
Draft

Report of Findings Reconnaissance Level Biological and Rare Plant Surveys for Reed Mine



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Acronyms and Abbreviations

AMSL	Above Mean Sea Level
BLM	Bureau of Land Management
Burleson	Burleson Consulting Inc.
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDDB	California Natural Diversity Database
CDFW	California Department of Fish and Wildlife
CNPS	California Native Plant Society
CRWQCB	California Regional Water Quality Control Board
CWA	Clean Water Act
DBH	Diameter at Breast Height
DCR	Davis Creek Reservoir
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FESA	Federal Endangered Species Act
MBTA	Migratory Bird Treaty Act
NPPA	Native Plant Protection Act
OLRA	Old Lower Reed Adit
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VELB	Valley Elderberry Longhorn Beetle
Yolo HCP/NCCP	Yolo Habitat Conservation Plan/Natural Communities Conservation Plan

1.0 Introduction

Burleson Consulting, Inc. (Burleson) prepared this report of findings regarding the reconnaissance-level biological survey for the Reed Mine and Upper Davis Creek Remediation Project located in Lake County for the Homestake Mining Company of California (Homestake). The Reed Mine location and vicinity are presented in Figure 1. Burleson's biologist Kevin Ghalambor and botanist Julia Fields completed a reconnaissance-level biological survey and rare plant survey of the proposed Project Site on May 23 and 24, 2018, focusing on six proposed remediation areas (Figure 2). The six areas surveyed comprise the Project Site and include:

- **Remediation Area 1:** Fusi-yama Adit Waste Rock
- **Remediation Area 2:** Reed North Waste Rock
- **Remediation Area 3:** Waste Rock and Drainage at the Old Lower Reed Adit (OLRA)
- **Remediation Area 4:** East Bank Upper Davis Creek Waste Rock
- **Remediation Area 5:** West Bank Furnace Area
- **Remediation Area 6:** Former Reed Mine Processing Area

The remediation goal for Reed Mine remediation areas is to reduce the potential risk of water quality degradation posed by mining wastes, and includes the following steps:

- Remove hazardous materials and dispose at a permitted off-site facility.
- Remove mine waste from banks of Upper Davis Creek and tributaries.
- Minimize erosion of mine waste at Reed Mine North.
- Prevent contact of mine drainage with mine waste at the OLRA.
- Minimize, to the extent practical, the concentration of arsenic, cobalt, copper, mercury, and nickel in drainage at the OLRA.

Implementing these remedial steps is expected to minimize risks to site visitors from exposure to mine waste at Reed Mine, and is expected to abate potential degradation of surface water beneficial use potentially associated with mine waste in the remediation areas.

The goal of these project activities is to mitigate adverse impacts potentially resulting from mining wastes in the Upper Davis Creek drainage and reduce the threat of further erosion of such material with the potential to impact surface waters and the environment. The project intends to meet these goals by removing or isolating mine wastes (waste rock and tailings) to minimize contact with surface water along Upper Davis Creek and tributaries. Additionally, the project is intended to reduce risks to protect human health and the environment by removing process residuals on the site that contain elevated levels of mercury.

This report presents results of the reconnaissance level biological and rare-plant survey, potential impacts to biological resources, and avoidance recommendations.

2.0 Existing Environmental Conditions

The Reed Mine (aka Reid Mine in older reports) is an inactive historic mercury mine located along the canyon of Upper Davis Creek in Yolo County, California, about 13.4 miles southeast of Lower Lake in Lake County, California (Figure 1). The Reed Mine Site consists of approximately 370 acres in a rural area along the upper tributary of Davis Creek, located within private property surrounded by Bureau of Land Management (BLM) property. Davis Creek Reservoir (DCR) is located 0.5 mile downstream of the Reed Mine features and covers approximately 267.5 acres (Figure 1).

The Reed Mine is reached by following Morgan Valley Road about 12.4 miles east-southeast of the intersection with California State Highway 53 in Lower Lake, Lake County, California, and turning left (northeast) onto Rayhouse/Reiff Road, then following Rayhouse/Reiff Road about 3.2 miles easterly to the Andalusia Pit, the northern most workings of the Reed Mine.

The Reed Mine is situated in Sections 23, 24, 25, and 26; Township 12N, Range 5W, Mount Diablo Baseline and Meridian at an elevation of about 1600 feet above mean sea level (amsl), along Yolo County Road 40 (aka Rayhouse Road and Rieff Road).

The Reed Mine consists of the Andalusia Mine, Fusiya Mine, and Reed Mine, associated underground workings (including 13 adits), historical waste rock and tailings piles, and the former Reed Mine processing area (Figure 2). Features associated with the Reed Mine extend about 1.3 miles along the Upper Davis Creek Canyon from the vicinity of the Andalusia Pit to the former Reed Mine processing area upstream from the DCR. Remediation activities are proposed to take place within these areas.

3.0 Habitat Assessment

The following text describes the methods used in this survey and biological conditions in the proposed Project Site, including vegetation near the remediation areas, local wildlife species, and special-status species with potential to occur in the general vicinity (see Figures 3a through 3e).

3.1 Methods

A list of federal and State special-status plant and wildlife species was developed for the proposed Project Site using a database search, which included a query of processed data from the California Natural Diversity Database (CNDDDB) for the Knoxville and 8 surrounding U.S. Geological Survey (USGS) 7.5-minute quadrangles. A spatial query of the CNDDDB was conducted to produce a map of special-status species with known occurrences within 5 miles of the Project Site (CNDDDB 2018) (Figure 4). Also, a list of federally endangered or threatened species was generated by the U.S. Fish and Wildlife Service (USFWS, 2018). The CNDDDB/USFWS searches and information on special-status plants and wildlife observed at the Project Site and documented from other sources and the information from were added to the special-status species list (Table 1). A

For the purpose of this survey, special-status species are defined as plants and wildlife that are legally protected under the State or Federal Endangered Species Act, plants that are considered rare (listed 1-3 but not including plant rank 4) by the California Native Plant Society (CNPS), species of concern under California Department of Fish and Wildlife (CDFW), and wildlife on special watch lists.

On May 23 and 24, 2018, Mr. Ghalambor and Ms. Fields completed a biological reconnaissance-level pedestrian and rare plant survey of the proposed Project Site, focused on proposed remediation areas and the immediate vicinity of the areas (see Appendix B). Plants and wildlife were observed and recorded as they were sighted along meandering transects throughout the areas. Binoculars were used to view areas inaccessible by foot, scan for birds, apparent nesting sites, and potential nesting sites.

