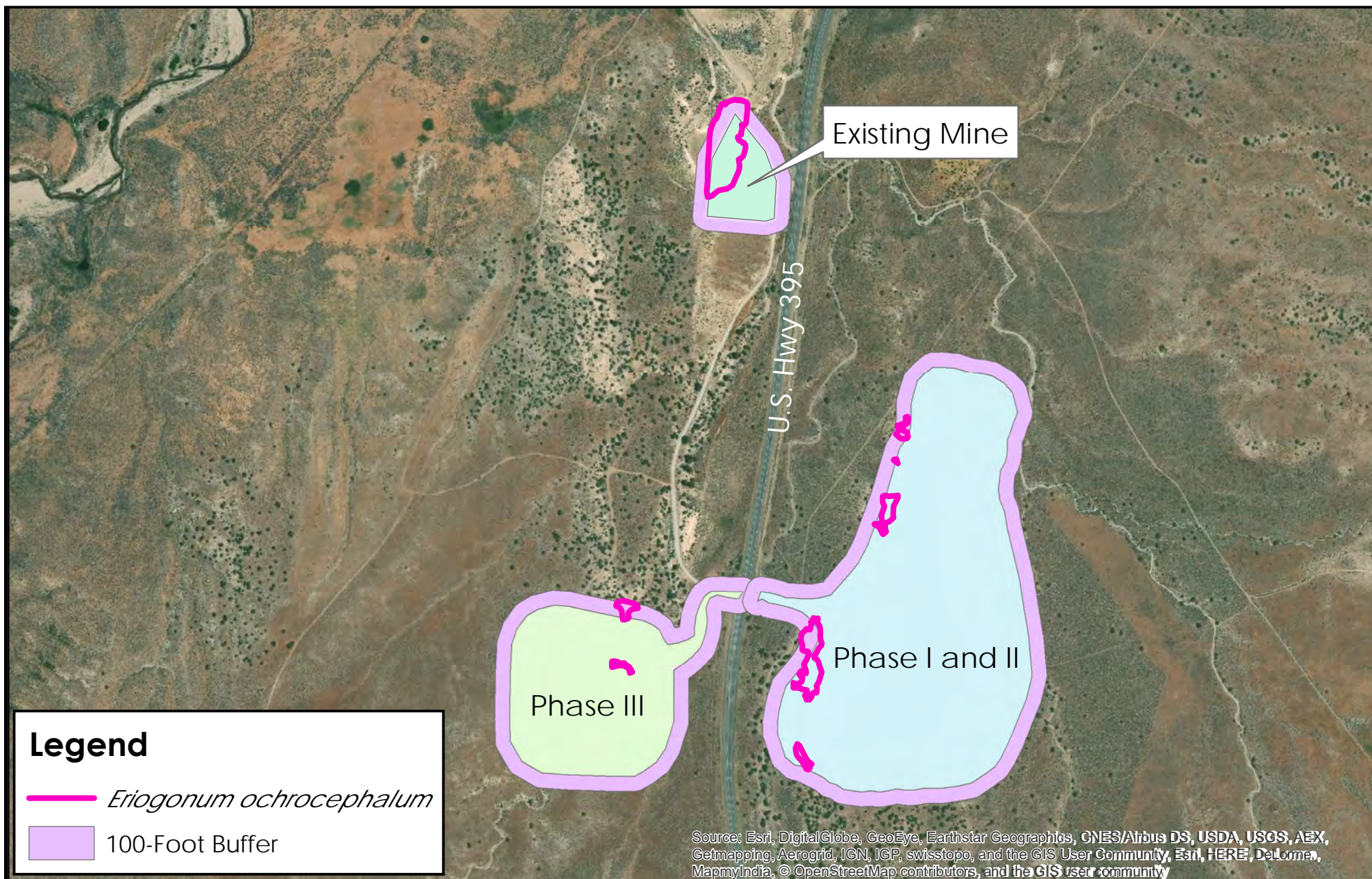


Figure 8 - Locations of  
*Eriogonum ochrocephalum* Populations  
 Geofortis Mines  
 Lassen County, CA

0 500 1,000 2,000 3,000  
 Feet

bec environmental, inc.  
 Environmental Services





**Photo 1**



Phase I/II population of *Eriogonum ochrocephalum* var. *ochrocephalum*.

**Photo 2**



Phase I/II population of *Eriogonum ochrocephalum* var. *ochrocephalum*.

**Photo 3**



Existing Mine Site population of *Eriogonum ochrocephalum* var. *ochrocephalum*.

**Photo 4**



Typical clump of *Eriogonum ochrocephalum* var. *ochrocephalum*.

**Photo 5**



Typical flower head of *Eriogonum ochrocephalum* var. *ochrocephalum*.

**Photo 6**



Typical flowering clump of *Eriogonum ochrocephalum* var. *ochrocephalum*.



**Photo 7**



Male unidentified nighthawk seen within Phase I/II.

**Photo 8**



Fledgling unidentified nighthawk seen within Phase I/II.

**Photo 9**



Common garter snake seen within Phase III.

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**Table 2. Bird Species Observed**

**Phase I and II**

Black-throated Sparrow  
Blue-grey Gnatcatcher  
Brown-headed Cowbird  
Calliope's Hummingbird  
Chipping Sparrow  
Dark-eyed Junco  
Eurasian Collared Dove  
House Finch  
Lesser Goldenfinch  
Unidentified Nighthawk  
Mountain Chickadee  
Red-tail Hawk

**Phase III**

Brown-headed Cowbird  
Dark-eyed Junco  
Eurasian Collared Dove  
House Finch

**Existing Mine Site**

Black-throated Sparrow  
Blue-grey Gnatcatcher  
Chipping Sparrow  
Dark-eyed Junco  
House Finch  
Mountain Chickadee  
Prairie Falcon



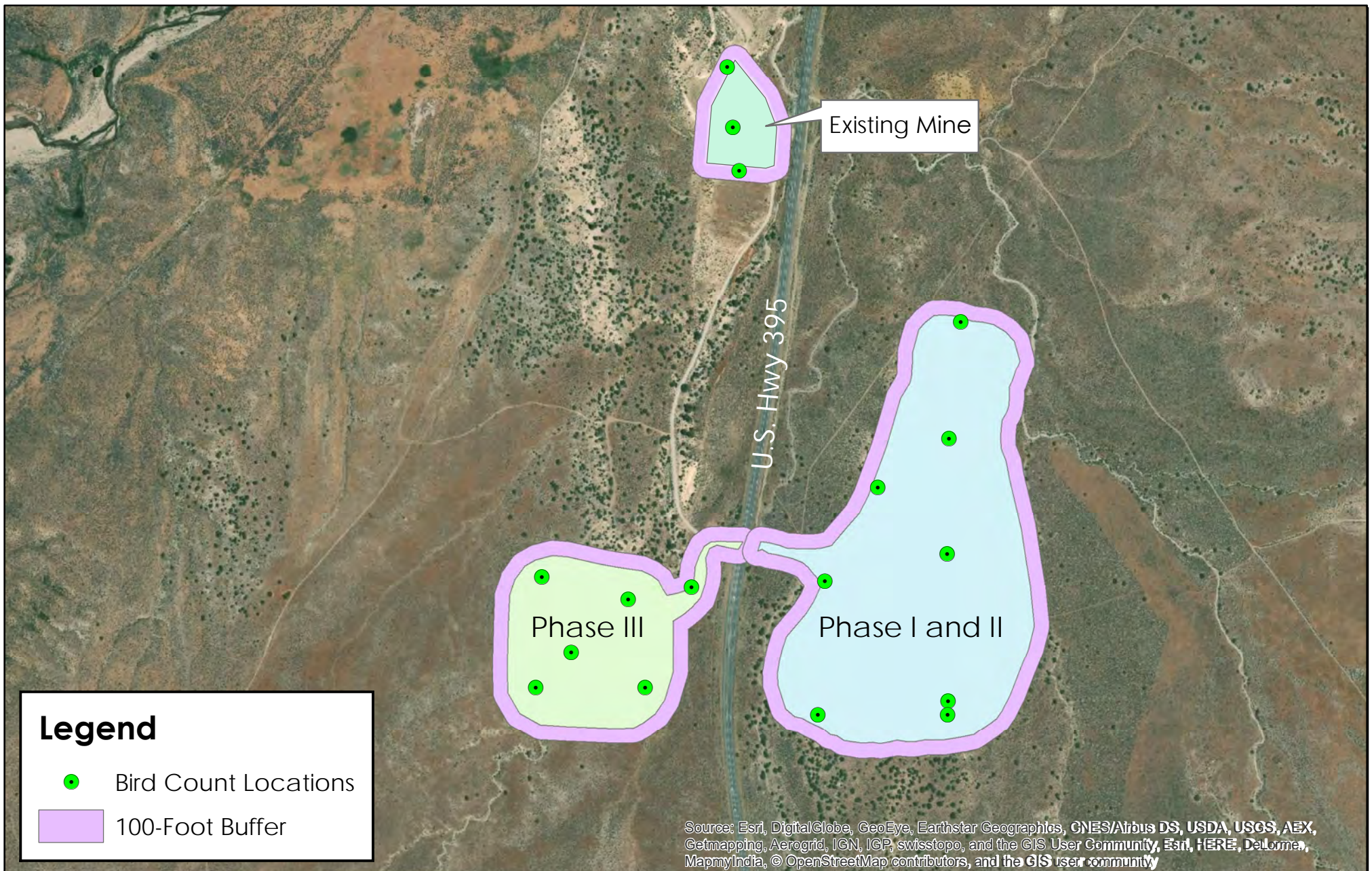


Figure 9 - Locations of Bird  
Count Point Surveys  
Geofortis Mines  
Lassen County, CA

0 500 1,000 2,000 3,000  
Feet

bec environmental, inc.  
Environmental Services





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## ***APPENDIX E***

### Resumes

**JEANNETTE HALDERMAN**  
**BOTANIST/PLANT ECOLOGIST**  
PO BOX 1744, TRUCKEE, CA 96160  
530-412-1062  
JTAYSMILING@YAHOO.COM

## **CREDENTIALS**

- M.A., Biology, emphasis on Plant Ecology/Plant Physiology, University of California, Fullerton
- B.A., Biology, emphasis on Botany, University of California, Fullerton
- Certified Verifier for Nevada Conservation Credit System to evaluate greater sage-grouse habitat

## **EXPERTISE**

- Over 27 years of experience performing botanical surveys and assessments (20 years in Truckee/Nevada).
- Over 27 years of experience designing, overseeing implementation, and monitoring maintenance and success of native habitat restoration projects.
- Preparation of documents in compliance with the NEPA, CEQA, the Endangered Species Act, the Clean Water Act, and the California Endangered Species Act.

## **KEY REPRESENTATIVE RELEVANT PROJECTS**

**Client:** Phoenix Biological Consulting (2018)

**Project:** Gemini Proposed Solar Plant on BLM Land (North Las Vegas, NV)

**Role:** Botanist

Conducted botanical survey with a team of botanists of proposed 8,700-acre project area in East Mojave), as per BLM approved protocol (complete survey via 10 and 15 meter -paced transects). Identified all species to genus as possible, and identified, documented and mapped (using Trimble) several sensitive plant species. Conducted pre-survey viewing of known populations of two sensitive species that we were surveying. Updated plant species list on a regular basis.

**Client:** State of Nevada, NDEP (2016)

**Project:** Northern Nevada Wetland Assessment (Various locations, NV)

**Role:** Lead Botanist (State of Nevada, NDEP)

Served as the lead wetland botanist of the EPA funded wetland assessment team, to assess the condition and health of pre-determined wetland locations throughout Northern Nevada. Surveys were conducted during the summer of 2016 in Elko, Yerington, Battle Mountain, Mount Rose, and Carson. Ms. Halderman and her assistant collected botanical cover and density data; collected, identified and mounted plant specimens for submission to the EPA appointed botanical team.

**Client:** Knight & Leavitt Associates, Inc. (2016)

**Project:** Yomba Shoshone Water Improvement Project (Reese Valley, Nye County, NV)

**Role:** Botanist (Subconsultant to Knight & Leavitt Associates, Inc.)

Conducted botanical survey of proposed 36-acre project area. Identified all species to genus as possible, and identified likelihood of potentially-occurring special-status plant species. Prepared and submitted botanical report for environmental assessment reporting.

**Client:** Enviroscientists, Inc. (2016)

**Project:** Calportland Cement Botanical Survey (Mojave, CA)

**Role:** Botanist (Subconsultant to Enviroscientists, Inc.)

Conducted botanical survey of project area with botanical team. Provided summary of all plant species identified, including special-status species numbers and locations using GPS (Garmin).

**Client:** Soda Mountain Solar (2012)

**Project:** Soda Mountain Solar Botanical and Weed Survey (San Bernardino County, CA).

**Role:** Botanist (CS Ecological Surveys and Assessments)

Conducted protocol-level floristic surveys with botanical crew. Mapped rare plant occurrences.

**JEANNETTE HALDERMAN**  
**BOTANIST/PLANT ECOLOGIST**  
PO BOX 1744, TRUCKEE, CA 96160  
530-412-1062  
JTAYSMILING@YAHOO.COM

**Client:** Terra-Gen (2010 and 2011)

**Project:** Alta Wind Infill II Wind Energy Project (Kern County, CA)

**Role:** Botanist (Garcia and Associates, Inc.)

Conducted protocol-level floristic surveys in Mojave Desert scrub habitats with botanical crew. Identified and mapped all *Opuntia basilaris* plants qualifying as Bakersfield cactus under guidance criteria supplied by CDFW. Mapped rare plants and invasive weed occurrences using field-collected GPS data.

**Client:** Southern California Edison (2011)

**Project:** Devers Substation (San Bernardino, CA)

**Role:** Botanist (Garcia and Associates, Inc.)

Conducted protocol-level floristic surveys with botanical crew. Mapped rare plant occurrences using field-collected GPS data.

**Client:** Metropolitan Water District (1992 and 1993)

**Project:** Inland Feeder Water Pipeline Project (San Bernardino and Riverside Counties, CA)

**Role:** Botanist (P&D Technologies)

Conducted protocol-level floristic surveys with botanical crew. Mapped rare plant occurrences. Prepared botanical existing conditions, impacts and mitigation sections of the environmental document.

**Client:** Southern California Gas Pipeline (1993)

**Project:** Southern California Gas Pipeline

**Role:** Botanist (P&D Technologies)

Conducted protocol-level floristic surveys with botanical crew. Mapped rare plant occurrences. Prepared botanical existing conditions, impacts and mitigation sections of the environmental document.

**Additional Relevant Botanical Surveys:**

- Morgan Hills Wind Project, Mojave Desert (Kern County) (2011)
- North Sky River Wind Energy Project, Tehachapi Mountains (Kern County) (2010)
- Tejon Ranch (Kern County, 1998)
- San Geronio Pass Water Agency Water Project, Riverside County (1993)
- Eastern Transportation Corridor, Orange and Riverside Counties (1993)

**Additional Relevant Projects (Habitat Restoration):**

- City of Palmdale – riparian/wetland habitats
- George Air Force Base Landfill Revegetation (Desert tortoise habitat)
- Rancho California Water District – Several riparian, alluvial, and upland habitats
- City of Murrieta – Nutmeg Street Expansion Riparian Revegetation project

**REFERENCES**

Ryan Young, Phoenix Biological Consulting, 949.887.0859

Catherine Schnurrenberger, C.S. Ecological Surveys & Assessments: 530.448.6848

Jeff Glazner, Salix Consulting, Inc.: 530.906.7195

Kris Kuyper, Enviroscentists, Inc.: 775.926.8822

**Robin Schofield**

*Profile:*

Robin has over 5 years' experience in the environmental sciences. She has assisted Nellis Air Force Base (AFB) in natural resources management of the 2.9 million-acre Nevada Test and Training Range (NTTR). She was involved with all aspects of natural resources management, but a majority of her time was spent supporting the rare plant and vegetation mapping program. She has excellent experience in identification and keying of flowering plants and conducted vegetation surveys under the direction of a PhD botanist for two years and is now able to identify plants for documentation purposes. Robin has conducted vegetation surveys to characterize vegetation at over 2000 ground truth points in locations ranging from desert basins and playas to pinyon-juniper mountain plant communities. The majority of these surveys were done in the Great Basin habitat. She played a major role in the preparation of plant community maps and reports for the Nevada Test and Training Range in southern Nevada. She was involved in numerous other programs including the large mammal and wild horse programs, the seeps and spring projects. She has also become very experienced in working with geographical information systems (GIS) on multiple projects. She has assisted in modeling vegetation communities with the use of GIS. She also played a major role in developing a GIS database for natural resources management at Nellis AFB and the NTTR. She was continually using GIS to prepare maps for use during biological surveys.