A reconnaissance survey of all the adits at or near the proposed remediation areas at Reed Mine was conducted on May 23 and 24, 2018 by Dr. Ed West with support from Burleson biologists to determine the locations of any existing and potential bat roosts. All known adits, shafts, buildings and associated mining structures in the area were carefully searched for openings and bat sign (roosting bats, bat vocalizations, guano, urine stains and insect part middens) to determine bat presence. A follow-up bat emergence survey was conducted at the rotary furnace on June 6, 2018 by Dr. Ed West, Brian Keeley, and Ryan Byrnes.

Additionally, a tree survey was performed by Burleson on September 15 and 16, 2018 to document trees that could be impacted by remediation activities. Photographs were taken of the various habitat types, wildlife, and plants (Appendix A).

3.2 General Habitat

The Project Site supports a mosaic of plant communities due to its rich variety of geologic substrates, in particular serpentine habitats. Chemically hostile to most plants, serpentine deposits within the project area create islands of rare and endemic plants that have adapted to these harsh soils along with numerous associated endemic insects. Where there are non-serpentine soils, the vegetation shifts suddenly to more typical coast range habitats, including riparian woodland, blue oak woodland and savannah, grassland, and chaparral. Serpentine plant communities include mixed serpentine chaparral, cypress chaparral, serpentine grasslands, and serpentine seeps and riparian habitats. Non-serpentine plant communities include blue oak woodlands, annual grassland, chamise chaparral, mixed chaparral, and riparian woodlands. Both substrates support streams with rich riparian communities. Remediation areas surveyed did not contain serpentine plant communities. There are human-created plant communities on the Project Sites' previously disturbed by mining activities and reclaimed later by Homestake (UC Davis, 2013). Human-created plant communities occur on Homestake's revegetated waste rock piles, dam abutments, roadsides, and other disturbed areas.

Habitat immediately within the remediation areas was composed of plants typical of disturbed areas including a mix of nonnative and native grasses, herbs, native shrubs, and native trees. The Waste Rock and Drainage at the Old Lower Reed Adit, Fusiyaama Adit Waste Rock, and Reed North Waste Rock sites are surrounded by mixed serpentine chaparral. Riparian woodland is within and surrounding the East Bank Upper Davis Creek Waste Rock and West Bank Furnace Area. Annual grassland (non-native) habitat surrounds the Former Reed Mine Processing Area.

Davis Creek flows into DCR and then into Cache Creek. The upper reach flows southeast, and then the stream makes a dramatic horseshoe bend to the northwest at the base of Little Blue Ridge, where the DCR is now located. Davis Creek has steep banks that are moderately to highly eroded, areas of cobbles and large rock substrates, and many wide flat areas with sandy or silty bottoms. Davis Creek has an aquatic flora dominated by sedges and rushes.

It should be noted that the Project Site was subject to a large wildfire that burned in 2015. As a result of fire suppression activities, non-native and invasive grasses were observed in larger quantities than on previous site visits for non-biological

support. Fire retardant used within the area contained fertilizer or other soil amendments to support post fire revegetation efforts, which has supported growth of non-native grass that is beginning to heavily invade open space areas and grassland communities around the project area. Vegetation is still in intermediate recovery following the fire.

3.3 Plants Observed per Remediation Area

The plant list for each area is included in Appendix B. A summary of the typical, most common species identified in each area during the biological survey is provided in this section. The Fusiyama Adit Waste Rock, Reed North Waste Rock, and Waste Rock and Drainage at the OLRA had sections of steep slope that were not accessible. While these areas were scanned visually, the limited accessibility may mean that additional species were not recorded.

3.3.1 Fusiyama Adit Waste Rock (Remediation Area 1) and Reed North Waste Rock (Remediation Area 2)

The Fusiyama Adit Waste Rock (Figure 3a) and Reed North Waste Rock (Figure 3b) areas were composed of mixed chaparral with grey pine (*Pinus sabiniana*) and disturbed habitat. Within the remediation areas, vegetation was sparse and isolated, with scattered areas of exposed waste rock, indicating disturbed habitat. The main difference between the two areas was Fusiyama Adit Waste Rock area contained more areas of exposed waste rock and disturbed habitat while the Reed North Waste Rock area was more densely vegetated. However, the overall vegetation makeup surrounding the two sites was similar.

Native vegetation observed within and immediately surrounding the remediation areas included: Yerba santa (*Eriodictyon californicum*), common manzanita (*Arctostaphylos manzanita ssp. manzanii*), inland scrub oak (*Quercus berberidifolia*), California bay (*Umbellularia californica*), deer brush (*Ceanothus integerrimus*), musk brush (*Ceanothus jepsonii*), California coffeeberry (*Rhamnus californica*), redbud (*Cercis occidentalis*), birch leaf mountain mahogany (*Cercocarpus betuloides var. betuloides*), toyon (*Heteromeles arbutifolia*), and grey pine. Understory vegetation was similar between the two areas, although the Reed North Waste Rock area supported a higher number of herbs than the Fusiyama Adit Waste Rock area. Blue elderberry (*Sambucus nigra ssp. caerulea*) and California nutmeg (*Torreya californica*) were observed at the Reed North Waste Rock area, but not at the Fusiyama Adit Waste Rock area.

Non-native species, mainly grasses, were observed in the open space areas of the remediation areas. Non-native species observed included: soft chess (*Bromus hordeaceus*), foxtail chess (*Bromus madritensis madritensis*), and wild oat (*Avena barbata*).

3.3.2 Waste Rock and Drainage at the Old Lower Reed Adit (OLRA) (Remediation Area 3)

This area is broken into two sites, Reed South 2 and Reed South 3 (Figure 3c). Reed South 2 is located upslope of Reed South 3 and contains mixed chaparral. Reed South 3, below Reed South 2, is located at the mouth of an old adit and situated directly on top of waste rock containing wetland components and disturbed habitat.

A small flow of water exits an adit and feeds into a wetland area on waste rock (Figure 3c). The wetland area did not contain standing water at the time of the survey, but the area immediately outside the adit was saturated with iron oxidized soil. Plants observed at and surrounding the wetland feature and in the vicinity of Reed South 3 included: pointed rush (*Juncus oxymersis*), cattail (*Typha sp.*), curly dock (*Rumex crispus*), California buckeye (*Aesculus californica*), California bay (*Umbellularia californica*), blue elderberry, toyon, yerba santa, narrow leaf milkweed (*Asclepias fascicularis*), and fiddleneck (*Amsinckia menziesii*).

Species observed in the Reed South 2 area included: common manzanita, grey pine, deer brush, inland scrub oak, chamise (*Adenostoma fasciculatum*), California poppy (*Eschscholzia californica*), blue oak (*Quercus douglasii*), and leather oak (*Quercus durata var. durata*).

Non-native species, mainly observed in the disturbed area and fringe of the wetland in Reed South 3, include: field bindweed (*Convolvulus arvensis*), white sweetclover (*Melilotus albus*), rose clover (*Trifolium hirtum*), Medusa head (*Elymus caput-medusae*), orchard grass (*Dactylis glomerata*), pampas grass (*Cortaderia selloana*), foxtail brome (*Bromus madritensis ssp. rubens*), and foxtail chess.

Burleson conducted a preliminary wetland determination of the wetland feature on May 24, 2018. The wetland determination was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Arid West Region Supplement) (U.S. Army Corps of Engineers 2006). The wetland feature identified on site may potentially be designated a water of the U.S. if the U.S. Army Corps of Engineers (USACE) determines that it has connectivity with waters of the U.S.

3.3.3 East Bank Upper Davis Creek Waste Rock (Remediation Area 4) and West Bank Furnace Area (Remediation Area 5)

These areas are directly opposite of each other located along Upper Davis Creek within riparian forest/woodland, about 0.20 mile upstream before the creek enters DCR (Figure 3d). The East Bank Upper Davis Creek Waste Rock site borders on annual grassland to east, but generally resides in riparian habitat.

West Bank Furnace Area contains an upland area generally made up of disturbed habitat from old mining activity, with pockets of mixed chaparral and disturbed habitat that borders riparian habitat.

Species observed in the riparian area were mostly native and include: California buckeye (*Aesculus californica*), redbud (*Cercis occidentalis*), and red willow (*Salix laevigata*), torrent sedge (*Carex nudata*), pointed rush (*Juncus oxymeris*), blue elderberry, poison oak (*Toxicodendron diversilobum*), yarrow (*Achillea millefolium*), giant mountain dandelion (*Agoseris grandiflora*), mugwort (*Artemisia douglasiana*), California man-root (*Marah fabacea*), Cobwebby hedge nettle (*Stachys albens*), and climbing bedstraw (*Galium porrigens*).

Species observed outside the riparian area at the grassland border of East Bank Upper Davis Creek Waste Rock were mostly non-native grasses and include: silvery hairgrass (*Aira caryophyllea*), wild oat, California brome grass (*Bromus carinatus*), ripgut brome (*Bromus diandrus*), soft chess, foxtail chess, foxtail brome, blue wildrye (*Elymus glaucus*), quack grass (*Elymus repens*), rattail sixweeks grass (*Festuca myuros*), woolly angelica (*Angelica tomentosa*), mustard (*Brassica sp.*), and California burclover (*Medicago polymorpha*). California brome and blue wildrye are native grasses.

Species observed outside the riparian area at the disturbed border of West Bank Furnace Area include: narrow leaf milkweed, gumweed (*Madia gracilis*), fiddleneck (*Amsinckia menziesii*), yerba santa, inland scrub oak, deer brush, toyon, and Birch leaf mahogany (*Cercocarpus betuloides var. betuloides*).

3.3.4 Former Reed Mine Processing Area (Remediation Area 6)

This area is located upslope from the East Bank Upper Davis Creek Waste Rock area and is within annual grassland with grey pines dispersed throughout (Figure 3e). Species observed were mainly non-native grasses which include: wild oat, ripgut brome, soft chess, foxtail chess, foxtail brome, dogtail grass (*Cynosurus echinatus*), quack grass, yellow starthistle (*Centaurea solstitialis*), prickly lettuce (*Lactuca serriola*), spiny sowthistle (*Sonchus asper*), mustard, smooth vetch, and rose clover. Additional native tree and shrub species observed in the area include: blue elderberry, blue oak, and California coffeeberry.

3.3.5 Tree Survey

A tree survey was conducted at each remediation area to map any trees in the remediation areas with a diameter at breast height (DBH) of 4 inches or larger that might be removed or damaged during remediation activities. The majority of the trees surveyed were recorded as “dead” as a result of the 2015 fire. Trees

recorded include gray pine, oak trees (varied), blue elderberry, and western sycamore. Tree survey results are shown on Figures 3a-3e and Table 2.

3.4 Special-Status Plant Species

Thirty-one special-status plants were identified by the CNDDDB and USFWS search for Knoxville and the eight surrounding 7.5 minute quadrangles (CDFW, 2018; USFWS, 2018) (Figure 3).

All but three of the plant species identified in the database search were determined to have some (low, moderate, or high) likelihood of occurrence at the Project Site. This determination was made if they were found within five miles of the property through the CNDDDB search or observed during the survey, had suitable habitat, and generally occurred within the elevations of the Project Site. Special-status species with a low, moderate, or high likelihood of occurrence include: Napa false indigo (*Amphora californica* var. *napensis*), Bent-flowered fiddleneck (*Amsinckia lunaris*), Jepson's milk-vetch (*Astragalus rattanii* var. *jepsonianus*), Big-scale balsamroot (*Balsamorhiza macrolepis*), pink creamsacs (*Castilleja rubicundula* ssp. *rubicundula*), Sonoma ceanothus (*Ceanothus sonomensis*), pappose tarplant (*Centromadia parryi* ssp. *parryi*), deep-scarred cryptantha (*Cryptantha excavate*), Jepson's coyote-thistle (*Eryngium jepsonii*), Snow Mountain buckwheat (*Eriogonum nervulosum*), San Joaquin spearscale (*Extriplex joaquinana*), adobe-lily (*Fritillaria pluriflora*), Toren's grimmia (*Grimmia torenii*), Hall's harmonia (*Harmonia hallii*), two-carpellate western flax (*Hesperolinon bicarpellatum*), drymaria-like western flax (*Hesperolinon drymarioides*), Sharsmith's western flax (*Hesperolinon sharsmithiae*), Colusa layia (*Layia septentrionalis*), Jepson's leptosiphon (*Leptosiphon jepsonii*), Cobb Mountain lupine (*Lupinus sericatus*), Porter's navarretia (*Navarretia paradoxinota*), Marin County navarretia (*Navarretia rosulata*), Sonoma beardtongue (*Penstemon newberryi* var. *sonomensis*), Freed's jewel-flower (*Streptanthus brachiatus* ssp. *hoffmanii*), Green jewel-flower (*Streptanthus hesperidis*), Three Peaks jewelflower (*Streptanthus morrisonii* ssp. *elatus*), Kruckeberg's jewelflower (*Streptanthus morrisonii* ssp. *kruckebergii*), and Keck's checker-mallow (*Sidalcea keckii*).