*Professional Experience:*

- **Legislative Environmental Impact Statement, Nellis Air Force Base, Nevada Test and Training Range. (2015 – 2018)** Ms. Schofield was a field and office manager for the current Leis for NTTR. This includes conducting surveys, entering data, analyzing data, and writing reports.
  - **Great Basin Bird Observatory (GBBO) Surveys**
  - **Nevada Bird Count/ Migratory Bird Surveys**
  - **Vegetation Survey and Mapping**
  - **Rare Plant Surveys**
  - **Desert Tortoise Presence/Absence Surveys**
- **Desert Tortoise Monitoring AHTNA, Nellis Air Force Base Landfill, Nevada. (March 2018)** Ms. Schofield conducted desert tortoise monitoring for AHTNA Environmental Inc construction around the Nellis AFB closed landfill. The drainage and fence-line were repaired, and no tortoises were seen during this project.
- **Vegetation Survey and Mapping, Nellis Air Force Base and Army Corps of Engineers, Nevada. (2013 – 2017).** Conducted plant surveys on the Nevada Test and Training Range as the primary and assistant biologist. Ms. Schofield has entered and analyzed data using ArcMap GIS, wrote summaries and edited/proofread reports.
- **Rare Plant Survey, Nellis Air Force Base and Army Corps of Engineers. (2013 – 2017)** Ms. Schofield analyzed the data that was collected from fieldwork using ArcMap GIS and wrote summaries for each site visited.
  - The following is a list of rare plants Ms. Schofield targeted during her rare plants surveys: *Abronia nana covielli*, *Agave utahensis eborispina*, *Aliciella heterostyla*, *Aliciella nyensis*, *Aliciella ripleyi*, *Arabis dispar*, *Arabis shockleyi*, *Arctomecon californica*, *Arctomecon merriamii*, *Eremogone stenomeres*, *Asclepias eastwoodiana*, *Astragalus ackermanii*, *Astragalus aequalis*, *Astragalus amphioxys musimonum*, *Astragalus beatleyae*, *Astragalus funereus*, *Astragalus geyeri triquestrous*, *Astragalus gilmanii*, *Astragalus inyoensis*,



*Astragalus mohavensis hemigyris, Astragalus nyensis, Astragalus oophorus clokeyanus, Astragalus remotus, Calochortus striatus, Camissonia megalantha, Castilleja martinii clokeyi, Chrysothamnus eremobius, Cryptantha tumulosa, Cyliodropuntia xmultigeniculata, Cymopterus ripleyi ripleyi, Cymopterus ripleyi saniculoides, Echinocereus engelmannii armatus, Ericameria cervina, Ericameria compacta, Ericameria watsonii, Erigeron clokeyi clokeyi, Erigeron ovinus, Eriogonum concinnum, Eriogonum corymbosum nilsii, Eriogonum dorrovii, Eriogonum heermannii clokeyi, Eriogonum mensicola, Coryphatha vivipara rosea, Fraxera albicaulis, Glossopetalon clokeyi, Glossopetalon pungens, Glossopetalon spinescens aridum, Mentzelia leucophylla, Mirabilis pudica, Penstemon albomarginatus, Penstemon arenarius, Penstemon bicolor bicolor, Penstemon bicolor roseus, Penstemon pahutensis, Penstemon pudicus, Penstemon thompsoniae jaegeri, Phacelia filiae, Phacelia mustelina, Phacelia parishii, Porophyllum pygmaeum, Salvia dorrii clokeyi, Sclerocactus nyensis, Sclerocactus polyancistrus, Sclerocactus blainei, Townsendia jonesii tumulosa.*

- **Unique Habitat Program, Nellis AFB, Creech AFB, and Nevada Test and Training Range, Nevada (2013 – 2017)** Collected and analyzed data for this project, along with editing the final report. This project continues to list different species of plants to their specific habitats and listing the importance of that habitat to the different species that utilize it.
- **Large and Small Mammal Surveys, Nellis Air Force Base, Creech Air Force Base, Nevada Test and Training Range, Nevada (2013 – 2017)** Ms. Schofield analyzed the data that was collected from fieldwork using ArcMap GIS. Using ArcMap GIS, she is able to obtain correct numbers for all species included in this project to put into the final report. She has edited past large mammal survey reports and has made it simpler to look through old data and continue to build upon that with each new year. The species that are surveyed for include pronghorn antelope, desert big horn sheep, wild horses and various small mammals potentially occurring in the Great Basin and Mojave Deserts. Ms. Schofield has been involved with conducting wild horse utilization surveys. She has been the primary when analyzing the wild horse data.
- **Migratory/Neo-tropical Birds and Raptor Surveys and Evaluation, Nevada Test and Training Range, Nevada (2013 – 2017)** Ms. Schofield has participated in raptor surveys and night prey drives. Raptor surveys include driving powerline roads and using binoculars to sight and identify birds in flight. Night prey drives are conducted with a flood lamp and prey, such as Jack rabbits and Cottontails are counted and averaged. Possible birds that are surveyed during the Raptor Surveys include red-tailed hawks, rough-legged hawks, golden eagles, prairie falcons, peregrine falcons, great horned owls, Swainson's hawks, and ferruginous hawks.
  - The following is a list of special bird and raptor species Ms. Schofield targeted during her surveys: Phainopepla, Bald and Golden Eagles, Vermilion flycatcher, Western burrowing owls, Loggerhead shrikes, Le Conte's thrasher, Western bluebird, Bendire's thrasher, Crissal thrasher, Gray vireo, Northern goshawk, Ferruginous hawk, Canyon Wren, Cactus Wren, Scott's oriole, Peregrine falcon, Prairie falcon, Common nighthawk, Pinyon jay, Sage Sparrow.
- **Christmas Bird Count Surveys, Nevada Test and Training Range, Nevada (2013-2017)** Ms. Schofield conducted Christmas bird count surveys. She became very familiar with winter breeding and migratory bird species. Surveys were completed in all types of weather; snow, rain and clouds.
- **Invasive Plant Infestation Survey and Eradication, Nellis Air Force Base, Creech Air Force Base and Nevada Test and Training Range (2013 – 2017)** Ms. Schofield has accompanied the lead biologists on invasive vegetation surveys of Tamarisk at Nellis AFB, Creech AFB and Nevada Test and Training Range in compliance with the Integrated Natural Resources Plan, Federal Noxious Weed Act, and Executive Order 13112.

- **Urban Forest Management, Nellis Air Force Base, Nevada and Army Corps of Engineers (2013)** Ms. Schofield collected and analyzed data for this project. Most of the analyzing had to be done using ArcMap GIS. She also requested the assistance of an arborist with identifying some species of trees. After this, she made a reference guide for most of the trees that have been encountered so far in this project. She wrote, reviewed, and edited the final report for this project.
- **Candidate Species Survey, Monitor Distribution/Unique Habitat, Nellis Air Force Base, Creech Air Force Base, and Nevada Test and Training Range. (2013)** Ms. Schofield has edited the final report for this project. This project conducts ongoing research of wildlife and plant inventories to determine the presence/absence and potential habitat for candidate species on the Nevada Test and Training Range. The project involves compiling information on habitats and species of concern that exist on NAFB and NTTR.
- **Desert Tortoise Management Plan Report, Nellis Air Force Base, Creech Air Force Base, Nevada Test and Training Range, Nevada (2013– 2017)** Ms. Schofield has assisted in editing the final report. This report is a living document and must be edited and updated constantly. It states how Desert Tortoises and their habitats should be taken care of, what to do if you come across one and more with in the Nellis or Creech Air Force Base and the Nevada Test and Training Range.
- **Integrated Natural Resources Management Plan, Nellis Air Force Base. (2013 – 2014)** Revised sections of the NAFB Integrated Natural Resource Management Plan based on comments from the U.S. Fish and Wildlife Service (USFWS), Department of Energy (DOE), Bureau of Land Management (BLM), Nevada Division of Wildlife (NDOW) and Nellis Air Force Base Environmental Management. This plan is used as guidance in conjunction with federal, state and local laws for the management of natural resources on Nellis AFB and Nevada Test and Training Range, equaling 2.9 million acres.
- **Desert Tortoise Surveys and Habitat Management, Nellis Air Force Base, Creech Air Force Base, Nevada Test and Training Range, Nevada (2015 – 2017)** Ms. Schofield assisted a qualified Desert Tortoise biologist in township presence/absence surveys. She has successfully completed 20 township squares to date with live Desert Tortoise sightings at 4 specimens. Ms. Schofield has also assisted in data management and map making using ArcMap GIS. Ms. Schofield has also assisted as a desert tortoise monitor on a construction project. The construction project was to repair a tortoise fence on Nellis Air Force Base.
- **Bird Surveys and Night Prey Surveys, North Las Vegas Airport, Nevada (2015 – 2016)** Ms. Schofield assisted AM and PM bird surveys according to the FAA compliances. These surveys are to determine what type of birds are present on the airport and which ones would be a BASH (Bird/Wildlife Aircraft Strike Hazard) issue. Along with the monthly bird surveys, monthly night surveys must also be completed to determine what type of night prey and/or predators are on the airport. Ms. Schofield was primary biologist for many of the bird and night surveys.

*Education:*

Bachelor of Biological Sciences, University of Nevada, Las Vegas, May 2013  
Great Basin College, Pahrump, Nevada, 2015 – Range and Vegetation Classes

*Training:*

Desert Tortoise and Field Technique Training – Ridgecrest, CA by Desert Tortoise Council, November 2016  
First Aid/CPR/AED

## *APPENDIX F*

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# Agency Responses and Data Sources



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Reno Fish And Wildlife Office  
1340 Financial Boulevard, Suite 234  
Reno, NV 89502-7147  
Phone: (775) 861-6300 Fax: (775) 861-6301  
<http://www.fws.gov/nevada/>



In Reply Refer To:

May 29, 2018

Consultation Code: 08ENVD00-2018-SLI-0533

Event Code: 08ENVD00-2018-E-01274

Project Name: GeoFortis Mines

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

#### To Whom It May Concern:

The attached species list indicates threatened, endangered, proposed, and candidate species and designated or proposed critical habitat that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act of 1973, as amended (ESA, 16 U.S.C. 1531 *et seq.*), for projects that are authorized, funded, or carried out by a Federal agency. Candidate species have no protection under the ESA but are included for consideration because they could be listed prior to the completion of your project. Consideration of these species during project planning may assist species conservation efforts and may prevent the need for future listing actions. For additional information regarding species that may be found in the proposed project area, visit <http://www.fws.gov/nevada/es/ipac.html>.

The purpose of the ESA is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the ESA and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or



designated or proposed critical habitat. Guidelines for preparing a Biological Assessment can be found at: [http://www.fws.gov/midwest/endangered/section7/ba\\_guide.html](http://www.fws.gov/midwest/endangered/section7/ba_guide.html).

If a Federal action agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this species list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally listed, proposed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally, as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation, for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the attached list.

The Nevada Fish and Wildlife Office (NFWO) no longer provides species of concern lists. Most of these species for which we have concern are also on the Animal and Plant At-Risk Tracking List for Nevada (At-Risk list) maintained by the State of Nevada's Natural Heritage Program (Heritage). Instead of maintaining our own list, we adopted Heritage's At-Risk list and are partnering with them to provide distribution data and information on the conservation needs for at-risk species to agencies or project proponents. The mission of Heritage is to continually evaluate the conservation priorities of native plants, animals, and their habitats, particularly those most vulnerable to extinction or in serious decline. In addition, in order to avoid future conflicts, we ask that you consider these at-risk species early in your project planning and explore management alternatives that provide for their long-term conservation.

For a list of at-risk species by county, visit Heritage's website (<http://heritage.nv.gov>). For a specific list of at-risk species that may occur in the project area, you can obtain a data request form from the website ([http://heritage.nv.gov/get\\_data](http://heritage.nv.gov/get_data)) or by contacting the Administrator of Heritage at 901 South Stewart Street, Suite 5002, Carson City, Nevada 89701-5245, (775) 684-2900. Please indicate on the form that your request is being obtained as part of your coordination with the Service under the ESA. During your project analysis, if you obtain new information or data for any Nevada sensitive species, we request that you provide the information to Heritage at the above address.

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Furthermore, certain species of fish and wildlife are classified as protected by the State of Nevada (<http://www.leg.state.nv.us/NAC/NAC-503.html>). You must first obtain the appropriate license, permit, or written authorization from the Nevada Department of Wildlife (NDOW) to take, or possess any parts of protected fish and wildlife species. Please visit <http://www.ndow.org> or contact NDOW in northern Nevada (775) 688-1500, in southern Nevada (702) 486-5127, or in eastern Nevada (775) 777-2300.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the Service's wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

The Service's Pacific Southwest Region developed the *Interim Guidelines for the Development of a Project Specific Avian and Bat Protection Plan for Wind Energy Facilities* (Interim Guidelines). This document provides energy facility developers with a tool for assessing the risk of potential impacts to wildlife resources and delineates how best to design and operate a bird- and bat-friendly wind facility. These Interim Guidelines are available upon request from the NFWO. The intent of a Bird and Bat Conservation Strategy is to conserve wildlife resources while supporting project developers through: (1) establishing project development in an adaptive management framework; (2) identifying proper siting and project design strategies; (3) designing and implementing pre-construction surveys; (4) implementing appropriate conservation measures for each development phase; (5) designing and implementing appropriate post-construction monitoring strategies; (6) using post-construction studies to better understand the dynamics of mortality reduction (*e.g.*, changes in blade cut-in speed, assessments of blade "feathering" success, and studies on the effects of visual and acoustic deterrents) including efforts tied into Before-After/Control-Impact analysis; and (7) conducting a thorough risk assessment and validation leading to adjustments in management and mitigation actions.

The template and recommendations set forth in the Interim Guidelines were based upon the Avian Powerline Interaction Committee's Avian Protection Plan template (<http://www.aplic.org/>) developed for electric utilities and modified accordingly to address the unique concerns of wind energy facilities. These recommendations are also consistent with the Service's wind energy guidelines. We recommend contacting us as early as possible in the planning process to discuss the need and process for developing a site-specific Bird and Bat Conservation Strategy.

The Service has also developed guidance regarding wind power development in relation to prairie grouse leks (sage-grouse are included in this). This document can be found at: [http://www.fws.gov/southwest/es/Oklahoma/documents/te\\_species/wind%20power/prairie%20grouse%20lek%205%20mile%20public.pdf](http://www.fws.gov/southwest/es/Oklahoma/documents/te_species/wind%20power/prairie%20grouse%20lek%205%20mile%20public.pdf).

Migratory Birds are a Service Trust Resource. Based on the Service's conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act of 1918, as amended (MBTA; 16 U.S.C. 703 *et seq.*), we recommend that any land clearing or other surface disturbance associated with proposed actions within the project area be timed to

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avoid potential destruction of bird nests or young, or birds that breed in the area. Such destruction may be in violation of the MBTA. Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed. Therefore, we recommend land clearing be conducted outside the avian breeding season. If this is not feasible, we recommend a qualified biologist survey the area prior to land clearing. If nests are located, or if other evidence of nesting (*i.e.*, mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.

Guidance for minimizing impacts to migratory birds for projects involving communications towers (*e.g.*, cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

If wetlands, springs, or streams are known to occur in the project area or are present in the vicinity of the project area, we ask that you be aware of potential impacts project activities may have on these habitats. Discharge of fill material into wetlands or waters of the United States is regulated by the U.S. Army Corps of Engineers (ACOE) pursuant to section 404 of the Clean Water Act of 1972, as amended. We recommend you contact the ACOE's Regulatory Section regarding the possible need for a permit. For projects located in northern Nevada (Carson City, Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, and Washoe Counties) contact the Reno Regulatory Office at 300 Booth Street, Room 3060, Reno, Nevada 89509, (775) 784-5304; in southern Nevada (Clark, Lincoln, Nye, and White Pine Counties) contact the St. George Regulatory Office at 321 North Mall Drive, Suite L-101, St. George, Utah 84790-7314, (435) 986-3979; or in California along the eastern Sierra contact the Sacramento Regulatory Office at 650 Capitol Mall, Suite 5-200, Sacramento, California 95814, (916) 557-5250.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

The table below outlines lead FWS field offices by county and land ownership/project type. Please refer to this table when you are ready to coordinate (including requests for section 7 consultation) with the field office corresponding to your project, and send any documentation regarding your project to that corresponding office. Therefore, the lead FWS field office may not be the office listed above in the letterhead.

#### **Lead FWS offices by County and Ownership/Program**

<b>County</b>	<b>Ownership/Program</b>	<b>Species</b>	<b>Office Lead*</b>
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<b>Alameda</b>	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
<b>Alameda</b>	All ownerships but tidal/estuarine	All	SFWO
<b>Alpine</b>	Humboldt Toiyabe National Forest	All	RFWO
<b>Alpine</b>	Lake Tahoe Basin Management Unit	All	RFWO
<b>Alpine</b>	Stanislaus National Forest	All	SFWO
<b>Alpine</b>	El Dorado National Forest	All	SFWO
<b>Colusa</b>	Mendocino National Forest	All	AFWO
<b>Colusa</b>	Other	All	By jurisdiction (see map)
<b>Contra Costa</b>	Legal Delta (Excluding ECCHCP)	All	BDFWO
<b>Contra Costa</b>	Antioch Dunes NWR	All	BDFWO
<b>Contra Costa</b>	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
<b>Contra Costa</b>	All ownerships but tidal/estuarine	All	SFWO
<b>Del Norte</b>	All	All	AFWO
<b>El Dorado</b>	El Dorado National Forest	All	SFWO
<b>El Dorado</b>	LakeTahoe Basin Management Unit		RFWO
<b>Glenn</b>	Mendocino National Forest	All	AFWO
<b>Glenn</b>	Other	All	By jurisdiction (see map)
<b>Humboldt</b>	All except Shasta Trinity National Forest	All	AFWO

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<b>Humboldt</b>	Shasta Trinity National Forest	All	YFWO
<b>Lake</b>	Mendocino National Forest	All	AFWO
<b>Lake</b>	Other	All	By jurisdiction (see map)
<b>Lassen</b>	Modoc National Forest	All	KFWO
<b>Lassen</b>	Lassen National Forest	All	SFWO
<b>Lassen</b>	Toiyabe National Forest	All	RFWO
<b>Lassen</b>	BLM Surprise and Eagle Lake Resource Areas	All	RFWO
<b>Lassen</b>	BLM Alturas Resource Area	All	KFWO
<b>Lassen</b>	Lassen Volcanic National Park	All (includes Eagle Lake trout on all ownerships)	SFWO
<b>Lassen</b>	All other ownerships	All	By jurisdiction (see map)
<b>Marin</b>	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
<b>Marin</b>	All ownerships but tidal/estuarine	All	SFWO
<b>Mendocino</b>	Russian River watershed	All	SFWO
<b>Mendocino</b>	All except Russian River watershed	All	AFWO
<b>Modoc</b>	Modoc National Forest	All	KFWO
<b>Modoc</b>	BLM Alturas Resource Area	All	KFWO
<b>Modoc</b>	Klamath Basin National Wildlife Refuge Complex	All	KFWO
<b>Modoc</b>	BLM Surprise and Eagle Lake Resource Areas	All	RFWO

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<b>Modoc</b>	All other ownerships	All	By jurisdiction (See map)
<b>Mono</b>	Inyo National Forest	All	RFWO
<b>Mono</b>	Humboldt Toiyabe National Forest	All	RFWO
<b>Napa</b>	All ownerships but tidal/estuarine	All	SFWO
<b>Napa</b>	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
<b>Nevada</b>	Humboldt Toiyabe National Forest	All	RFWO
<b>Nevada</b>	All other ownerships	All	By jurisdiction (See map)
<b>Placer</b>	Lake Tahoe Basin Management Unit	All	RFWO
<b>Placer</b>	All other ownerships	All	SFWO
<b>Sacramento</b>	Legal Delta	Delta Smelt	BDFWO
<b>Sacramento</b>	Other	All	By jurisdiction (see map)
<b>San Francisco</b>	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
<b>San Francisco</b>	All ownerships but tidal/estuarine	All	SFWO
<b>San Mateo</b>	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
<b>San Mateo</b>	All ownerships but tidal/estuarine	All	SFWO
<b>San Joaquin</b>	Legal Delta excluding San Joaquin HCP	All	BDFWO

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<b>San Joaquin</b>	Other	All	SFWO
<b>Santa Clara</b>	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
<b>Santa Clara</b>	All ownerships but tidal/estuarine	All	SFWO
<b>Shasta</b>	Shasta Trinity National Forest except Hat Creek Ranger District (administered by Lassen National Forest)	All	YFWO
<b>Shasta</b>	Hat Creek Ranger District	All	SFWO
<b>Shasta</b>	Bureau of Reclamation (Central Valley Project)	All	BDFWO
<b>Shasta</b>	Whiskeytown National Recreation Area	All	YFWO
<b>Shasta</b>	BLM Alturas Resource Area	All	KFWO
<b>Shasta</b>	Caltrans	By jurisdiction	SFWO/AFWO
<b>Shasta</b>	Ahjumawi Lava Springs State Park	Shasta crayfish	SFWO
<b>Shasta</b>	All other ownerships	All	By jurisdiction (see map)
<b>Shasta</b>	Natural Resource Damage Assessment, all lands	All	SFWO/BDFWO
<b>Sierra</b>	Humboldt Toiyabe National Forest	All	RFWO
<b>Sierra</b>	All other ownerships	All	SFWO
<b>Siskiyou</b>	Klamath National Forest (except Ukonom District)	All	YFWO
<b>Siskiyou</b>	Six Rivers National Forest and Ukonom District	All	AFWO
<b>Siskiyou</b>	Shasta Trinity National Forest	All	YFWO

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<b>Siskiyou</b>	Lassen National Forest	All	SFWO
<b>Siskiyou</b>	Modoc National Forest	All	KFWO
<b>Siskiyou</b>	Lava Beds National Volcanic Monument	All	KFWO
<b>Siskiyou</b>	BLM Alturas Resource Area	All	KFWO
<b>Siskiyou</b>	Klamath Basin National Wildlife Refuge Complex	All	KFWO
<b>Siskiyou</b>	All other ownerships	All	By jurisdiction (see map)
<b>Solano</b>	Suisun Marsh	All	BDFWO
<b>Solano</b>	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
<b>Solano</b>	All ownerships but tidal/estuarine	All	SFWO
<b>Solano</b>	Other	All	By jurisdiction (see map)
<b>Sonoma</b>	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
<b>Sonoma</b>	All ownerships but tidal/estuarine	All	SFWO
<b>Tehama</b>	Mendocino National Forest	All	AFWO
<b>Tehama</b>	Shasta Trinity National Forest except Hat Creek Ranger District (administered by Lassen National Forest)	All	YFWO
<b>Tehama</b>	All other ownerships	All	By jurisdiction (see map)
<b>Trinity</b>	BLM	All	AFWO
<b>Trinity</b>	Six Rivers National Forest	All	AFWO
<b>Trinity</b>	Shasta Trinity National Forest	All	YFWO

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<b>Trinity</b>	Mendocino National Forest	All	AFWO
<b>Trinity</b>	BIA (Tribal Trust Lands)	All	AFWO
<b>Trinity</b>	County Government	All	AFWO
<b>Trinity</b>	All other ownerships	All	By jurisdiction (See map)
<b>Yolo</b>	Yolo Bypass	All	BDFWO
<b>Yolo</b>	Other	All	By jurisdiction (see map)
<b>All</b>	FERC-ESA	All	By jurisdiction (see map)
<b>All</b>	FERC-ESA	Shasta crayfish	SFWO
<b>All</b>	FERC-Relicensing (non-ESA)	All	BDFWO

**\*Office Leads:**

**AFWO=Arcata Fish and Wildlife Office**

**BDFWO=Bay Delta Fish and Wildlife Office**

**KFWO=Klamath Falls Fish and Wildlife Office**

**RFWO=Reno Fish and Wildlife Office**

**YFWO=Yreka Fish and Wildlife Office**

**Attachment(s):**

- Official Species List
  - USFWS National Wildlife Refuges and Fish Hatcheries
  - Migratory Birds
  - Wetlands
-

# Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Reno Fish And Wildlife Office**

1340 Financial Boulevard, Suite 234

Reno, NV 89502-7147

(775) 861-6300

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## Project Summary

Consultation Code: 08ENV00-2018-SLI-0533

Event Code: 08ENV00-2018-E-01274

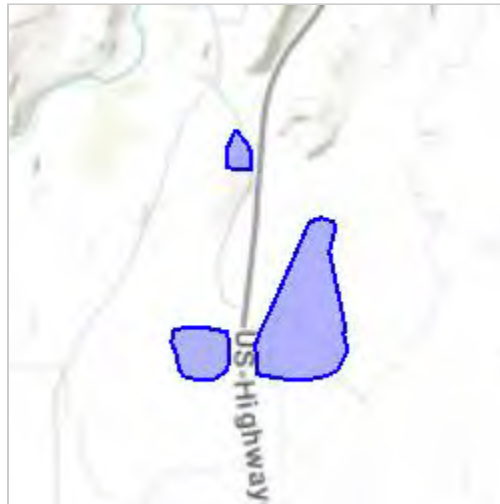
Project Name: GeoFortis Mines

Project Type: MINING

Project Description: Mining project in Lassen County, CA.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/39.85310276082005N120.03761061265571W>



Counties: Lassen, CA

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## Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Mammals

NAME	STATUS
North American Wolverine <i>Gulo gulo luscus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/5123">https://ecos.fws.gov/ecp/species/5123</a>	Proposed Threatened

## Fishes

NAME	STATUS
Lahontan Cutthroat Trout <i>Oncorhynchus clarkii henshawi</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/3964">https://ecos.fws.gov/ecp/species/3964</a> Species survey guidelines: <a href="https://ecos.fws.gov/ipac/guideline/survey/population/233/office/14320.pdf">https://ecos.fws.gov/ipac/guideline/survey/population/233/office/14320.pdf</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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# USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

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# Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

- 
1. The [Migratory Birds Treaty Act](#) of 1918.
  2. The [Bald and Golden Eagle Protection Act](#) of 1940.
  3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birds and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Golden Eagle <i>Aquila chrysaetos</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA <a href="https://ecos.fws.gov/ecp/species/1680">https://ecos.fws.gov/ecp/species/1680</a>	Breeds Dec 1 to Aug 31
Sage Thrasher <i>Oreoscoptes montanus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA <a href="https://ecos.fws.gov/ecp/species/9433">https://ecos.fws.gov/ecp/species/9433</a>	Breeds Apr 15 to Aug 10

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## Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

### Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

### Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

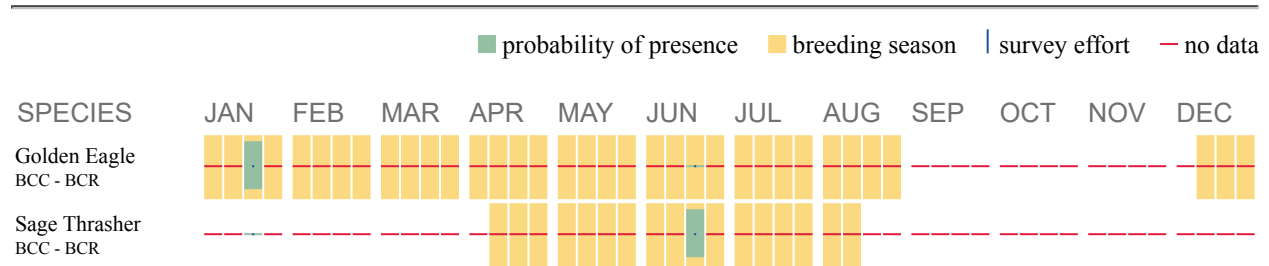
### No Data (—)

A week is marked as having no data if there were no survey events for that week.

### Survey Timeframe

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Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

## Migratory Birds F AQ

**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as



occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](#).

### **What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

### **How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### **What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC

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species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### **Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

### **What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

### **Proper Interpretation and Use of Your Migratory Bird Report**

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location?”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

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# Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

## RIVERINE

- [R4SBA](#)
-



BRIAN SANDOVAL  
*Governor*

STATE OF NEVADA  
**DEPARTMENT OF WILDLIFE**

6980 Sierra Center Parkway, Suite 120  
Reno, Nevada 89511  
(775) 688-1500 • Fax (775) 688-1495

TONY WASLEY  
*Director*

ELIZABETH O'BRIEN  
*Deputy Director*

JACK ROBB  
*Deputy Director*

Danielle Viglione  
Environmental Technician  
BEC Environmental  
7241 W. Sahara Ave., Suite 120  
Las Vegas, Nevada 89117

May 25, 2018

Re: Geofortis Mines

Dear Danielle Viglione:

I am responding to your request for information from the Nevada Department of Wildlife (NDOW) on the known or potential occurrence of wildlife resources in the vicinity of the Geofortis Mines located in Washoe County, Nevada. In order to fulfill your request an analysis was performed using the best available data from the NDOW's wildlife occurrences, raptor nest sites and ranges, greater sage-grouse leks and habitat, and big game distributions databases. No warranty is made by the NDOW as to the accuracy, reliability, or completeness of the data for individual use or aggregate use with other data. These data should be considered **sensitive** and may contain information regarding the location of sensitive wildlife species or resources. All appropriate measures should be taken to ensure that the use of this data is strictly limited to serve the needs of the project described on your GIS Data Request Form. Abuse of this information has the potential to adversely affect the existing ecological status of Nevada's wildlife resources and could be cause for the denial of future data requests.

To adequately provide wildlife resource information in the vicinity of the proposed project the NDOW delineated an area of interest that included a four-mile buffer around the project area provided by you on Thursday, May 24, 2018. Wildlife resource data was queried from the NDOW databases based on this area of interest. The results of this analysis are summarized below.

**Big Game** - Occupied mule deer and pronghorn antelope distributions exist outside of the project area within portions of the four-mile buffer area. No known occupied bighorn sheep or elk distributions exist in the vicinity of the project area. Please refer to the attached maps for details regarding big game distributions relative to the proposed project area.

**Greater Sage-Grouse** - Greater sage-grouse habitat in the vicinity of the project area has primarily been classified as General habitat by the Nevada Sagebrush Ecosystem Program (<http://sagebrusheco.nv.gov>). Other habitat also exists in the vicinity of the project area. Please refer to the attached map for details regarding greater sage-grouse habitat relative to the proposed project area. There are no known radio-marked greater sage-grouse tracking locations in the vicinity of the project area. There are no known greater sage-grouse lek sites in the vicinity of the project area.

**Raptors** - Various species of raptors, which use diverse habitat types, may reside in the vicinity of the project area. American kestrel, bald eagle, barn owl, burrowing owl, Cooper's hawk, ferruginous hawk, golden eagle, great horned owl, long-eared owl, merlin, northern goshawk, northern harrier, northern pygmy owl, northern saw-whet owl, osprey, peregrine falcon, red-tailed hawk, rough-legged hawk, sharp-shinned hawk, short-eared owl, Swainson's hawk, turkey vulture, and western screech owl have distribution ranges that include the project area and four-mile buffer area. Furthermore, Cooper's hawk, peregrine falcon, and red-tailed hawk have been directly observed in the vicinity of the project area.



Raptor species are protected by State and Federal laws. In addition, bald eagle, burrowing owl, California spotted owl, ferruginous hawk, flammulated owl, golden eagle, northern goshawk, peregrine falcon, prairie falcon, and short-eared owl are NDOW species of special concern and are target species for conservation as outlined by the Nevada Wildlife Action Plan. Per the *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance* (United States Fish and Wildlife Service 2010) we have queried our raptor nest database to include raptor nest sites within ten miles of the proposed project area. There are three known raptor nest sites within ten miles of the project area:

Probable Use	Last Check	Last Active	Township/Range/Section
Eagle	1/1/1977		21 0230N 0180E 008
Eagle	10/6/1982	10/6/1982	21 0210N 0180E 004
Owl	1/7/1978		21 0230N 0180E 027

### Other Wildlife Resources

There are no big game and one small game water developments in the vicinity of the project area. The following species have also been observed in the vicinity of the project area:

Common Name	ESA	State	SWAP SoCP
gophersnake			
Great Basin collared lizard			Yes
long-nosed leopard lizard			Yes
mountain lion			
western fence lizard			
yellow-backed spiny lizard			
zebra-tailed lizard			

ESA: Endangered Species Act Status

State: State of Nevada Special Status

SWAP SoCP: Nevada State Wildlife Action Plan (2012) Species of Conservation Priority

The proposed project area may also be in the vicinity of abandoned mine workings, which often provide habitat for state and federally protected wildlife, especially bat species, many of which are protected under NAC 503.030. To request data regarding known abandoned mine workings in the vicinity of the project area please contact the Nevada Division of Minerals (<http://minerals.state.nv.us/>).

The above information is based on data stored at our Reno Headquarters Office, and does not necessarily incorporate the most up to date wildlife resource information collected in the field. Please contact the Habitat Division Supervising Biologists at our Western Region Reno Office (775.688.1500) to discuss the current environmental conditions for your project area and the interpretation of our analysis. Furthermore, it should be noted that the information detailed above is preliminary in nature and not necessarily an identification of every wildlife resource concern associated with the proposed project. Consultation with the Supervising Habitat biologist will facilitate the development of appropriate survey protocols and avoidance or mitigation measures that may be required to address potential impacts to wildlife resources.

Mark Freese - Western Region Supervising Habitat Biologist (775.688.1145)

Federally listed Threatened and Endangered species are also under the jurisdiction of the United States Fish and Wildlife Service. Please contact them for more information regarding these species.

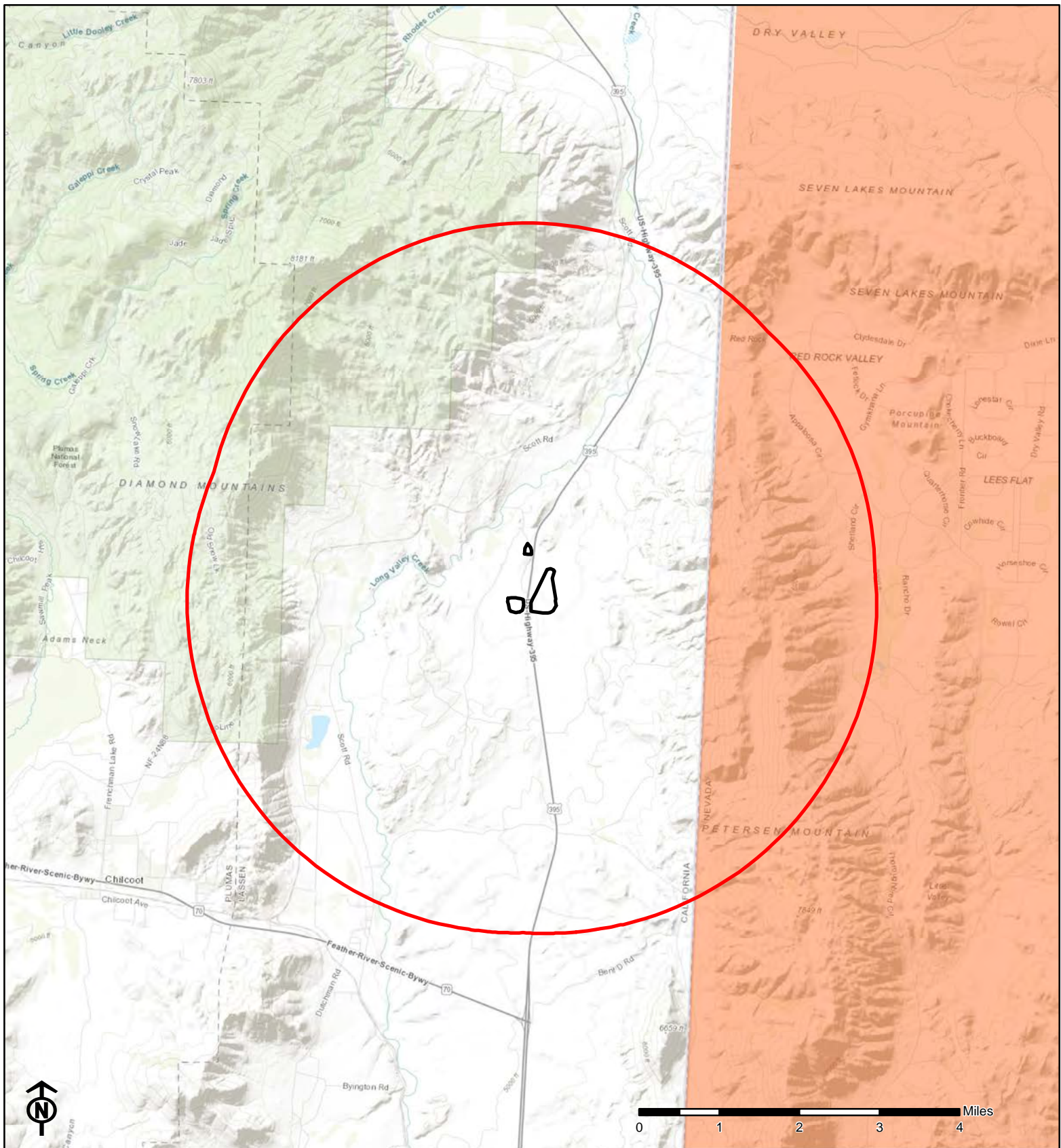
If you have any questions regarding the results or methodology of this analysis please do not hesitate to contact our GIS office at (775) 688-1439.