The three plant species not likely to occur at the Project Site include: Burke's goldfields (*Lasthenia burkei*), bearded popcornflower (*Plagiobothrys hystriculus*), and Northern California black walnut (*Juglans hindsii*). Burke's goldfields and bearded popcorn flower are associated with vernal pool habitat which is absent from the Project Site. Northern California black walnut has suitable habitat present; however, this species was not observed during any of the surveys. It is unlikely this species will become established within the project area by the time remediation activities take place.

Although identified in the CNDDDB search, no special-status plants were observed during the May 23 and 24, 2018 rare plant and reconnaissance level biological survey. Several of the special-status plants are generally found in serpentine soils, which are present at the Reed Mine area, with serpentine outcrops present in the vicinity of remediation areas; however, serpentine soils are not the dominant soil type present at the specific locations where remediation activities will occur. Plant species associated with serpentine soils were considered to have a “low” potential for occurrence due to the prevalence of serpentine outcrops.

3.5 General Wildlife

The chaparral, woodland, grassland, and aquatic communities at and in the vicinity of the remediation areas can support numerous birds, mammals, fish, reptiles, and amphibians. Due to the Project Site also acting as a UC Reserve, observations of general wildlife in the area have been well documented. A full list of general wildlife observed in the area can be obtained from the McLaughlin Natural Reserve website at <https://naturalreserves.ucdavis.edu/mclaughlin-reserve>. The section below discusses general wildlife that could be encountered on Project Site.

Birds

Common bird species associated with chaparral habitat include California thrasher (*Toxostoma redivivium*), wrenit (*Chaemaea fasciata*), California quail (*Callipela californica*), California towhee (*Pipilo crissalis*), and spotted towhee (*Pipilo maculatus*).

Within oak woodland, western scrub jays (*Aphelocoma californica*), wild turkeys (*Meleagris gallopavo*), and acorn woodpeckers (*Melanerpes formicivorous*) forage heavily on the acorns, while oak titmice (*Parus inornatus*), western bluebirds (*Sialia mexicanus*), American kestrels (*Falco sparverius*) and tree swallows (*Tachycine bicolor*) nest in the cavities of older oaks. Raptors such as red-tailed hawk (*Buteo jamaicensis*), Cooper’s hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*) and American kestrel (*Falco sparverius*) use the oaks for nesting, roosting, and as perches while foraging. Golden eagles (*Aquila chrysaetos*) may be seen in the winter as they perch in oaks adjacent to grassland clearings, waiting for a jackrabbit or other medium-sized mammal to pass by (UC Davis 2017).

Around and at DCR, common bird species include; double-crested cormorants (*Phalacrocorax auritus*), common mergansers (*Mergus merganser*), belted kingfishers (*Megaceryle alcyon*), and osprey (*Pandion haliaetus*). Great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), black phoebe (*Sayornis nigricans*), and red-winged blackbirds (*Agelaius phoeniceus*) are found along the

shoreline and in the emergent vegetation. This area also supports bald eagles (*Haliaeetus leucocephalus*), with a known pair residing at the DCR. This species is discussed further in the next section.

Bird species observed during surveys include; bald eagle, osprey, red-tailed hawk, California quail, acorn woodpeckers, red-winged blackbirds, western scrub jays, *Accipiter sp.*, mourning doves (*Zenaida macroura*), and turkey vultures (*Cathartes aura*).

Mammals

According to McLaughlin Natural Reserve data, 38 mammalian species have been seen in the area and 16 others are thought to potentially occur (UC Davis 2017). Raccoon (*Procyon lotor*), black bear (*Ursus americanus*), and mule deer (*Odocoileus hemionus*) can be found in riparian woodland. Brush rabbits (*Sylvilagus bachmani*), western grey squirrels (*Sciurus griseus*), and Townsend's chipmunk can be found in mixed oak/pine woodland. Blue oak woodlands often host the black-tailed jackrabbit (*Lepus californicus*) and the Botta's pocket gopher (*Thomomys bottae*). In grasslands, typical species include the brush rabbit and black-tailed jackrabbit. Typical species found in chaparral include the brush rabbit, black-tailed jackrabbit, mule deer, bobcat (*Lynx rufus*), Townsend's chipmunk, mountain lion (*Puma concolor*), and coyote (*Canis latrans*).

Abandoned mine features associated with the Project Site provide suitable habitat for bats. Common bat species with potential to occur include; California myotis (*Myotis californicus*), hoary bat (*Lasiurus cinereus*), and red bat (*Lasiurus blossevillii*).

Species observed during surveys include; mule deer, western grey squirrels, chipmunk, jackrabbits, and a single coyote. Species were mainly observed in chaparral habitats, with the exception of the coyote, which was observed within grassland habitat near the Reed Mine Processing Area.

Fish

Upper Davis Creek and DCR support both native and non-native fish species. Native fish species include; California roach (*Hesperoleucus symmetricus*), Sacramento sucker (*Catostomus occidentalis*), and Sacramento squawfish (*Ptychocheilus grandis*). Non-natives fish species include green sunfish (*Lepomis cyanellus*) and mosquitofish (*Gambusia affinis*). Additionally, DCR supports non-native bluegill (*Lepomis macrochirus*) and largemouth bass (*Micropterus salmoides*), which were introduced to assess mercury concentrations.

No fish species were observed during surveys.

Reptiles and Amphibians

Western fence lizards (*Sceloporus occidentalis*), northern alligator lizards (*Gerrhonotus coeruleus*), southern alligator lizards (*Gerrhonotus multicarinatus*), side-blotched lizards (*Uta stansburiana*), western skinks (*Eumeces skiltonianus*) and California whiptail lizards (*Aspidoscelis tigris munda*) are present in chaparral, grassland and oak woodland.

Common kingsnakes (*Lampropeltis getulus*), California mountain kingsnakes (*Lampropeltis zonata*), gopher snakes (*Pituophis melanoleucus*), and northern Pacific rattlesnakes (*Crotalus viridis oreganus*) can be found in grassland, woodland, and chaparral habitats. California red-sided garter snakes (*Thamnophis sirtalis infernalis*), western terrestrial garter snakes (*Thamnophis elegans*), and western aquatic garter snakes (*Thamnophis couchi*) can be found near aquatic habitats, mainly DCR and Upper Davis Creek.