Sincerely,

*Bonnie Weller*



**Bonnie Weller, GIS Analyst**  
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-  Project Area
-  Four Mile Buffer Area Boundary
-  Mule Deer Distribution

## Geofortis Mines Mule Deer Distribution

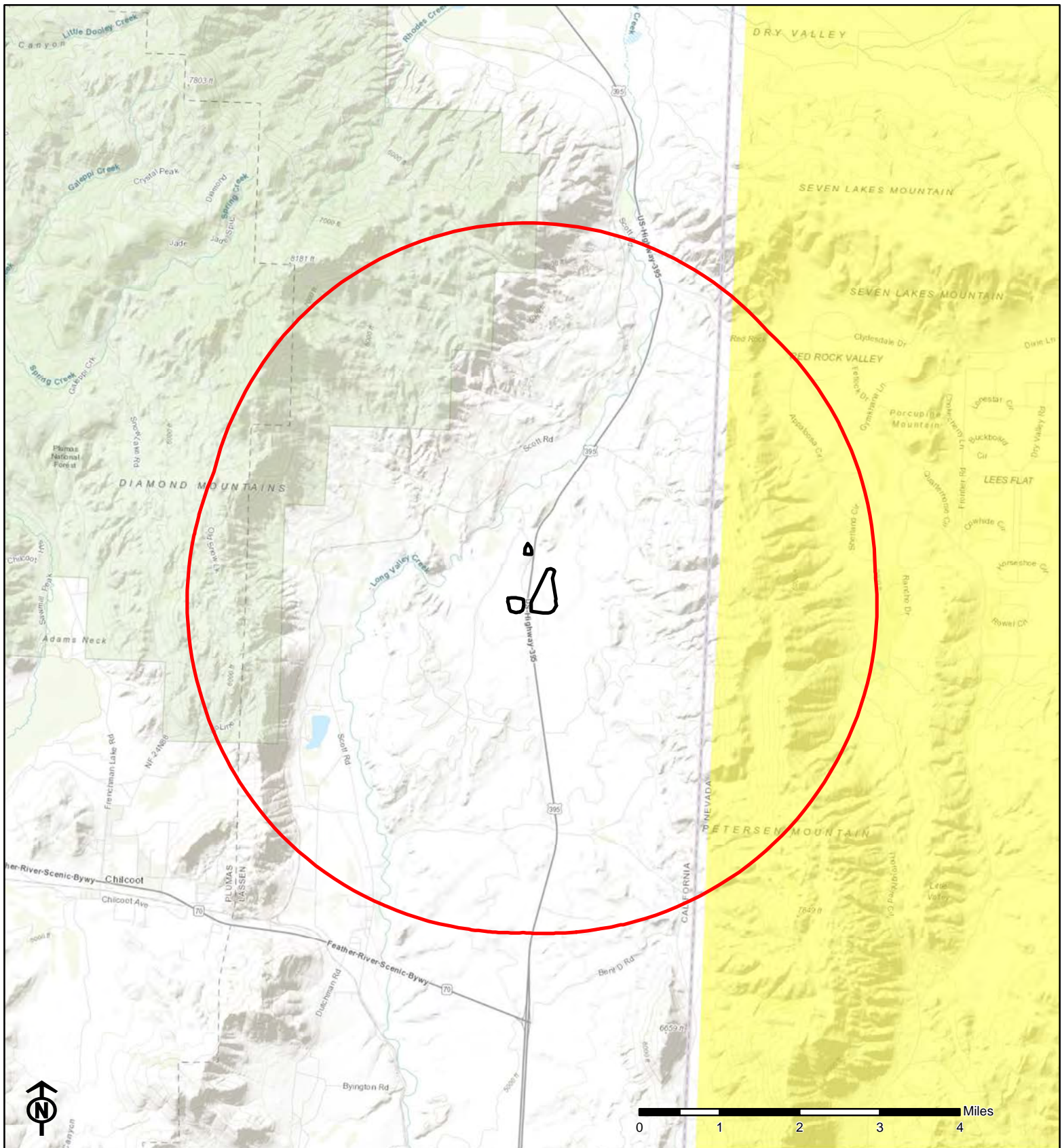
**May 25, 2018**




Projection: UTM Zone 11 North, NAD83

No warranty is made by the Nevada Department of Wildlife as to the accuracy, reliability, or completeness of the data for individual use or aggregate use with other data.







-  Project Area
-  Four Mile Buffer Area Boundary
-  Pronghorn Antelope Distribution

## Geofortis Mines Pronghorn Antelope Distribution

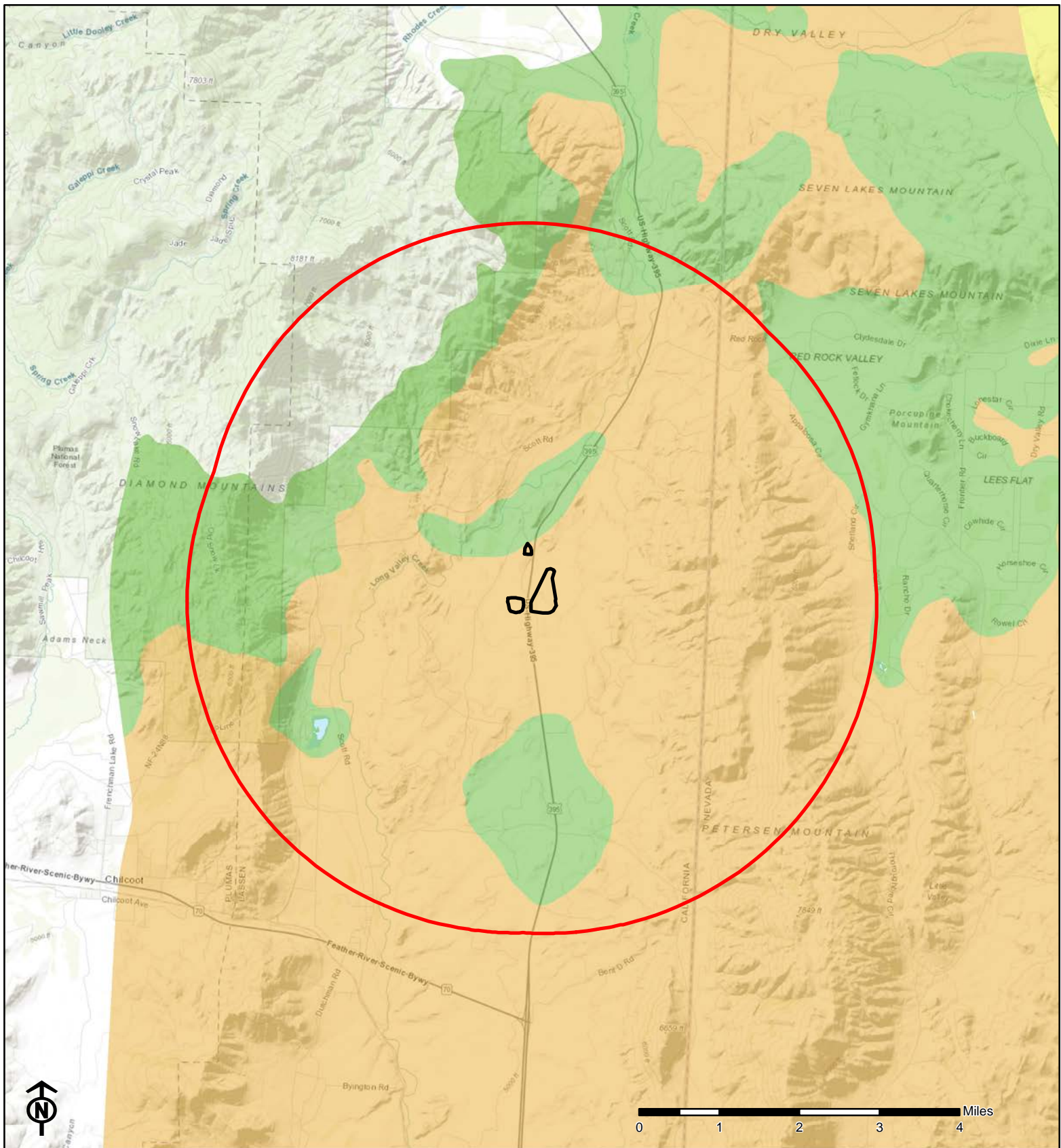
**May 25, 2018**







Projection: UTM Zone 11 North, NAD83

No warranty is made by the Nevada Department of Wildlife as to the accuracy, reliability, or completeness of the data for individual use or aggregate use with other data.







-  Project Area
-  Four Mile Buffer Area Boundary
-  Priority Habitat
-  General Habitat
-  Other Habitat
-  Bi-State Habitat

## Geofortis Mines Greater Sage-Grouse Habitat

**May 25, 2018**

Projection: UTM Zone 11 North, NAD83

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**Geofortis Pozzolan Mine Project  
California Native Plant Society Rare Plant Program Data**

Scientific Name	Common Name	Lifeform	CRPR	GRank	SRank	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation High (m)	Elevation High (ft)	CA Endemic	States	Counties	Quads	Last Update
<i>Astragalus agrestis</i>	field milk-vetch	perennial herb	2B.2	G5	S2	None	None	Apr-Jul(Aug)	Great Basin scrub, Meadows and seeps	vernally mesic	1650	5415	F	CO, IA, ID, IL, MN, MT, ND, NE, NM, NV, OR, SD, UT, WA, WY	LAS, SIE	Evans Canyon (3912061), Cleghorn Flat (4012075), McDonald Peak (4012084), Anderson Mtn. (4012085)	2014-01-30
<i>Astragalus lemmonii</i>	Lemmon's milk-vetch	perennial herb	1B.2	G2	S2	None	None	May-Aug(Sep)	Great Basin scrub, Meadows and seeps, Marshes and swamps (lake shores)		2200	7220	F	NV, OR	INY, LAS, MNO, MOD, PLU, SHA, SIE	Mt. Morgan (3711846), Toms Place (3711856), Whitmore Hot Springs (3711867), Loyalton (3912062), Antelope Valley (3912063), Reconnaissance Peak (3912073), Dixie Peak (4012181), Ash Valley (4112016), Lane Reservoir (4112017), Fall River Mills (4112114), Big Swamp (4112121), Perez (4112163)	2010-03-15
<i>Astragalus lentiformis</i>	lens-pod milk-vetch	perennial herb	1B.2	G2	S2	None	None	May-Jul	Great Basin scrub, Lower montane coniferous forest	volcanic, sandy	1910	6265	T		PLU	Chilcoot (3912072), Portola (3912074), Blairsden (3912075), Frenchman Lake (3912082), Dixie Mountain (3912083), Crocker Mtn. (3912084), Grizzly Valley (3912085), Squaw Valley Peak (4012014), Babcock Peak (4012015)	2010-03-15
<i>Astragalus pulsifer</i> var. <i>pulsifer</i>	Pulsifer's milk-vetch	perennial herb	1B.2	G4T2	S2	None	None	May-Aug(Sep)	Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland	usually granitic, sandy or rocky	1800	5905	F	NV	LAS, PLU, SIE	Beckwourth Pass (3912071), Chilcoot (3912072), Reconnaissance Peak (3912073), Constantia (3912081), Frenchman Lake (3912082), Genesee Valley (4012016), Taylorsville (4012017), Shaffer Mtn. (4012043), Susanville (4012046)	2010-03-15
<i>Boechera microphylla</i>	small-leaved rockcress	perennial herb	3	G4Q	S3	None	None	Jul	Pinyon and juniper woodland (volcanic or granitic, rocky)		3265	10710	F	ID, MT, NV, OR, UT, WA, WY	ALP, INY, MNO, MOD, PLU	Telescope Peak (3611721), Quinn Peak (3611835), Last Chance Mtn. (3711736), Dexter Canyon (3711877), Ebbetts Pass (3811957), Onion Valley (3912078), Frenchman Lake (3912082), McKesick Peak (4012012), Kettle Rock (4012026), Janesville (4012035), Emerson Peak (4112022)	2012-04-25
<i>Carex vallicola</i>	western valley sedge	perennial rhizomatous herb	2B.3	G5	S2	None	None	Jul-Aug	Great Basin scrub, Meadows and seeps	mesic	2805	9205	F	AZ, CO, ID, MT, NM, NV, OR, SD, UT, WA, WY	ALP, LAS, MNO, MOD	Mt. Barcroft (3711852), Mount Dana (3711982), Mt. Jackson (3811933), Pickel Meadow (3811935), Mt. Patterson (3811943), Chris Flat (3811944), Desert Creek Peak (3811953), Topaz Lake (3811965), Heenan Lake (3811966), Evans Canyon (3912061), Holbrook Canyon (4112015), Snake Lake (4112021), Emerson Peak (4112022), Mt. Bidwell (4112082)	2013-06-12

**Geofortis Pozzolan Mine Project  
California Native Plant Society Rare Plant Program Data**

Scientific Name	Common Name	Lifeform	CRPR	GRank	SRank	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation High (m)	Elevation High (ft)	CA Endemic	States	Counties	Quads	Last Update
<i>Crepis runcinata</i>	fiddleleaf hawksbeard	perennial herb	2B.2	G5	S3	None	None	May-Aug	Mojavean desert scrub, Pinyon and juniper woodland	Mesic, alkaline	1975	6480	F	AZ, CO, IA, ID, KS, MN, MT, ND, NE, NM, NV, OR, SD, TX, UT, WA, WY	ALP, INY, LAS, MNO, MOD, SIE	Shoshone (3511683), Soldier Pass (3711738), Deep Springs Lake (3711831), Bishop (3711834), Fish Slough (3711844), Mt. Barcroft (3711852), Chidago Canyon (3711854), Wattersen Canyon (3711866), Whitmore Hot Springs (3711867), Old Mammoth (3711868), Benton (3711874), Benton Hot Springs (3711875), River Spring (3711885), Indian Meadows (3711886), Lundy (3811912), Bodie (3811921), Big Alkali (3811922), Bridgeport (3811932), Markleeville (3811967), Sierraville (3912053), Sattley (3912054), Evans Canyon (3912061), Loyalton (3912062), Antelope Valley (3912063), Calpine (3912064), Observation Peak (4012072), Eagle Peak (4112032), Sugar Hill (4112073), McGinty Point (4112074), McGinty Reservoir (4112075), Willow Ranch (4112083), Pease Flat (4112085), Big Swamp (4112121)	2017-05-31
<i>Eriastrum sparsiflorum</i>	few-flowered eriastrum	annual herb	4.3	G5	S4	None	None	May-Sep	Chaparral, Cismontane woodland, Great Basin scrub, Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland	granitic, sandy, usually openings	1710	5610	F	NV	ALP, FRE, INY, KRN, LAS, MNO, PLU, TUL	Walker Pass (3511861), Lamont Peak (3511871), Cannell Peak (3511873), Cactus Peak (3611717), Crag Peak (3611812), Sentinel Peak (3611815), Hockett Peak (3611824), Camp Nelson (3611825), The Sphinx (3611875), Poleta Canyon (3711833), Bishop (3711834), Benton (3711874), Woodfords (3811977), Constantia (3912081)	2016-11-01
<i>Erigeron eatonii</i> var. <i>nevadincola</i>	Nevada daisy	perennial herb	2B.3	G5T2T3	S2S3	None	None	May-Jul	Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland	rocky	2900	9515	F	NV	LAS, PLA, PLU, SIE	Tahoe City (3912022), Evans Canyon (3912061), Loyalton (3912062), Antelope Valley (3912063), Beckwourth Pass (3912071), Portola (3912074), Constantia (3912081), Frenchman Lake (3912082), Doyle (4012011)	2013-06-12
<i>Eriogonum microthecum</i> var. <i>schoolcraftii</i>	Schoolcraft's wild buckwheat	shrub	1B.2	G5T3	S3	None	None	Jul-Sep	Great Basin scrub, Pinyon and juniper woodland	sandy to rocky	1750	5740	F	NV	LAS	Constantia (3912081), Doyle (4012011), McKesick Peak (4012012), Ferris Creek (4012013), Milford (4012023)	2012-05-14
<i>Eriogonum ochrocephalum</i> var. <i>ochrocephalum</i>	ochre-flowered buckwheat	perennial herb	2B.2	G5T3?	S1	None	None	May-Jun	Great Basin scrub, Pinyon and juniper woodland	volcanic or clay	2410	7905	F	NV, OR	LAS	Beckwourth Pass (3912071), Constantia (3912081), Calneva Lake (4012021), Diamond Mtn. (4012036), Little Mud Flat (4012042)	2013-06-12
<i>Hymenoxys lemmonii</i>	alkali hymenoxys	perennial herb	2B.2	G4?	S2S3	None	None	Jun-Aug(Sep)	Great Basin scrub, Lower montane coniferous forest, Meadows and seeps (subalkaline)		3390	11120	F	AZ, ID, NV, OR, UT	MOD, PLU, SIE, SIS	Sardine Peak (3912052), Chilcoot (3912072), Reconnaissance Peak (3912073), Snake Lake (4112021), Mt. Shasta (4112242), Weed (4112244), China Mtn. (4112245), Lake Shastina (4112254), Gazelle (4112255), Little Shasta (4112264), Montague (4112265), Yreka (4112266)	2014-07-30

**Geofortis Pozzolan Mine Project  
California Native Plant Society Rare Plant Program Data**

Scientific Name	Common Name	Lifeform	CRPR	GRank	SRank	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation High (m)	Elevation High (ft)	CA Endemic	States	Counties	Quads	Last Update
<i>Ivesia aperta</i> var. <i>aperta</i>	Sierra Valley ivesia	perennial herb	1B.2	G2T2	S2	None	None	Jun-Sep	Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland, Vernal pools	vernally mesic, usually volcanic	2300	7545	F	NV	LAS, PLU, SIE	Sardine Peak (3912052), Sierraville (3912053), Evans Canyon (3912061), Loyalton (3912062), Antelope Valley (3912063), Calpine (3912064), Chilcoot (3912072), Reconnaissance Peak (3912073), Portola (3912074), Frenchman Lake (3912082), McKesick Peak (4012012), Ferris Creek (4012013)	2010-08-17
<i>Ivesia baileyi</i> var. <i>baileyi</i>	Bailey's ivesia	perennial herb	2B.3	G5T4	S2	None	None	May-Aug	Great Basin scrub, Lower montane coniferous forest	volcanic, rocky	2600	8530	F	ID, NV, OR	LAS, PLU	Beckwouth Pass (3912071), Chilcoot (3912072), Frenchman Lake (3912082), Dixie Mountain (3912083), Doyle (4012011), Wendel (4012032), Little Mud Flat (4012042)	2013-06-12
<i>Ivesia sericoleuca</i>	Plumas ivesia	perennial herb	1B.2	G2	S2	None	None	May-Oct	Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Vernal pools	vernally mesic, usually volcanic	2200	7220	T		LAS, NEV, PLA, PLU, SIE	Martis Peak (3912031), Truckee (3912032), Boca (3912041), Hobart Mills (3912042), Independence Lake (3912043), Dog Valley (3912051), Sardine Peak (3912052), Sierraville (3912053), Sattley (3912054), Haypress Valley (3912055), Calpine (3912064), Reconnaissance Peak (3912073), Portola (3912074), Blairsden (3912075), Frenchman Lake (3912082), Crocker Mtn. (3912084), Grizzly Valley (3912085), McKesick Peak (4012012), Ferris Creek (4012013), Squaw Valley Peak (4012014), Janesville (4012035)	2011-07-25
<i>Ivesia webberi</i>	Webber's ivesia	perennial herb	1B.1	G1	S1	None	FT	May-Jul	Great Basin scrub (volcanic ash), Lower montane coniferous forest, Pinyon and juniper woodland	sandy or gravelly	2075	6810	F	NV	LAS, PLU, SIE	Dog Valley (3912051), Evans Canyon (3912061), Loyalton (3912062), Chilcoot (3912072), Constantia (3912081), Quincy (3912088), Crescent Mills (4012018)	2016-09-02



**Geofortis Pozzolan Mine Project  
California Native Plant Society Rare Plant Program Data**

Scientific Name	Common Name	Lifeform	CRPR	GRank	SRank	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation High (m)	Elevation High (ft)	CA Endemic	States	Counties	Quads	Last Update
Juncus luciensis	Santa Lucia dwarf rush	annual herb	1B.2	G3	S3	None	None	Apr-Jul	Chaparral, Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Vernal pools		2040	6695	T		LAS, MNT, MOD, NAP, NEV, PLA, PLU, RIV, SBA, SBT, SDG, SHA, SLO	Cuyamaca Peak (3211685), Julian (3311615), Murrieta (3311752), Wildomar (3311753), Goleta (3411947), San Marcos Pass (3411957), Lake Cachuma (3411958), Big Pine Mtn. (3411966), California Valley (3512031), Camatta Ranch (3512043), Creston (3512055), Templeton (3512056), Estrella (3512065), Adelaida (3512067), Tierra Redonda Mountain (3512078), Parkfield (3512084), Burnett Peak (3512172), Jolon (3512182), Cosio Knob (3612112), Bear Canyon (3612113), Cone Peak (3612114), Mount Johnson (3612153), Detert Reservoir (3812265), Martis Peak (3912031), Norden (3912033), Portola (3912074), Johnsville (3912076), Frenchman Lake (3912082), Dixie Mountain (3912083), Crocker Mtn. (3912084), Grizzly Valley (3912085), Ferris Creek (4012013), Squaw Valley Peak (4012014), Janesville (4012035), Pikes Point (4012057), Buckhorn Lake (4012081), Jacks Backbone (4012166), Egg Lake (4112133)	2010-03-15
Loeflingia squarrosa var. artemisiarum	sagebrush loeflingia	annual herb	2B.2	G5T3	S2	None	None	Apr-May	Desert dunes, Great Basin scrub, Sonoran desert scrub	sandy	1615	5300	F	NV, OR, WY	INY, KRN, LAS, LAX, PLU, SBD	Baldy Mesa (3411744), Rogers Lake South (3411777), Redman (3411778), Kramer Junction (3411785), Leuhman Ridge (3411786), Rogers Lake North (3411787), Palmdale (3411851), Lancaster East (3411861), Rosamond Lake (3411871), Rosamond (3411872), Soledad Mtn. (3411882), Boron (3511716), Keene (3511825), Tinemaha Reservoir (3711812), Big Pine (3711823), Beckwourth Pass (3912071), Reconnaissance Peak (3912073), Doyle (4012011), Calneva Lake (4012021), Observation Peak (4012072)	2013-06-12
Lupinus nevadensis	Nevada lupine	perennial herb	4.3	G4	S4	None	None	Apr-Jun	Great Basin scrub, Pinyon and juniper woodland		3000	9845	F	NV, OR	INY, LAS, MNO, PLU, SIE	Thimble Peak (3611771), Fall Canyon (3611772), Wahguyhe Peak (3611781), Grapevine Peak (3611782), Waucoba Mtn. (3711811), Watterson Canyon (3711866), Whitmore Hot Springs (3711867), Evans Canyon (3912061), Beckwourth Pass (3912071), Doyle (4012011), Karlo (4012053), Shinn Mtn. (4012062)	2010-03-15

**Geofortis Pozzolan Mine Project  
California Native Plant Society Rare Plant Program Data**

Scientific Name	Common Name	Lifeform	CRPR	GRank	SRank	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation High (m)	Elevation High (ft)	CA Endemic	States	Counties	Quads	Last Update
Micromonolepis pusilla	dwarf monolepis	annual herb	2B.3	G5	S3?	None	None	May-Aug	Great Basin scrub	alkaline, openings	2400	7875	F	CO, ID, NV, OR, UT, WA, WY	LAS, MNO, MOD, RIV	Hayfield (3311566), Banner Ridge (3711865), Whitmore Hot Springs (3711867), Benton Hot Springs (3711875), Constantia (3912081), Spencer Creek (4012031), Wendel (4012032), Wendel Hot Springs (4012033), Cherry Mtn. (4012051), West of Snowstorm Mtn. (4012064), Fredonyer Peak (4012065), Eagleville (4112031)	2013-06-12
Orobanche ludoviciana var. arenosa	Suksdorf's broom-rape	perennial herb (achlorophyllous)	2B.3	G5T5	S2	None	None	Jun-Sep(Oct)	Great Basin scrub		1600	5250	F	AZ, ID, NV, OR, UT, WA, WY	INY, LAS, MNO	Independence (3611872), Kearsarge Peak (3611873), Whitmore Hot Springs (3711867), River Spring (3711885), Indian Meadows (3711886), Constantia (3912081), Shaffer Mtn. (4012043)	2016-11-01
Potamogeton epihydrus	Nuttall's ribbon-leaved pondweed	perennial rhizomatous herb (aquatic)	2B.2	G5	S2S3	None	None	(Jun)Jul-Sep	Marshes and swamps (assorted shallow freshwater)		2172	7125	F	AK, AL, AR, CO, CT, DC, DE, FL, GA, IA, ID, IL, IN, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, NH, NJ, NV, NY, OH, OR, PA, RI, SC, SD, TN, UT, VA, VT, WA, WI, WV, WY	ELD, MAD, MEN, MOD, MPA, PLA, PLU, SHA, TUO	Little Shuteye Peak (3711944), Half Dome (3711965), El Capitan (3711966), Yosemite Falls (3711975), Ackerson Mtn. (3711977), Falls Ridge (3711984), Ten Lakes (3711985), Cooper Peak (3811927), Pinecrest (3811928), Pyramid Peak (3812072), Eureka Hill (3812385), Point Arena (3812386), Tahoe City (3912022), Beckwourth Pass (3912071), Willits (3912343), Laytonville (3912364), Cahto Peak (3912365), Covelo East (3912372), Covelo West (3912373), Ferris Creek (4012013), Crescent Mills (4012018), Igo (4012255), Whiskeytown (4012265), Alturas (4112045), Surprise (4112054), Jacks Butte (4112057), Whittemore Ridge (4112066), Boles Meadows East (4112067), McGinty Reservoir (4112075), South Mtn. (4112076), Mt. Bidwell (4112082), Pease Flat (4112085), Beaver Mtn. (4112086)	2016-11-01
Pyrrocoma lucida	sticky pyrrocoma	perennial herb	1B.2	G3	S3	None	None	Jul-Oct	Great Basin scrub, Lower montane coniferous forest, Meadows and seeps	alkaline clay	1950	6400	T		LAS, PLU, SIE, YUB	Sierraville (3912053), Sattley (3912054), Antelope Valley (3912063), Calpine (3912064), Clio (3912065), Reconnaissance Peak (3912073), Portola (3912074), Blairsden (3912075), Johnsville (3912076), Frenchman Lake (3912082), Dixie Mountain (3912083), Crocker Mtn. (3912084), Grizzly Valley (3912085), Quincy (3912088), Camptonville (3912141), McKesick Peak (4012012), Ferris Creek (4012013), Taylorsville (4012017), Greenville (4012028), Janesville (4012035), Canyondam (4012121)	2013-05-22

**Geofortis Pozzolan Mine Project  
California Native Plant Society Rare Plant Program Data**

Scientific Name	Common Name	Lifeform	CRPR	GRank	SRank	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation High (m)	Elevation High (ft)	CA Endemic	States	Counties	Quads	Last Update
Rumex venosus	winged dock	perennial herb	2B.3	G5?	S3	None	None	May-Jun	Great Basin scrub (sandy)		1800	5905	F	CO, IA, ID, IN, KS, MT, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, WI, WY	LAS	Beckwourth Pass (3912071), Constantia (3912081), Doyle (4012011), McKesick Peak (4012012), Calneva Lake (4012021), Milford (4012023), Wendel (4012032), Standish (4012034), Janesville (4012035), Shaffer Mtn. (4012043), Spalding Tract (4012067)	2013-06-12
Stanleya viridiflora	green-flowered prince's plume	perennial herb	2B.3	G4	S2	None	None	May-Aug	Great Basin scrub (white ash deposits)		1600	5250	F	CO, ID, MT, NV, OR, UT, WY	LAS, PLU	Chilcoat (3912072), Reconnaissance Peak (3912073), Spencer Creek (4012031), Little Mud Flat (4012042), Shaffer Mtn. (4012043), Five Springs (4012052), Karlo (4012053), Al Shinn Canyon (4012061)	2013-06-12
Trifolium lemmonii	Lemmon's clover	perennial herb	4.2	G3	S3	None	None	May-Jul	Great Basin scrub, Lower montane coniferous forest		1830	6005	F	NV	NEV, PLU, SIE	Sierraville (3912053), Portola (3912074), Frenchman Lake (3912082), Crocker Mtn. (3912084), Grizzly Valley (3912085), McKesick Peak (4012012), Squaw Valley Peak (4012014), Babcock Peak (4012015), Stony Ridge (4012024), Antelope Lake (4012025)	2010-03-15
Viola purpurea ssp. aurea	golden violet	perennial herb	2B.2	G5T2	S2	None	None	Apr-Jun	Great Basin scrub, Pinyon and juniper woodland	sandy	2500	8200	F	NV	ALP, KRN, LAS, LAX, MNO, SBD, SDG, SIE	Boucher Hill (3311638), Vail Lake (3311648), Cajon (3411734), Mojave (3511812), McKittrick Summit (3511937), Banner Ridge (3711865), Whitmore Hot Springs (3711867), Lee Vining (3711981), Lundy (3811912), Big Alkali (3811922), Mt. Jackson (3811933), Fales Hot Springs (3811934), Pickel Meadow (3811935), Chris Flat (3811944), Woodfords (3811977), Evans Canyon (3912061)	2015-01-07

March 25, 2022

Lonnie Roy, PE  
Vice President  
Broadbent and Associates, Inc.  
8 W. Pacific Avenue  
Henderson, NV 89015

Dear Mr. Roy:

**SUBJECT: Addendum to Biological Survey Report for Geofortis Minerals Bureau of Land Management Pozzolan Mineral Claims, Long Valley, Lassen County, California**

**REFERENCE: BLM NEPA Number: DOI-BLM-NV-C020-2020-0026-EA**

Broadbent and Associates, Inc. (Broadbent) assisted the Bureau of Land Management (BLM) Sierra Front Field Office of the Carson City District in the development of an Environmental Assessment of proposed Pozzolan Mining Operations at the Ironcloud and Cal Mineral Claims in Lassen County, California. Broadbent contracted BEC Environmental, Inc. (BEC) to evaluate the biological resources potentially affected by the proposed Project.

Beginning in 2018, BEC evaluated habitats and rare or protected species potentially present in the Project area, conducted baseline surveys in accordance with protocols provided by BLM resource specialists, and generated a report summarizing the results of those efforts. The report was completed in 2018 and minor edits were incorporated in 2020.

During development of the Environmental Assessment by the BLM, the footprints of the proposed mine sites were reduced based on subsequent mineral potential studies. The Environmental Assessment was completed and the Finding of No Significant Impact and Decision Record were signed in May 2021.

Geofortis and Broadbent subsequently initiated the permitting process with Lassen County. The County requested an updated review of the list of species designated as threatened or endangered under the Endangered Species Act (ESA) with potential to occur in the Project Area as identified by the U.S. Fish and Wildlife Service (USFWS).

The attached Addendum to the original report provides an updated site location map representing the original and revised boundaries of the proposed mining areas. The Addendum also includes a review of the updated list of threatened or endangered species identified by the USFWS as potentially present and an assessment of the potential for the species to be present or otherwise impacted by the proposed Project.

Best Regards,

  
Danny Rakestraw  
Senior Biologist





# Biological Survey Report ADDENDUM

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## Geofortis Minerals Bureau of Land Management Pozzolan Mineral Claims Long Valley, Lassen County, California

BLM NEPA Number: DOI-BLM-NV-C020-2020-0026-EA

### **Prepared For:**

*Broadbent and Associates, Inc.  
Lonnie C. Roy, PE  
Principal Engineer/Vice President  
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### **Prepared By:**

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**Project No.** 062.18.001

**Date:** March 25, 2022

## **1 INTRODUCTION**

BEC Environmental, Inc. (BEC) was retained by Broadbent and Associates, Inc. (Broadbent) to provide biological support to assist Geofortis Minerals, LLC (Geofortis) in acquiring the necessary approvals from the Bureau of Land Management (BLM) for initiation of mining activities to occur on Federal and private land.

Beginning in 2018, BEC evaluated habitats and rare or protected species potentially present in the Project area, conducted baseline surveys in accordance with protocols guided and approved by BLM resource specialists, and generated a report summarizing the results of those efforts. The report was completed in 2018 and minor edits were incorporated in October 2020 (BEC, 2020). The report is available on the BLM ePlanning website (2020) and from the BLM Stillwater Field Office in Carson City, Nevada.