Bullfrogs (*Rana catesbeiana*), western toads (*Bufo boreas*), and Pacific treefrogs (*Hyla regilla*) are the common frog/toad species found in the area. These species are found in ponds and streams.

California newts (*Taricha torosa*) and rough-skinned newts (*Taricha granulosa*) are present in and near ponds and streams.

Both newt species and several lizard species were observed in the project area during surveys. Evidence of rattlesnakes (molted snake skin) was also observed; however, no live snakes were observed. No other reptiles or amphibians were observed during surveys.

3.6 Special-Status Wildlife Species

Seventeen special-status wildlife species were identified in the CNDDDB and USFWS search for Knoxville and the eight surrounding 7.5 minute quadrangles (CNDDDB, 2018; USFWS, 2018). Four of these species are not likely to occur on the Project Site because of a lack of suitable habitat (Table 1). This determination was made if they were found within five miles of the property through the CNDDDB search or observed during the survey, had suitable habitat, and generally occurred within the elevations of the Project Site.

Valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) is completely dependent on its host plant, elderberry, and elderberry shrubs were seen on the site. Elderberry shrubs were identified at all remediation areas, with the exception of Fusiyama Adit Waste Rock area. The project site is outside the current range of this species; however, because hosts plants were found there is a potential for VELB to be on site.

Three species of reptile/amphibians were identified by the database search. Western pond turtle (*Emys marmorata*) requires permanent ponds for habitat. This species has been observed in the DCR and there is high likelihood this species would be encountered at the remediation areas along Upper Davis Creek. Additionally, California red-legged frog (*Rana aurora draytonii*) and foothill yellow-legged frog (*Rana boylei*) have potential to occur within the project area at Upper Davis Creek and DCR; however, the California red-legged frog is less likely. The foothill yellow-legged frog has been observed within McLaughlin Reserve. Davis Creek has suitable habitat for this species. California red-legged frog (*Rana aurora draytonii*) is the largest native frog in the Western United States. These frogs require dense, shrubby or emergent vegetation associated with deep still or slow-moving water. The edges of the DCR provides suitable habitat for this species.

Eight special-status birds were identified in the search. Two of these species are not likely to occur because of the general lack of habitat. Northern spotted owl resides in old-growth, multi-layered mixed conifer, redwood, Douglas-fir habitats. They feed on small mammals and typically nest in a tree or snag cavity, or in the broken top of a large tree. The proposed project is lacking suitable old growth trees for nesting and foraging habitat. Swainson's hawk are adapted to the open grasslands, and have become dependent on agriculture, especially alfalfa crops, as native communities are converted to agricultural lands. They will use lone trees in agricultural fields or pastures and roadside trees when available and adjacent to suitable foraging habitat. Suitable foraging habitat is absent from the Project Site.

Special-status birds with potential to occur at the Project Site include tricolored blackbird (*Agelaius tricolor*), golden eagle (*Aquila chrysaetos*), burrowing owl (*Athene cunicularia*), bald eagle (*Haliaeetus leucocephalus*), prairie falcon (*Falco mexicanus*), and bank swallow (*Riparia riparia*). Riparian habitat along Davis Creek and surrounding DCR can support tricolored blackbirds and bank swallows. The DCR can support bald eagle (observed during survey) and grasslands can support burrowing owl. Prairie falcons can utilize all types of habitat found at the Project Site. Additionally, ospreys have been documented nesting in the area and the DCR provides suitable foraging habitat and trees surrounding the DCR provide suitable nesting habitat. While ospreys are not federally or state listed, this species is protected under the Migratory Bird Treaty Act (MBTA).

Three special-status bats were identified, Townsend's big-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), and western red bat (*Lasiurus blossevillii*). Townsend's big-eared bat is found throughout California in all but subalpine and alpine habitats. Day roosts require caves, mines, tunnels, buildings, or other human-made structures. The follow-up emergence survey

showed that Townsend's big-eared bats (*Corynorhinus townsendii*) and one or more species of *Myotis* were roosting in the furnace.

Townsend's big-eared bats has a high likelihood to occur at the proposed Project Site based on this occurrence. Pallid bat and western red bat were not observed during the bat survey; however, suitable habitat for these species is similar to Townsend's big eared-bat, and there is a low likelihood of occurrence.

The four wildlife species not likely to occur at the Project Site include: Vernal pool fairy shrimp (*Branchinecta lynchi*), northern spotted owl (*Strix occidentalis caurina*), Swainson's hawk (*Buteo swainsoni*), and delta smelt (*Hypomesus transpacificus*). Vernal pool fairy shrimp are associated with vernal pool habitat which is absent from the Project Site. Swainson's hawk require agricultural fields for foraging and nest in trees adjacent to this habitat. Old growth forest associated with Northern spotted owl is absent from the Project Site. Delta smelt is found in saline Sacramento-San Joaquin estuaries which is outside the Project Site vicinity. All of these habitats are absent from the project area and these species are not likely to occur.

4.0 Regulatory Setting

This section provides a summary of the major Federal, State, and Local laws and permits pertaining to biological resource protection for the proposed remediation project.

4.1 Federal Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973 requires a Federal agency authorizing, funding or carrying out a project within its jurisdiction to determine whether any Federally listed threatened or endangered species may be present within a study area and determine whether the agency's action could affect any Federally listed species. Threatened and endangered species (which are identified in 50 CFR §§ 17.11 and 17.12) are protected and prohibited from "take", defined as direct or indirect harm or harassment, unless an ESA Section 10 permit is granted to an entity other than the Federal agency or a Biological Opinion with incidental take provisions is rendered to a Federal lead agency via ESA Section 7 consultation. Pursuant to the requirements of the ESA, an agency reviewing the Proposed Project within its jurisdiction must determine whether any Federally listed or proposed species may be present in the study area and determine whether the Proposed Project is likely to jeopardize the continued existence of such species or result in the adverse modification or destruction of the habitat for such species (16 U.S.C. § 1536(a)).

4.2 Clean Water Act

The CWA makes it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit is obtained.

Section 404 of the CWA protects waters of the United States, including wetlands and drainages, by requiring projects that would discharge fill material into them to obtain a permit or authorization from the USACE. The permitting program is designed to avoid the discharge of fill into Waters of the United States, hereinafter referred to as “wetlands,” or when impacts on wetlands cannot be avoided, to require compensatory mitigation.