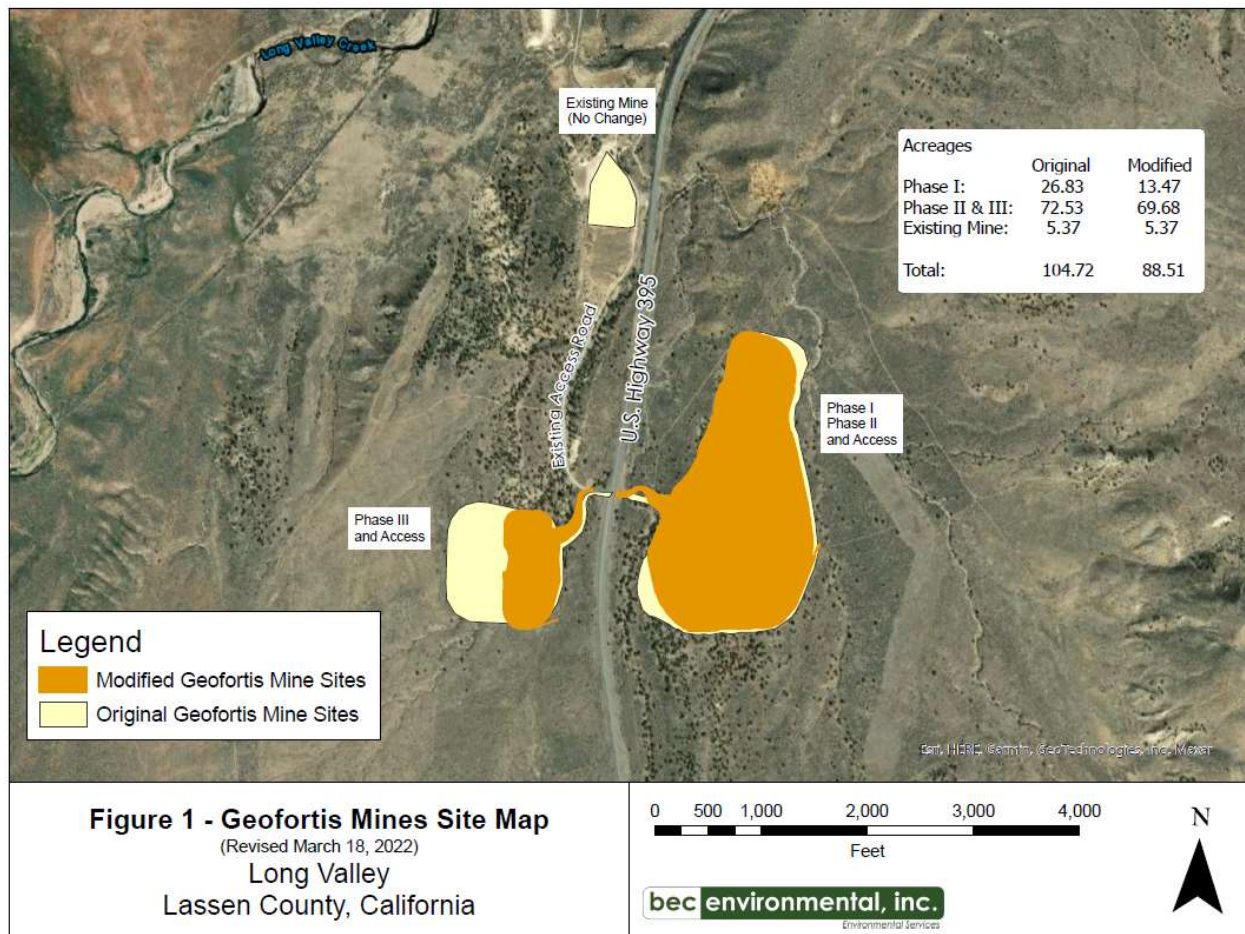
During the review of the proposed Project and development of the Environmental Assessment, the footprint of the proposed mine sites for two of the three phases were reduced based on the mineral potential within portions of the areas. The Environmental Assessment was then completed by the BLM and a Finding of No Significant Impact and a Decision Record were signed in May 2021.

Following completion of these reviews, Geofortis and Broadbent initiated coordination with Lassen County to begin the review and permitting process. The County requested a review of the updated list of species listed as threatened or endangered under the Endangered Species Act (ESA) or identified as candidates for listing with potential to occur in the Project area as identified by the U.S. Fish and Wildlife Service (USFWS).

The attached information provides an updated site location map representing the original and the revised boundaries of the proposed mining areas. The information also includes a review of the updated list of ESA-designated species identified by the USFWS as potentially present and an assessment of the potential for the species to be present or otherwise impacted by the proposed Project.

## **2 UPDATED PROJECT BOUNDARY**

During the evaluation of the proposed Project, Geofortis and BLM reduced the size of the previously undisturbed phases of the Project based on an assessment of the mineral potential within the areas. As a result of this modification, the boundaries of the areas of potential impact were smaller than but still within areas originally evaluated in the Biological Resources Report. To reflect this change, a new map representing the original and the new boundaries has been developed and is included as Figure 1 below. Figure 1 also shows the change in the sizes of the proposed disturbance within the phases.



### 3 U.S. FISH AND WILDLIFE SERVICE UPDATED SPECIES LIST

#### 3.1 Data Requests

##### 3.1.1 Original Results (2018)

BEC biologists originally queried the USFWS Information for Planning and Consultation (IPaC) database on May 29, 2018, to gather information on species listed under the Endangered Species Act (ESA) as Threatened, Endangered, or as candidates for such listing, and critical habitat for these species which may occur in the vicinity of the Project site. Results also included USFWS Birds of Conservation Concern (BCC) or birds that warrant special attention in the Project area.

As summarized in the original Biological Resources Summary report, the IPaC data indicated two species listed under the ESA had the potential to be present within the region and therefore had the potential to be impacted by the Project if present in the Project area: Lahontan cutthroat trout (Threatened) and North American wolverine (*Gulo gulo luscus*) (Proposed Threatened). No critical habitat was identified within the vicinity of the Project location.

BEC biologists determined neither species had potential to be affected by the Project due to the lack of suitable habitat within or near the Project and that existing data did not support the likelihood the area was within the known distribution of either of these species.

### 3.1.2 Updated Results (2022)

BEC biologists queried the USFWS IPaC database on March 20, 2022 to obtain and review updated information related to the species potentially present in the Project area and potentially impacted by the Project.

The species listed as potentially present within the Project area differs from the species identified in the 2018 results (**Appendix A**). The North American wolverine was no longer on the list as a result of the USFWS determining that listing the species as threatened or endangered was not warranted in 2020 (USFWS, 2020b). The Lahontan cutthroat trout was not included as potentially present in the area in the 2022 database, but a reason for the revision was not provided. The removal of this species supports the original determination by the BEC biologists that the project was not likely to affect the species.

The 2022 IPaC results identified two species as potentially present that were not included in the previous results: the Carson wandering skipper (*Pseudocopaeodes eunus obscurus*) and the monarch butterfly (*Danaus plexippus*).

## 3.2 Evaluation of Potential Effects

### 3.2.1 Carson Wandering Skipper

#### 3.2.1.1 Species Information

The Carson wandering skipper was listed as endangered under the federal Endangered Species Act in 2001 (USFWS). The California Department of Fish and Wildlife's (CDFW) Terrestrial and Vernal Pool Invertebrates of Conservation Priority (2017) includes the Carson wandering skipper.

The Carson wandering skipper is only known from two populations in Washoe County, Nevada and Lassen County, California. The Lassen County population location is near Honey Lake, north of the Project area (Xerces Society, 2021a). Its habitat is characterized as lowland grassland on alkaline substrates in the saltbush-greasewood community of the intermountain west (Xerces Society, 2021a). Breeding habitat for the species requires salt grass (*Distichlis spicata*) in areas with nectar sources that are in bloom during the flight season in the spring and summer (Xerces Society, 2021a). Nectar sources are provided from flowering plants such as thistles, heliotrope, tumble mustard, and cleomella (NDNH, 2021). Nectar sources of the species are typically in open areas near springs or water, with a possible association with geothermal activity on highly alkaline soils.

The USFWS Environmental Conservation Online System (USFWS ECOS) provides a map of the current range of the Carson wandering skipper which includes the Project area (2021). Although the Biological Survey Report (BEC, 2020) reported tumble mustard, a known nectar plant, to be present in the Project area, the Project area lacked alkaline soils and salt grass. Water features in the Project area are ephemeral, resulting from rain events.

#### 3.2.1.2 Potential Effects Determination

Based on available information on the isolated distribution of the species, it is unlikely the species is present in the Project area despite the area being mapped as "current range" within the ECOS system based on suitability models.

Additionally, as summarized in the Biological Survey Report for the Project (BEC, 2020), the habitat in the Project area does not provide the alkaline, moist soils, or salt grass flats required for breeding and larval host plants. Based on the lack of alkaline soils and breeding habitat, negligible potential exists for this species to be present within the Project area or impacted by the Project.



### **3.2.2 Monarch Butterfly**

#### **3.2.2.1 Species Information**

The monarch butterfly was petitioned to be listed under the federal Endangered Species Act in 2014 and in 2020, the USFWS determined listing the species as threatened or endangered is warranted but precluded by higher priority actions (USFWS, 2020a). The CDFW Terrestrial and Vernal Pool Invertebrates of Conservation Priority includes the monarch butterfly (CDFW, 2017). The species is also identified as a Species of Greatest Conservation Need in California's State Wildlife Action Plan (2015).

The monarch butterfly is widely distributed throughout the western United States, including California (Xerces Society, 2021b). Breeding habitat for the species requires native milkweeds for food for larvae, other flowering plants for nectar for adults, trees/shrubs for shading and roosting, and connectivity among patches of such habitat, typically present within riparian corridors or other mesic sites (Xerces Society, 2021b). Migratory habitat is similar with the lack of a requirement for milkweed for larvae. Overwintering habitat consists of groves of large trees to provide microhabitat necessary for survival (Xerces Society, 2021b).

The Xerces Society (2021b) designates Lassen County as a summer breeding zone for the species, prioritizing the need to identify and protect existing milkweed and nectar plants. However, no sign of large stands of nectar-producing plants for adults to feed upon and large shrubs or trees to provide shelter and roosting areas for adults were observed during the 2018 site survey (BEC, 2020). The closest recorded observation on monarch mapping applications, such as the Monarch Milkweed Mapper (2022), is a historical observation of an adult monarch butterfly over four miles to the northeast of the Project.

#### **3.2.2.2 Potential Effects Determination**

The monarch may be present in the region based on available information, as is the case throughout most or all of the northern California and northwest Nevada region. However, the Project area does not provide habitat for breeding, overwintering, or other aspects required for the species. Therefore, the species is not likely to be affected by Project activities. Based on the lack of such habitat and a lack of adequate nectar-producing plants, negligible potential exists for this species to be present within the Project area or impacted by the Project.

## **4 SUMMARY**

### **Project Boundary**

The revised Project area is smaller than and within the area surveyed and evaluated in the original report, therefore reducing the acreage affected by the proposed Project.

### **Federally Threatened and Endangered Species**

The 2022 USFWS IPaC list of Federally-listed Threatened, Endangered, and candidate species and critical habitat which may occur in the vicinity of the Project site differed from those of 2018. The Wolverine and the LCT were no longer included as potentially present in the Project area.

The 2022 IPaC information identified two species not included in the previous results: the Carson wandering skipper and the monarch butterfly. The Carson wandering skipper does not have known breeding habitat within or adjacent to the Project. Known populations are isolated and distant from the Project, and are unlikely to be affected. The monarch butterfly may be present in the region based on available information. However, the Project area does not provide habitat for breeding, providing shelter, or other aspects required for the species. Therefore, the species is not likely to be affected by the Project.

## 5 REFERENCES

- BEC. (2020). *Biological Survey Report, Geofortis Minerals Bureau of Land Management Pozzolan Mineral Claims, Long Valley, Lassen County, California.*
- BLM. (2020). *Bureau of Land Management National NEPA Register.* Retrieved from <https://eplanning.blm.gov/eplanning-ui/project/2001284/570>
- CDFW. (2015). *California State Wildlife Action Plan.*
- CDFW. (2017). *CDFW Terrestrial and Vernal Pool Invertebrates of Conservation Priority.*
- NDNH. (2021). *Nevada Division of Natural Heritage.* Retrieved from Species Explorer: <http://species.heritage.nv.gov/>
- USFWS. (2001). *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Carson Wandering Skipper. 51116-51129. Federal Register - Vol. 67, No. 152. August 7.*
- USFWS. (2020a). *Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Monarch Butterfly. 81813 – 81822. Federal Register - Vol. 85, No. 243. December 17, 2020.*
- USFWS. (2020b). *Endangered and Threatened Wildlife and Plants; Withdrawal of the Proposed Rule for the North American Wolverine. 64618-64648. Federal Register - Vol. 85, No. 198, October 13, 2020.*
- USFWS ECOS. (2021). *Carson wandering skipper (Pseudocopaeodes eunus obscurus).* Retrieved from ECOS Environmental Conservation Online System: <https://ecos.fws.gov/ecp/species/674>
- Western Monarch Milkweed Mapper.* (2022). Retrieved from <https://www.monarchmilkweedmapper.org/>
- Xerces Society. (2021a). *Carson Wandering Skipper.* Retrieved from Xerces Society for Invertebrate Conservation: <https://xerces.org/endangered-species/species-profiles/at-risk-butterflies-moths/carson-wandering-skipper>
- Xerces Society. (2021b). *Priority Action Zones in California for Recovering Western Monarchs.*

## ***APPENDIX A***

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### 2022 USFWS IPaC Results



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Reno Fish And Wildlife Office  
1340 Financial Boulevard, Suite 234  
Reno, NV 89502-7147  
Phone: (775) 861-6300 Fax: (775) 861-6301  
<http://www.fws.gov/reno/>



In Reply Refer To:  
Project Code: 2022-0021742  
Project Name: GeoFortis Mines

March 18, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

#### To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)).



(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

**Migratory Birds:** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <https://www.fws.gov/birds/policies-and-regulations.php>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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Attachment(s):

- Official Species List
  - USFWS National Wildlife Refuges and Fish Hatcheries
  - Migratory Birds
  - Wetlands
-

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Reno Fish And Wildlife Office**

1340 Financial Boulevard, Suite 234

Reno, NV 89502-7147

(775) 861-6300

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## Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Insects

NAME	STATUS
Carson Wandering Skipper <i>Pseudocopaeodes eunus obscurus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/674">https://ecos.fws.gov/ecp/species/674</a>	Endangered
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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# USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

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## Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

- 
1. The [Migratory Birds Treaty Act](#) of 1918.
  2. The [Bald and Golden Eagle Protection Act](#) of 1940.
  3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Sage Thrasher <i>Oreoscoptes montanus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA <a href="https://ecos.fws.gov/ecp/species/9433">https://ecos.fws.gov/ecp/species/9433</a>	Breeds Apr 15 to Aug 10

## Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

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## Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

## Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

## Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

## No Data (—)

A week is marked as having no data if there were no survey events for that week.

## Survey Timeframe

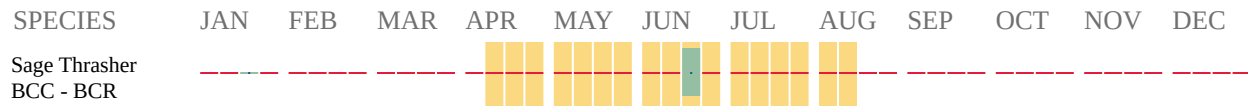
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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■ probability of presence   ■ breeding season   | survey effort   — no data

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Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

## Migratory Birds FAQ

**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

### **How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### **What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### **Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

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Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

**What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

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## Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED.  
PLEASE VISIT [HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML](https://www.fws.gov/wetlands/data/mapper.html) OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

---

## **IPaC User Contact Information**

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## **Lead Agency Contact Information**

Lead Agency: Bureau of Land Management

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## **Geofortis Minerals LLC Seed Collection Protocol**

### **March 2022**

In support of the development of the mining operation proposed by Geofortis Minerals LLC (Geofortis), the collection of wild seed from existing stands of White Wooley Buckwheat (*Eriogonum ochrocephalum* var. *ochrocephalum*) has been proposed in the mining plans submitted to Lassen County and in the Plans of Operations submitted to the Bureau of Land Management. This document provides details on how the seed collection will be performed.

The majority of the details of this plan are described in the Woody Plant Seed Manual, published by the United States Department of Agriculture (USDA Agricultural Handbook 727, April 2008). This handbook is directed at the those involved in the collection and sale of seeds, production of nursery stock, or planting itself in support of commercial forest products, planting for wildlife food, watershed protection, urban environmental improvement, ornamental enhancement, wetlands mitigation, and carbon sequestration.

Geofortis is proposing to continue operation of an existing, permitted mine on approximately 5 acres of previously disturbed land on the west side of Highway 395, as well as the establishment of a new mine with approximately 85 acres of new disturbance. In the new mine, Phases I and II are on the east side of the Highway, while Phase III is on the west side of the Highway, south of the existing mine. In support of permits from the Bureau of Land Management (BLM) and Lassen County (County), a Biological Resources Report was prepared by BEC Environmental Inc. (BEC, 2020).

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The Woodland habitat overstory was dominated by *Juniperus osterosperma* (Utah juniper) with scattered *Pinus jeffreyi* (Jeffrey pines). The understory and the areas between trees were similar to the Shrubland, dominated by *Artemisia tridentata* ssp. *tridentata* (big sagebrush). Exposed, white, sparsely vegetated soil areas are present within Woodland habitats, along the northwestern facing slope of Phase I and II, flat and eastern facing slopes in the central portion of Phase III, and on the cut slopes of the existing mine site. These areas contained a substance consistent in appearance and feel with clay within the top layer and correlate with the following soil types: Corral-Glenbrook complex, 15 to 50 percent slopes; Rough broken land; and Barnard stony sandy loam, 2 to 15 percent slopes soil types. These areas were dominated by *Penstemon speciosus* (showy penstemon) and buckwheat species including *Eriogonum microtheca* var. *ambiguum* (yellow-flowered buckwheat), *Eriogonum caespitosum* (matted wild buckwheat), and *Eriogonum ochrocephalum* var. *ochrocephalum* (white woolly buckwheat). At the southeastern end of Phase I and II and central areas of Phase III, similar areas were present, but contained more exposed gravel on the surface. The primary vegetation in these areas was sparsely scattered *Streptanthus cordatus* (heartleaf twistflower), *Penstemon speciosus* (showy penstemon), *Cordylanthus ramosus* (cushy bird's beak), and *Juncus balticus* (Baltic rush).

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Project Area	Population #	Estimated # individuals	% in Project Area	% in Buffer
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As an environmental protection measure, it is recommended that prior to land disturbance that Geofortis transplant the existing individual plants within the mine footprint to an onsite nursery and prior to transplanting, wild seed from the existing plants be collected. This document details the seed collection.

The USDA Woody Seed Manual describes the Buckwheat family as “important pioneer plants after natural disturbance” and “useful for erosion control and for revegetation of anthropogenically disturbed sites”. The large number of individual plants in the previously disturbed mine site show the hardiness of the plants.

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Due to the small area to be collected, the seeds will be collected by hand-stripping. The window of opportunity for seed collection is rather wide as the fruits usually persist for two to three weeks after maturity (Stevens et. al., 1996). The seed collection will occur in the spring to early summer. After collection and drying, the material can be threshed and cleaned with a fanning mill. Due to the small amount of seed that is expected to be collected, cleaning can be performed by hand with a screen or rubbing board.

## **Seed Storage**

Stevens et .al. (1996) suggest that the Buckwheat seeds exhibit orthodox storage behavior and this would indicate that the seeds should be dried to 10% moisture or less and then stored at subfreezing temperatures. This would suggest a 10 to 15 year storage time is reasonable with high viability. Since the revegetation of the mine site is proposed to be concurrent with mining operation, this storage time would allow for seeding within this time frame.

## **Seeding**

The USDA Woody Plant Seed Manual suggest that Wild-Buckwheats are readily established from direct seeding. They are established best when seeded to a depth of 2 to 5 mm and since the proposed seeding areas will be small, this can be done by hand. Seeding will occur in late fall or early winter.

## **Monitoring**

The revegetation will be monitored during the mining operation and for 5 years after mining has ceased. The revegetation of the White Woolly Buckwheat will be considered successful when the number of individuals plants established is equal to or greater than the number of plants identified in the BEC report.

## **Attachments**

Portion of Appendix E from USDA Handbook 727, *Polygonaceae-Buckwheat Family*

## **References**

BEC Environmental, Inc., Biological Survey Report, *Geofortis Minerals Bureau of Land Management Pozzolan Minerals Claims, Long Valley, Lassen County, California*, Revised May 13, 2020.

Stevens, R. Jorgensen et. al., *Forb and Seed Production Guide for Utah*, Logan, Utah State University Extension Service, 1996.

United States Department of Agriculture, *The Woody Plant Seed Manual, Agricultural Handbook 727*, April 2008.

Polygonaceae—Buckwheat family

## *Eriogonum* Michx.

wild-buckwheat, buckwheatbrush

Susan E. Meyer

Dr. Meyer is a research ecologist at the USDA Forest Service's Rocky Mountain Research Station, Shrub Sciences Laboratory, Provo, Utah

**Growth habit, occurrence, and uses.** The North American genus *Eriogonum*—wild-buckwheat, also buckwheatbrush—is made up of about 200 species of annual and perennial herbs and shrubs, most of which are found in the West. About half are woody, at least at the base. The habit of the woody species may be either (a) truly shrubby, (b) subshrubby, with annual renewal of upper shoots, or (c) pulvinate (mat-forming), with the woody shoots condensed into an above-ground caudex. The usually evergreen leaves are borne alternately and may be predominantly basal or borne along the stems. There may be whorls of leaves on the flowering stalks. The leaves are usually tomentose, at least below, and the stem nodes are often tomentose as well. The often-flat-topped inflorescences are usually borne above the leafy part of the plant and are conspicuous and characteristic even after seed dispersal.

Most plant communities in the West contain at least 1 species of woody wild-buckwheat (table 1). Some species are widely distributed and of wide ecological amplitude (for example, sulfurflower buckwheat brush), whereas others are narrowly restricted geographically and often edaphically as well (for example, pretty buckwheat brush). Wild-buckwheat species are often important pioneer plants after natural disturbance, and their presence may facilitate the establishment of later-successional species. This makes them useful for erosion control and for revegetation of anthropogenically disturbed sites such as mined land and highway rights-of-way (Ratliff 1974; Zamora 1994). Some species are important as browse plants for wild ungulates, particularly in the early spring when their evergreen habit makes them more highly nutritive than many other spring browse species (Tiedemann and Driver 1983; Tiedemann and others 1997). Some wild-buckwheat species are important bee plants. In California, Mojave buckwheatbrush has been rated third in importance for honey production, exceeded only by 2 native *Salvia* species (Kay and others 1977). Many wild-buckwheat species also have tremendous potential as easily grown, drought-tolerant ornamentals. Their interesting forms and leaf textures combined with masses of showy,

long-lasting flowers make them excellent candidates for home xeriscapes. Named varieties that have been released are 'Sierra' sulfurflower wild-buckwheat (Stevens and others 1996) and 'Umatilla' snow wild-buckwheat (Tiedemann and others 1997).

**Flowering and fruiting.** The small, usually perfect flowers of wild-buckwheat are borne in clusters within cup-like or cylindrical involucre that are variously solitary or arrayed in capitate, cymose, or panicle inflorescences. Each flower consists of a perianth with 9 stamens inserted at its base and a superior 1-celled and 1-seeded ovary. The perianth is made up of 6 fused segments in 2 whorls of 3. The ovary ripens in fruit into a usually 3-angled achene (figures 1 and 2). This achene is held more or less tightly within the perianth, depending on the species. For example, in snow wild-buckwheat the achenes fall free of the perianth at dispersal, whereas in Shockley wild-buckwheat the woolly perianth with the achene enclosed is the dispersal unit. The ovule within the seed is anatropous, so that the radicle end is pointing outward and upward. This makes it possible for germination and emergence to take place with the perianth still attached.

Wild-buckwheat species may flower at any time from early spring to fall, depending on species and habitat. Within a given habitat, species may bloom in succession. For example, at mid-elevation in central Utah, cushion wild-buckwheat blooms in spring, followed by James wild-buckwheat in early to midsummer, and finally by lace buckwheatbrush in late summer and fall. The bloom time for any species usually lasts well over a month, and the plants are almost as showy in fruit as in flower. The flowers are insect-pollinated.

**Seed collection, cleaning, and storage.** The window of opportunity for seed collection of wild-buckweats is often rather wide, as the fruits usually persist on the plant for 2 to 3 weeks after maturity (Stevens and others 1996). When achenes are mature, the perianths dry and often change color, turning brown or rusty. At this point, the achenes can be harvested by hand-stripping or by beating them into hop-

**Table 1—** *Eriogonum*, wild-buckwheat: habit, habitat, and geographic range

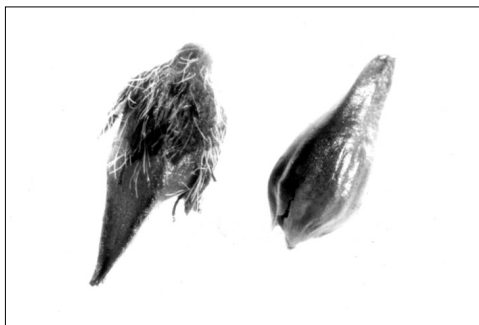
Species	Common name(s)*	Habitat	Range
<b>SHRUBS</b>			
<i>E. corymbosum</i> Benth.	lace buckwheatbrush, buckwheatbrush, crisp-leaf buckwheat	Desert shrub, pinyon juniper, mostly on shales	Colorado Plateau, Uinta Basin, & adjacent areas
<i>E. fasciculatum</i> Benth.	Mojave buckwheatbrush, California buckwheatbrush, flat-top buckwheatbrush	Warm desert shrub, coastal sage scrub, chaparral, pinyon-juniper	Mojave & Colorado Deserts & coastal & cismontane S California
<i>E. heermannii</i> Dur. & Hilg.	Heermann buckwheatbrush, molecule model plant	Warm desert shrub, mostly on rock outcrops	Mojave Desert
<b>SUBSHRUBS</b>			
<i>E. brevicaule</i> Nutt.	shortstem wild-buckwheat	Open, barren hills, mountain brush to alpine	Central Rocky Mtns of Wyoming, Utah & Idaho
<i>E. heracleoides</i> Nutt.	Wyeth wild-buckwheat, parsnipflower buckwheat	Sagebrush-grassland to aspen & Douglas-fir	N Rocky Mtns from BC to central Utah
<i>E. jamesii</i> Benth.	James wild-buckwheat	Desert shrub to mountain brush & ponderosa pine	S Rocky Mtns S into N Mexico
<i>E. niveum</i> Dougl. ex Benth.	snow wild-buckwheat, snow eriogonum	Sagebrush-grassland	Columbia River Plateau
<i>E. umbellatum</i> Torr.	sulfurflower wild-buckwheat, sulfur wildbuckwheat	Sagebrush-grassland to spruce-fir	Widespread in W North America
<b>PULVINATE/ MAT-FORMING</b>			
<i>E. bicolor</i> M.E. Jones	pretty buckwheatbrush	Cold desert shrub, on Mancos Shale	Central Utah
<i>E. ovalifolium</i> Nutt.	cushion wild-buckwheat, roundleaf buckwheat	Wide range, from cold desert to alpine	Widespread, W North America
<i>E. shockleyi</i> S. Wats.	Shockley wild-buckwheat, mat buckwheat	Desert shrub to pinyon-juniper	Idaho & Colorado to SE California, Arizona, & New Mexico

Source: Meyer and Paulsen (2000).

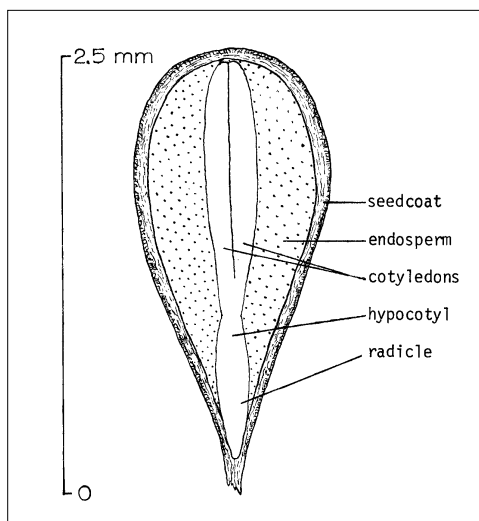
Note: The genus *Eriogonum* is not that of the true, domesticated buckwheat, hence the common names of wild-buckwheat and buckwheatbrush.



**Figure 1**—*Eriogonum fasciculatum*, Mojave buckwheatbrush: achene in calyx (left) and achene without calyx (right).



**Figure 2**—*Eriogonum fasciculatum*, Mojave buckwheatbrush: longitudinal section through a seed excised from an achene.



pers or other containers. Combine harvesting has proven successful for sulflower wild-buckwheat in seed production fields (Stevens and others 1996). The harvested material will include achenes, perianths, involucre, and inflorescence branches. After the material is dried thoroughly, it may be threshed in a barley de-bearder and cleaned with a fanning mill. Species with tightly held achenes may require hand-rubbing through screens or on a rubbing board, which is also an alternative cleaning method for small seedlots of any species. The material should not be handled too rough-

ly, as the radicle end of the achene is often slender and easily damaged. Achene weights vary both among and within species but are usually in the range of 350 to 1,360/g (10,000 to 39,000/oz) (table 2). Seed quality is also variable (table 2).

There are few published reports of viability evaluation beyond germination percentages obtained without pretreatment, which may underestimate viability if there is a dormant fraction. Stevens and others (1996) report that viabilities of >90% may be expected from sulflower and Wyeth wild-buckwheats in an agronomic setting if seeds are harvested when fully mature; these values are comparable to those for wild-collected lots of many species (table 2). Insects may damage 10 to 35% of the fruits prior to harvest, but damaged seeds are normally eliminated in cleaning. Post-harvest damage from insect infestations is also possible (Stevens and others 1996). There is little information on maintenance of viability during storage for species of wild-buckwheat. Stevens and others (1996) report high viability for sulflower and Wyeth wild-buckwheats during 10 to 15 years in warehouse storage, which would indicate orthodox storage behavior. Other species are perhaps comparable.

**Seed germination and testing.** Germination is epigeal (figure 3). Seedlots of many species of wild-buckwheats contain at least a fraction that will germinate without any pretreatment (tables 2 and 3) (Young 1989). The size of this fraction depends on species and on the particular lot involved. Stevens and others (1996) report that seeds of sulflower and Wyeth wild-buckwheats lose dormancy during short periods of dry storage, and Mojave buckwheatbrush seeds are also reported to dry after-ripen (Kay and others 1977). Dormant seeds of most species we have examined lose dormancy during chilling at 1 °C for periods of 8 to 12 weeks (table 3).

To date there are no formal procedures for evaluating the seed quality of wild-buckwheat species, and tetrazolium (TZ) staining is probably the procedure most commonly employed. To evaluate using TZ, achenes are soaked overnight in water, clipped through both pericarp and seed coat at the cotyledon end (the wide end or hilum), and placed in 1% TZ solution for several hours at room temperature. Achenes are bisected longitudinally for evaluation (Belcher 1985).

**Field seeding and nursery practice.** Wild-buckwheats are generally readily established from direct seeding (Ratliff 1974; Stevens and others 1996; Tiedemann and Driver 1983; Zamora 1994). They establish best when seeded at a depth of 2 to 5 mm ( $1/16$  to  $3/16$  in), either by drilling or by broadcasting followed by covering (for example, raking). Seeding should take place before the season of maximum precipitation, which is generally fall or early winter in

**Table 2—*Eriogonum*, wild-buckwheat: achene weights and typical viability percentages**

Species	Achenes/weight		Viability	
	/g	/lb	%	Test
<b>SHRUBS</b>				
<i>E. corymbosum</i>	900	410,000	93	Post-chilling cut test
	2,000	900,000	—	—
<i>E. fasciculatum</i>	1,330	600,000	4–34	Germination %, no pretreatment
	520–1,085	236,000–490,000	20–46	Germination %, no pretreatment
<i>E. heermannii</i>	660	300,000	95	Post-chilling cut test
<b>SUBSHRUBS</b>				
<i>E. brevicaulle</i>	700	320,000	84	Post-chilling cut test
<i>E. heracleoides</i>	350	160,000	95	Post-chilling cut test
	310	141,000	87	Post-chilling cut test
<i>E. jamesii</i>	350	160,000	—	—
<i>E. niveum</i>	1,290–1,360	585,000–620,000	52–72	Germination %; no pretreatment
<i>E. umbellatum</i>	470	213,000	86	Post-chilling cut test
	265	120,000	—	—
<b>PULVINATE/MAT-FORMING</b>				
<i>E. bicolor</i>	960	436,000	47	Post-chilling cut test
<i>E. ovalifolium</i>	990	450,000	95	Post-chilling cut test
<i>E. shockleyi</i>	750	340,000	86	Post-chilling cut test

**Sources:** Belcher (1985), Kay and others (1977), Meyer and Paulsen (2000), Stevens and others (1996), Tiedemann and Driver (1983).

\* Post-chilling cut tests (AOA 1996) are considered accurate for recently harvested seedlots; however, tetrazolium staining (TZ) is required for seedlots stored for more than 2 years.

**Table 3—*Eriogonum*, wild-buckwheat: germination percentages**

Species	Samples	Germination* (% of total viable seeds)				
		No chill	4 weeks	8 weeks	12 weeks	16 weeks
<i>E. brevicaulle</i>	2	3	28	65	86	96
<i>E. corymbosum</i>	3	28	79	100	100	100
<i>E. heracleoides</i>	3	4	11	30	55	77
<i>E. jamesii</i>	2	54	79	91	94	100
<i>E. ovalifolium</i>	2	22	74	98	98	100
<i>E. umbellatum</i>	4	7	30	74	99	100

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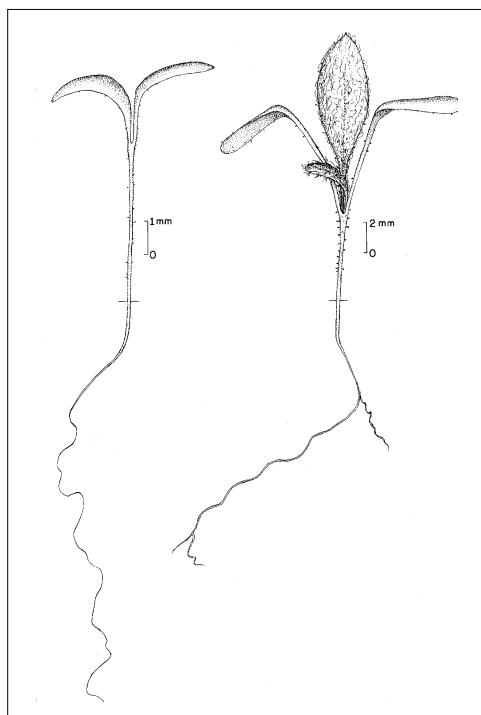
\* Germination percentage determined after 0 to 16 weeks of chilling at 1 °C followed by 4 weeks of incubation at 10/20 °C

northern rainfall regions and midsummer in southern rainfall regions. Most wild-buckwheats are early seral and do not compete well with heavy stands of perennial grasses. Wild-buckwheats planted for field seed production are reported to reach 30 to 50% of maximum production, 200 to 400 kg/ha (180 to 360 lb/ac), the second year after planting (Stevens and others 1996).