Section 401 of the CWA requires any applicant for a federal license or permit that could result in any discharge into a navigable water (*e.g. a*, USACE permit to fill wetlands) to obtain certification from the CRWQCB. In 1989, EPA issued guidance to States on the application of Section 401 to wetlands.

4.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (Title 16, United States Code, § 703-712) was implemented through various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. The law was enacted in 1918 and was last amended in 1989. Pursuant to the Act, taking, killing, or possessing migratory birds is unlawful. The MBTA is administered by the USFWS, which establishes seasons for hunting and permitted actions (*e.g.*, licensed hunting or research activities). Project proponents of actions that have potential to negatively affect migratory birds, their nests, or their eggs are required to enter into a Memorandum of Understanding with USFWS to ensure that impacts to migratory birds are minimized and that suitable habitats are restored and/or enhanced where possible and practicable.

4.4 California Environmental Quality Act

California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000 through 21177) applies to all projects undertaken, funded, or requiring an issuance of a permit by a public agency. CEQA’s basic purposes are to inform governmental decision-makers and the public about the potential significant environmental effects of proposed activities; identify ways that environmental damage can be avoided or significantly reduced; require changes in projects through the use of alternatives or mitigation measures when feasible; and disclose to the public the reasons why a project was approved if significant environmental effects are involved.

4.5 California Endangered Species Act

The California Endangered Species Act (CESA) of 1984 (California Fish and Game Code §§ 2050 et seq.) requires consultation with the State Department of Fish and Wildlife (CDFW) to determine whether any State-listed endangered or threatened species are present in a study area, and whether those species may be adversely affected by a project. The CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-caused losses of listed species populations and their essential habitats.

4.6 California Fully Protected Species (FGC §§ 3511, 4700, 5050, and 5515)

Under Section 3511 of the California Fish and Game Code, fully protected species may not be taken or possessed at any time and licenses or permits may not be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Four sections of the California Fish and Game Code list 37 fully protected species (California Fish and Game Code Sections 3511, 4700, 5050, and 5515). Each of these statutes (a) prohibits take or possession “at any time” of the species listed in the statute, with few exceptions, (b) states that no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to “take” the species, and (c) states that no previously issued permits or licenses for take of the species “shall have any force or effect” for authorizing take or possession.

4.7 Lake and Streambed Alteration Agreement

Section 1602 of the California Fish and Game Code requires a Streambed Alteration Agreement for any activity that may alter the bed and/or bank of a lake, stream, river, or channel. Typical activities that require a Streambed Alteration Agreement include excavation or fill placed within a channel, vegetation clearing, structures for diversion of water, installation of culverts and bridge supports, cofferdams for construction dewatering, and bank reinforcement.

4.8 Yolo County Natural Community Conservation Plan and Habitat Conservation Plan

The Yolo Habitat Conservation Plan/Natural Communities Conservation Plan (“Yolo HCP/ NCCP”) was developed to provide for the conservation of twelve (12) sensitive species and the natural communities and agricultural land on

which they depend, and to provide a streamlined permitting process to address the effects a range of future anticipated activities on those species.

The Yolo HCP/NCCP and associated Yolo County ordinances have been prepared to help implement in a manner that achieves, among other things, the following objectives: (a) To protect, enhance, and restore natural communities and cultivated lands, including rare and endangered species habitat, and provide for the conservation of covered species within Yolo County; (b) To replace the current system of separately permitting and mitigating individual projects with a conservation and mitigation program, set forth in the Yolo HCP/ NCCP, that comprehensively coordinates the implementation of permit requirements through the development of a countywide conservation strategy, including identification of priority acquisition areas in riparian zones or other locations with important species habitat; (c) To provide for additional habitat conservation that is otherwise unlikely to take place in Yolo County and benefit both listed species and project proponents by ensuring a more efficient, effective approach to mitigation; and (d) To ensure that the Conservancy, in its capacity as the implementing entity for the Yolo HCP/NCCP, collects the local development mitigation fees necessary to assist with plan implementation and all of the related objectives set forth above.

5.0 Potential Impacts to Biological Resources with Recommendations

The project consists of removing mine waste (waste rock, ore, and tailings) from six locations, stabilizing waste rock in a gully in waste rock at one location, implementing erosion controls including revegetation of disturbed areas, and monitoring.

Recommendations to protect sensitive species and habitat are discussed below.

5.1 Bird Species

At the time of the survey, one special-status bird species, bald eagle, was observed with a known nest location along the western shoreline of DCR. This bird is currently a fully protected State species. Other than this species, no other special-status species were observed flying, foraging, or nesting on the proposed Project Site. The absence of nesting birds and special-status species during the pedestrian survey is not evidence that there will be no nesting birds or special-status species on the Project Site during construction.

Therefore, if construction activities will occur during the nesting season (estimated to be January through August), pre-construction surveys for the presence of special-status bird species or any nesting bird species within 500 feet of proposed construction areas should be conducted by a qualified biologist. This survey should be conducted no more than 14 days prior to the initiation of construction activities during the breeding season (raptors – February through August). During this survey, the biologist would inspect all trees and grassland immediately adjacent to the remediation areas for nests. If any other nest sites of bird species protected under the MBTA are observed within the vicinity of the Project Site, then the project should be modified and/or delayed as necessary to avoid direct take of identified nest, eggs, and/or young.

If vegetation will be removed by the proposed project and all necessary approvals have been obtained, substrate (e.g., trees and shrubs) containing nests should be removed between November 1 and February 28 to ensure that active (containing intact eggs, live chicks, or presence of an adult) nests are not destroyed or disturbed as a result of project construction activities. If a nest may be destroyed during the nesting season, a qualified biologist should survey the nest to determine if it is active.

5.2 Bats

One special-status bat species was observed during a 2018 bat survey of the Project Site. The survey of a rotary furnace at the Former Reed Mine Processing Area site revealed bats were actively using the furnace as a day roost. The follow-up emergence survey showed that Townsend's big-eared bats (*Corynorhinus townsendii*) and one or more species of *Myotis* were roosting in the furnace. No evidence of bats or bat colonies were identified at any of the other remediation areas at Reed Mine. However, the bats roosting in the rotary furnace will need to be excluded from the furnace prior to its removal. The bats should be excluded by a qualified bat biologist using one-way gates at each end of the furnace. Once the bats have been excluded, the furnace can be sealed and removed. The exclusion should be conducted only after the breeding season (April 15 - August 31), but before the hibernation season (October 15 - March 1), or between March 31 and April 15 - after the hibernation season but before the reproductive season. No disturbance of the furnace site should occur during the bat breeding season (West 2018).