Most species of wild-buckwheat are also easily propagated in a nursery setting. Shaw (1984) reported that Wyeth wild-buckwheat may be successfully produced as 1+0 bare-root stock. Because of the taprooted habit, plants must be

lifted carefully. Other woody wild-buckwheats could probably be produced as bareroot stock, but no published information is available. Wild-buckwheats may also be produced as container stock; book planters or tube containers such as those used for producing conifer seedlings are most appropriate. Nondormant lots may be direct-sown, whereas seedlots requiring chilling may be sown as chilled seed or as young germlings (Landis and Simonich 1984). Seedlings of many species grow rapidly and should not be held in small containers for more than a few months. Many species flower the first year and may even form flowering stalks while still in small tube containers.

**Figure 3**—*Eriogonum fasciculatum*, Mojave buckwheat-brush: very young seedling (left) and older seedling (right).



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Stevens et al. (1996) suggest that the Buckwheat seeds exhibit orthodox storage behavior and this would indicate that the seeds should be dried to 10% moisture or less and then stored at subfreezing temperatures. This would suggest a 10 to 15 year storage time is reasonable with high viability. Since the revegetation of the mine site is proposed to be concurrent with mining operation, this storage time would allow for seeding within this time frame.

## **Seeding**

The USDA Woody Plant Seed Manual suggest that Wild-Buckwheats are readily established from direct seeding. They are established best when seeded to a depth of 2 to 5 mm and since the proposed seeding areas will be small, this can be done by hand. Seeding will occur in late fall or early winter.

## **Monitoring**

The revegetation will be monitored during the mining operation and for 5 years after mining has ceased. The revegetation of the White Woolly Buckwheat will be considered successful when the number of individuals plants established is equal to or greater than the number of plants identified in the BEC report.

## **Attachments**

Portion of Appendix E from USDA Handbook 727, *Polygonaceae-Buckwheat Family*

## **References**

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Polygonaceae—Buckwheat family

## *Eriogonum* Michx. wild-buckwheat, buckwheatbrush

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**Growth habit, occurrence, and uses.** The North American genus *Eriogonum*—wild-buckwheat, also buckwheatbrush—is made up of about 200 species of annual and perennial herbs and shrubs, most of which are found in the West. About half are woody, at least at the base. The habit of the woody species may be either (a) truly shrubby, (b) subshrubby, with annual renewal of upper shoots, or (c) pulvinate (mat-forming), with the woody shoots condensed into an above-ground caudex. The usually evergreen leaves are borne alternately and may be predominantly basal or borne along the stems. There may be whorls of leaves on the flowering stalks. The leaves are usually tomentose, at least below, and the stem nodes are often tomentose as well. The often-flat-topped inflorescences are usually borne above the leafy part of the plant and are conspicuous and characteristic even after seed dispersal.

Most plant communities in the West contain at least 1 species of woody wild-buckwheat (table 1). Some species are widely distributed and of wide ecological amplitude (for example, sulfurflower buckwheat brush), whereas others are narrowly restricted geographically and often edaphically as well (for example, pretty buckwheat brush). Wild-buckwheat species are often important pioneer plants after natural disturbance, and their presence may facilitate the establishment of later-successional species. This makes them useful for erosion control and for revegetation of anthropogenically disturbed sites such as mined land and highway rights-of-way (Ratliff 1974; Zamora 1994). Some species are important as browse plants for wild ungulates, particularly in the early spring when their evergreen habit makes them more highly nutritive than many other spring browse species (Tiedemann and Driver 1983; Tiedemann and others 1997). Some wild-buckwheat species are important bee plants. In California, Mojave buckwheatbrush has been rated third in importance for honey production, exceeded only by 2 native *Salvia* species (Kay and others 1977). Many wild-buckwheat species also have tremendous potential as easily grown, drought-tolerant ornamentals. Their interesting forms and leaf textures combined with masses of showy,

long-lasting flowers make them excellent candidates for home xeriscapes. Named varieties that have been released are 'Sierra' sulfurflower wild-buckwheat (Stevens and others 1996) and 'Umatilla' snow wild-buckwheat (Tiedemann and others 1997).

**Flowering and fruiting.** The small, usually perfect flowers of wild-buckwheat are borne in clusters within cup-like or cylindrical involucre that are variously solitary or arrayed in capitate, cymose, or panicle inflorescences. Each flower consists of a perianth with 9 stamens inserted at its base and a superior 1-celled and 1-seeded ovary. The perianth is made up of 6 fused segments in 2 whorls of 3. The ovary ripens in fruit into a usually 3-angled achene (figures 1 and 2). This achene is held more or less tightly within the perianth, depending on the species. For example, in snow wild-buckwheat the achenes fall free of the perianth at dispersal, whereas in Shockley wild-buckwheat the woolly perianth with the achene enclosed is the dispersal unit. The ovule within the seed is anatropous, so that the radicle end is pointing outward and upward. This makes it possible for germination and emergence to take place with the perianth still attached.

Wild-buckwheat species may flower at any time from early spring to fall, depending on species and habitat. Within a given habitat, species may bloom in succession. For example, at mid-elevation in central Utah, cushion wild-buckwheat blooms in spring, followed by James wild-buckwheat in early to midsummer, and finally by lace buckwheatbrush in late summer and fall. The bloom time for any species usually lasts well over a month, and the plants are almost as showy in fruit as in flower. The flowers are insect-pollinated.

**Seed collection, cleaning, and storage.** The window of opportunity for seed collection of wild-buckwheats is often rather wide, as the fruits usually persist on the plant for 2 to 3 weeks after maturity (Stevens and others 1996). When achenes are mature, the perianths dry and often change color, turning brown or rusty. At this point, the achenes can be harvested by hand-stripping or by beating them into hop-

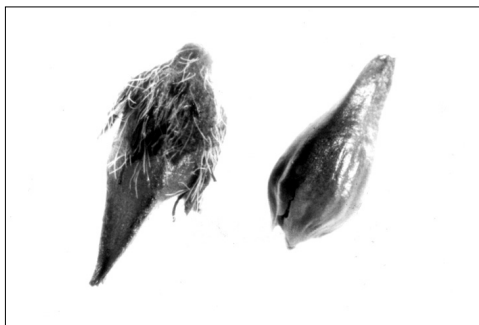
**Table 1—** *Eriogonum*, wild-buckwheat: habit, habitat, and geographic range

Species	Common name(s)*	Habitat	Range
<b>SHRUBS</b>			
<i>E. corymbosum</i> Benth.	lace buckwheatbrush, buckwheatbrush, crisp-leaf buckwheat	Desert shrub, pinyon juniper, mostly on shales	Colorado Plateau, Uinta Basin, & adjacent areas
<i>E. fasciculatum</i> Benth.	Mojave buckwheatbrush, California buckwheatbrush, flat-top buckwheatbrush	Warm desert shrub, coastal sage scrub, chaparral, pinyon-juniper	Mojave & Colorado Deserts & coastal & cismontane S California
<i>E. heermannii</i> Dur. & Hilg.	Heermann buckwheatbrush, molecule model plant	Warm desert shrub, mostly on rock outcrops	Mojave Desert
<b>SUBSHRUBS</b>			
<i>E. brevicaule</i> Nutt.	shortstem wild-buckwheat	Open, barren hills, mountain brush to alpine	Central Rocky Mtns of Wyoming, Utah & Idaho
<i>E. heracleoides</i> Nutt.	Wyeth wild-buckwheat, parsnipflower buckwheat	Sagebrush-grassland to aspen & Douglas-fir	N Rocky Mtns from BC to central Utah
<i>E. jamesii</i> Benth.	James wild-buckwheat	Desert shrub to mountain brush & ponderosa pine	S Rocky Mtns S into N Mexico
<i>E. niveum</i> Dougl. ex Benth.	snow wild-buckwheat, snow eriogonum	Sagebrush-grassland	Columbia River Plateau
<i>E. umbellatum</i> Torr.	sulfurflower wild-buckwheat, sulfur wildbuckwheat	Sagebrush-grassland to spruce-fir	Widespread in W North America
<b>PULVINATE/ MAT-FORMING</b>			
<i>E. bicolor</i> M.E. Jones	pretty buckwheatbrush	Cold desert shrub, on Mancos Shale	Central Utah
<i>E. ovalifolium</i> Nutt.	cushion wild-buckwheat, roundleaf buckwheat	Wide range, from cold desert to alpine	Widespread, W North America
<i>E. shockleyi</i> S. Wats.	Shockley wild-buckwheat, mat buckwheat	Desert shrub to pinyon-juniper	Idaho & Colorado to SE California, Arizona, & New Mexico

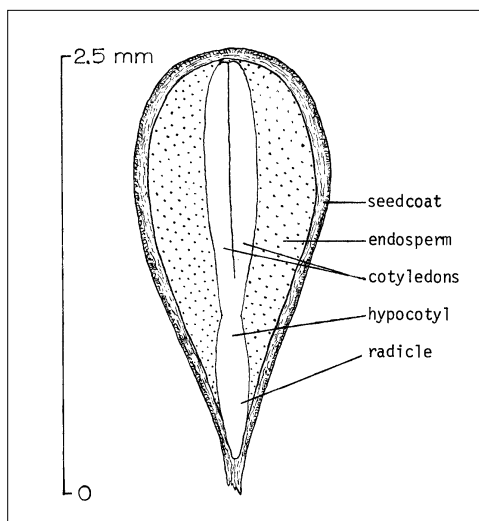
Source: Meyer and Paulsen (2000).

Note: The genus *Eriogonum* is not that of the true, domesticated buckwheat, hence the common names of wild-buckwheat and buckwheatbrush.

**Figure 1**—*Eriogonum fasciculatum*, Mojave buckwheatbrush: achene in calyx (left) and achene without calyx (right).



**Figure 2**—*Eriogonum fasciculatum*, Mojave buckwheatbrush: longitudinal section through a seed excised from an achene.



pers or other containers. Combine harvesting has proven successful for sulflower wild-buckwheat in seed production fields (Stevens and others 1996). The harvested material will include achenes, perianths, involucre, and inflorescence branches. After the material is dried thoroughly, it may be threshed in a barley de-bearder and cleaned with a fanning mill. Species with tightly held achenes may require hand-rubbing through screens or on a rubbing board, which is also an alternative cleaning method for small seedlots of any species. The material should not be handled too rough-

ly, as the radicle end of the achene is often slender and easily damaged. Achene weights vary both among and within species but are usually in the range of 350 to 1,360/g (10,000 to 39,000/oz) (table 2). Seed quality is also variable (table 2).

There are few published reports of viability evaluation beyond germination percentages obtained without pretreatment, which may underestimate viability if there is a dormant fraction. Stevens and others (1996) report that viabilities of >90% may be expected from sulflower and Wyeth wild-buckwheats in an agronomic setting if seeds are harvested when fully mature; these values are comparable to those for wild-collected lots of many species (table 2). Insects may damage 10 to 35% of the fruits prior to harvest, but damaged seeds are normally eliminated in cleaning. Post-harvest damage from insect infestations is also possible (Stevens and others 1996). There is little information on maintenance of viability during storage for species of wild-buckwheat. Stevens and others (1996) report high viability for sulflower and Wyeth wild-buckwheats during 10 to 15 years in warehouse storage, which would indicate orthodox storage behavior. Other species are perhaps comparable.

**Seed germination and testing.** Germination is epigeal (figure 3). Seedlots of many species of wild-buckwheats contain at least a fraction that will germinate without any pretreatment (tables 2 and 3) (Young 1989). The size of this fraction depends on species and on the particular lot involved. Stevens and others (1996) report that seeds of sulflower and Wyeth wild-buckwheats lose dormancy during short periods of dry storage, and Mojave buckwheatbrush seeds are also reported to dry after-ripen (Kay and others 1977). Dormant seeds of most species we have examined lose dormancy during chilling at 1 °C for periods of 8 to 12 weeks (table 3).

To date there are no formal procedures for evaluating the seed quality of wild-buckwheat species, and tetrazolium (TZ) staining is probably the procedure most commonly employed. To evaluate using TZ, achenes are soaked overnight in water, clipped through both pericarp and seed coat at the cotyledon end (the wide end or hilum), and placed in 1% TZ solution for several hours at room temperature. Achenes are bisected longitudinally for evaluation (Belcher 1985).

**Field seeding and nursery practice.** Wild-buckwheats are generally readily established from direct seeding (Ratliff 1974; Stevens and others 1996; Tiedemann and Driver 1983; Zamora 1994). They establish best when seeded at a depth of 2 to 5 mm ( $1/16$  to  $3/16$  in), either by drilling or by broadcasting followed by covering (for example, raking). Seeding should take place before the season of maximum precipitation, which is generally fall or early winter in

**Table 2—*Eriogonum*, wild-buckwheat: achene weights and typical viability percentages**

Species	Achenes/weight		Viability	
	/g	/lb	%	Test
<b>SHRUBS</b>				
<i>E. corymbosum</i>	900	410,000	93	Post-chilling cut test
	2,000	900,000	—	—
<i>E. fasciculatum</i>	1,330	600,000	4–34	Germination %, no pretreatment
	520–1,085	236,000–490,000	20–46	Germination %, no pretreatment
<i>E. heermannii</i>	660	300,000	95	Post-chilling cut test
<b>SUBSHRUBS</b>				
<i>E. brevicaulle</i>	700	320,000	84	Post-chilling cut test
<i>E. heracleoides</i>	350	160,000	95	Post-chilling cut test
	310	141,000	87	Post-chilling cut test
<i>E. jamesii</i>	350	160,000	—	—
<i>E. niveum</i>	1,290–1,360	585,000–620,000	52–72	Germination %; no pretreatment
<i>E. umbellatum</i>	470	213,000	86	Post-chilling cut test
	265	120,000	—	—
<b>PULVINATE/MAT-FORMING</b>				
<i>E. bicolor</i>	960	436,000	47	Post-chilling cut test
<i>E. ovalifolium</i>	990	450,000	95	Post-chilling cut test
<i>E. shockleyi</i>	750	340,000	86	Post-chilling cut test

Sources: Belcher (1985), Kay and others (1977), Meyer and Paulsen (2000), Stevens and others (1996), Tiedemann and Driver (1983).

\* Post-chilling cut tests (AOA 1996) are considered accurate for recently harvested seedlots; however, tetrazolium staining (TZ) is required for seedlots stored for more than 2 years.

**Table 3—*Eriogonum*, wild-buckwheat: germination percentages**

Species	Samples	Germination* (% of total viable seeds)				
		No chill	4 weeks	8 weeks	12 weeks	16 weeks
<i>E. brevicaulle</i>	2	3	28	65	86	96
<i>E. corymbosum</i>	3	28	79	100	100	100
<i>E. heracleoides</i>	3	4	11	30	55	77
<i>E. jamesii</i>	2	54	79	91	94	100
<i>E. ovalifolium</i>	2	22	74	98	98	100
<i>E. umbellatum</i>	4	7	30	74	99	100

Source: Meyer and Paulsen (2000).

\* Germination percentage determined after 0 to 16 weeks of chilling at 1 °C followed by 4 weeks of incubation at 10/20 °C

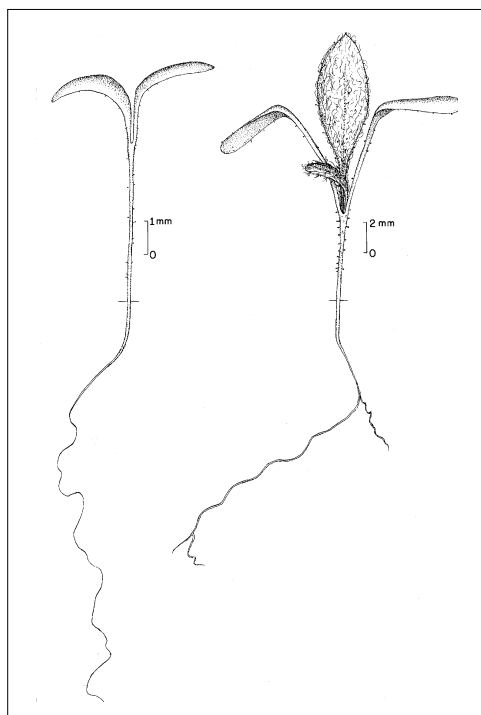
northern rainfall regions and midsummer in southern rainfall regions. Most wild-buckwheats are early seral and do not compete well with heavy stands of perennial grasses. Wild-buckwheats planted for field seed production are reported to reach 30 to 50% of maximum production, 200 to 400 kg/ha (180 to 360 lb/ac), the second year after planting (Stevens and others 1996).

Most species of wild-buckwheat are also easily propagated in a nursery setting. Shaw (1984) reported that Wyeth wild-buckwheat may be successfully produced as 1+0 bare-root stock. Because of the taprooted habit, plants must be

lifted carefully. Other woody wild-buckwheats could probably be produced as bareroot stock, but no published information is available. Wild-buckwheats may also be produced as container stock; book planters or tube containers such as those used for producing conifer seedlings are most appropriate. Nondormant lots may be direct-sown, whereas seedlots requiring chilling may be sown as chilled seed or as young germlings (Landis and Simonich 1984). Seedlings of many species grow rapidly and should not be held in small containers for more than a few months. Many species flower the first year and may even form flowering stalks while still in small tube containers.



**Figure 3**—*Eriogonum fasciculatum*, Mojave buckwheat-brush: very young seedling (left) and older seedling (right).



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