5.3 Rare Plants and other Vegetation

No rare plant species were found at the remediation areas surveyed. The absence of rare plants on the survey dates is not evidence that there are no rare plants at the remediation areas.

Therefore, follow-up rare plant surveys should be conducted at the proposed Project Site between April and June. These surveys should be completed before any construction activities begin and should be floristic in nature.

Many native grasses and shrubs were observed. Therefore, it is recommended to the extent feasible that construction activities minimize disturbances to native plants. General recommended avoidance measures should help minimize impacts to rare plants and native vegetation.

5.4 VELB

Elderberry shrubs were observed at all the remediation areas with the exception of the Fusiyama Adit Waste Rock area. The presence of VELB was not observed; however, focused exit hole and stem count surveys were not conducted, and its presence should be assumed.

For any proposed construction activities that will occur within 100 feet of the surveyed elderberry plants, avoidance measures should be implemented. Per VELB Guidelines, when construction does occur within 100 feet of elderberry shrubs, where possible, a minimum buffer of 25 feet from the drip line will be implemented and strictly adhered to, and the USFWS will be consulted. Section 7 consultation with the USFWS will likely be required if impacts to elderberry shrubs cannot be avoided.

5.5 Special-status Reptiles and Amphibians

Western pond turtle (*Emys marmorata*), California red-legged frog (*Rana aurora draytonii*) and foothill yellow-legged frog (*Rana boyleii*) have potential to occur at the project site. Western pond turtle and foothill yellow-legged frog have been observed at or near the Project Site. Davis Creek can support yellow legged-frog and the DCR can support both western pond turtle and California red-legged frog. Focused protocol level surveys that cover all life cycles for these species should be conducted prior to any construction to determine presence or absence of the species. Measures discussed in Section 5.6 for riparian and wetland areas should also help reduce any potential impacts to these species.

Additional avoidance measure for these species include:

- The time period for completing the work within the project area shall be restricted to periods of low stream flow and dry weather and shall be confined to the period of March 15th to November 30th. Construction activities shall be timed with awareness of precipitation forecasts and likely increases in stream flow. Construction activities within the project area shall cease until all reasonable erosion control measures, inside and

outside of the project area, have been implemented prior to all storm events. Revegetation, restoration and erosion control work is not confined to this time period.

- If work in the flowing portion of the stream is unavoidable, the entire stream flow shall be diverted around or through the work area during the excavation and/or construction operations. Stream flow shall be diverted using gravity flow through temporary culverts/pipes or pumped around the work site with the use of hoses. When any dam or other artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the dam pursuant to FGC Section 5937. The temperature of the diverted water will not be allowed to become elevated such that it may be deleterious to aquatic organisms downstream. The dissolved oxygen concentration of the diverted water will not be allowed to drop to a level that may be deleterious to downstream aquatic life. Any temporary dam or other artificial obstruction constructed shall only be built from clean materials such as sandbags, gravel bags, water dams, or clean/washed gravel which will cause little or no siltation. If sheet piling is driven into the stream or lakebed to create a coffer dam to protect the work area, a bubble curtain, at a minimum will be installed while all pilings are being driven so as to minimize adverse concussive impacts to aquatic species. Water from inside of lake or pond coffer dams may be pumped out into the water body provided the water is clear (not turbid) and free of any oil sheen or other visible contaminants.

5.6 Riparian and Wetland Areas

A potential jurisdictional wetland is located at the Waste Rock and Drainage at the Old Lower Reed Adit (OLRA) site. Soil surface cracks were observed around the outer edges of the wetland feature and saturated soils were present closer to the mouth of the adit. The actual opening of the adit is not visible. Plants associated with wetlands such as Baltic rush (*Juncus balticus ssp. ater*) and cattail (*Typha sp.*) were the dominant species in the saturated area.

The wetland feature sits directly on top of mine waste that is proposed to be removed, ultimately, impacting the wetland. Additionally, a treatment system for the adit drainage has been proposed at this location; however, no final decisions have been made at the time of this report.

This area could provide habitat for special-status amphibian species, although focused surveys have not been conducted at this location. Protocol level

amphibian surveys should be conducted at this feature to verify presence/absence of special-status amphibian species.

The wetland determination forms prepared during the survey should be submitted to the USACE to determine if the feature is jurisdictional under Section 404 of the Clean Water Act (CWA). Section 404 protects waters of the U.S. that include wetlands and drainages, by requiring projects that would discharge fill material into them to obtain a permit or authorization from the USACE. The permitting program is designed to minimize the fill of waters of the U.S., and when impacts cannot be avoided, require compensatory mitigation. Additionally, Section 401 of the Clean Water Act requires any applicant for a federal license or permit that could result in any discharge into a non-navigable water (*i.e.*, USACE permit to fill wetlands) to obtain certification from the California Regional Water Quality Control Board (CRWQCB). However, if the USACE does not consider the seasonal wetland jurisdictional, a Section 401 Permit may still be required.

Riparian areas were the primary habitat at the East Bank Upper Davis Creek Waste Rock and West Bank Furnace Area. Waste rock in these areas are proposed for excavation and removal. Since these riparian areas are directly adjacent to Davis Creek, additional care should be taken when carrying out activities that may promote erosion such as cutting down trees and grading, to avoid disturbing riparian habitat beyond the project limits. Revegetation activities should take place following construction. A Section 1600 Streambed Alteration Permit from CDFW would likely be required.

5.7 General Recommendations

The following general recommendations for protection of the habitat and plant and wildlife species should be considered, in addition to the specific recommendations listed above:

- Where present, existing paved and unpaved roads should be used to access the work area.
- All work should be performed in the dry season (approximately April 15 through October 15) to reduce the likelihood of erosion. A qualified biologist (biological monitor) should be present onsite when necessary to inspect any construction-related activities to ensure that no unnecessary ground disturbance or take of species occurs.
- No pesticides or herbicides should be used within 250 feet of riparian or wetland areas.

- Construction equipment should be washed before entering the site to avoid introducing non-native or invasive species to the area.
- All sensitive areas (riparian, potential wetland, and bat-roosting) should be clearly delineated and flagged prior to construction to avoid disturbance to these areas.
- All areas to be avoided during construction will be fenced and flagged, and contractors and work crews will be briefed on the importance to avoid damaging elderberry shrubs during construction and the possible penalties for not complying with these requirements. See Section 5.4 above for additional elderberry shrub avoidance measures.
- Erosion and sediment control measures to protect environmental sensitive areas should be in place prior to the beginning of construction activities. Precautions to minimize turbidity/siltation shall be taken into account during project planning and implementation. This may require the placement of silt fencing, coir logs, coir rolls, straw bale dikes, or other siltation barriers so that silt and/or other deleterious materials are not allowed to pass to downstream reaches. Passage of sediment beyond the sediment barrier(s) is prohibited. If any sediment barrier fails to retain sediment, corrective measures shall be taken. The sediment barrier(s) shall be maintained in good operating condition throughout the construction period and the following rainy season. Maintenance includes, but is not limited to, removal of accumulated silt and/or replacement of damaged silt fencing, coir logs, coir rolls, and/or straw bale dikes.
- Utilize Best Management Practices (BMPs) to prevent spills and leaks into water bodies. If maintenance or refueling of vehicles or equipment must occur on-site, use a designated area and/or a secondary containment, located away from drainage courses to prevent the runoff of storm water and the runoff of spills. Ensure that all vehicles and equipment are in good working order (no leaks). Place drip pans or absorbent materials under vehicles and equipment when not in use. Ensure that all construction areas are covered by a site-wide spill response plan and have proper spill clean-up materials (absorbent pads, sealed containers, booms, etc.) to contain the movement of any spilled substances. Any other substances which could be hazardous to aquatic life, resulting from project related activities, shall be prevented from contaminating the soil and/or entering the waters of the State. Any of these materials, placed within or where they may enter a stream or lake by the contractor or any party working under contract or with the permission of the contractor, shall be removed immediately.

Homestake Mining Company - Biological and Rare Plant Surveys for Reed Mine

Figure 1 - Project Location Map



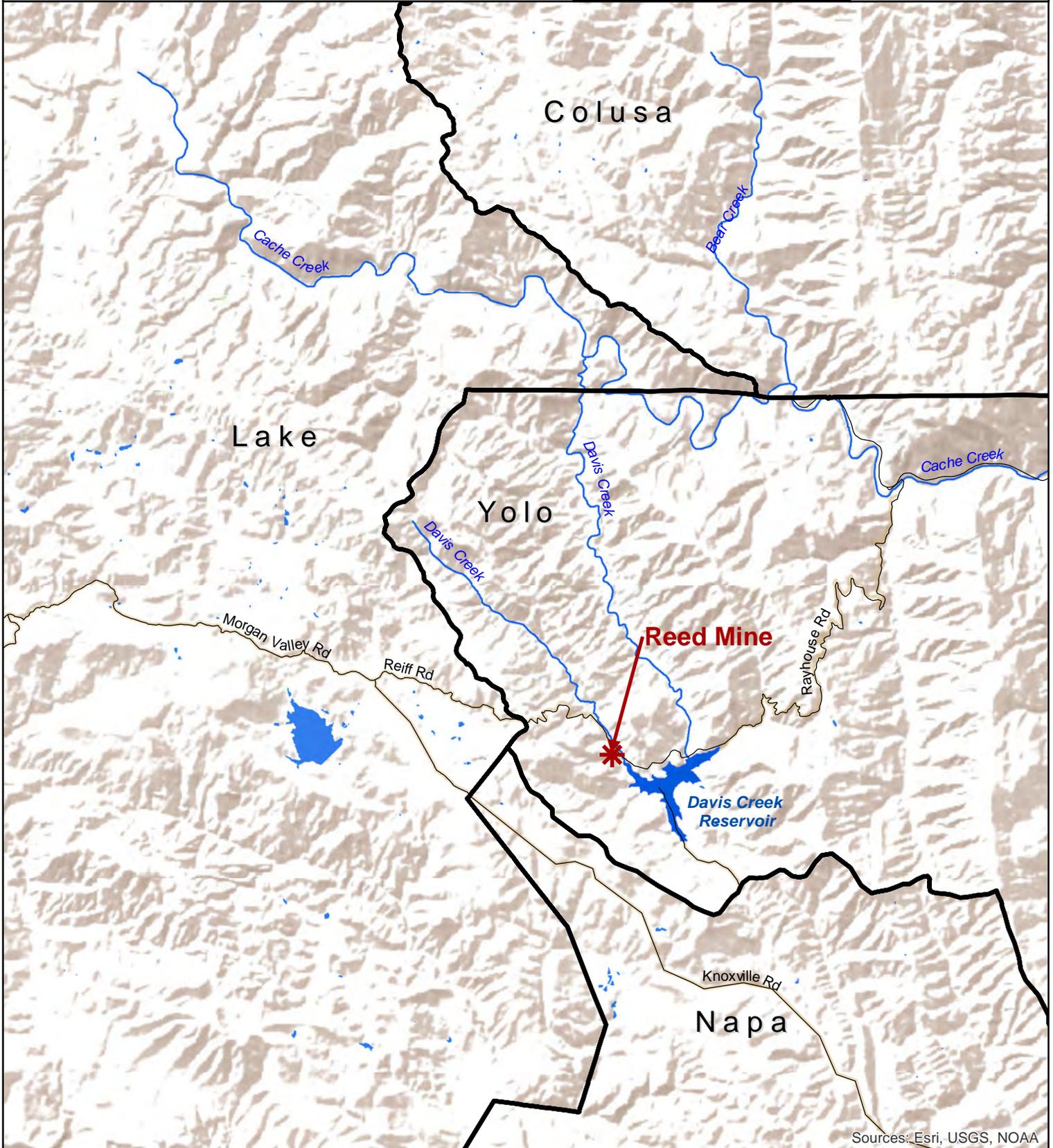
- Reed Mine Location
- County Boundary
- Roads
- Water Body

Source: CNDDDB 2018; Burleson 2018; ESRI 2012.



Burleson Consulting, Inc.

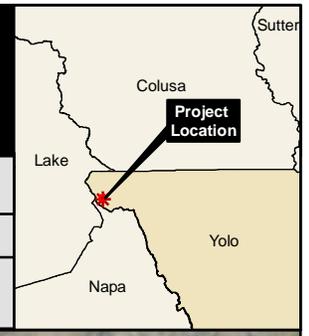
1 inch = 2 miles



Sources: Esri, USGS, NOAA

Homestake Mining Company - Biological and Rare Plant Surveys for Reed Mine

Figure 2 - Project Remediation Areas

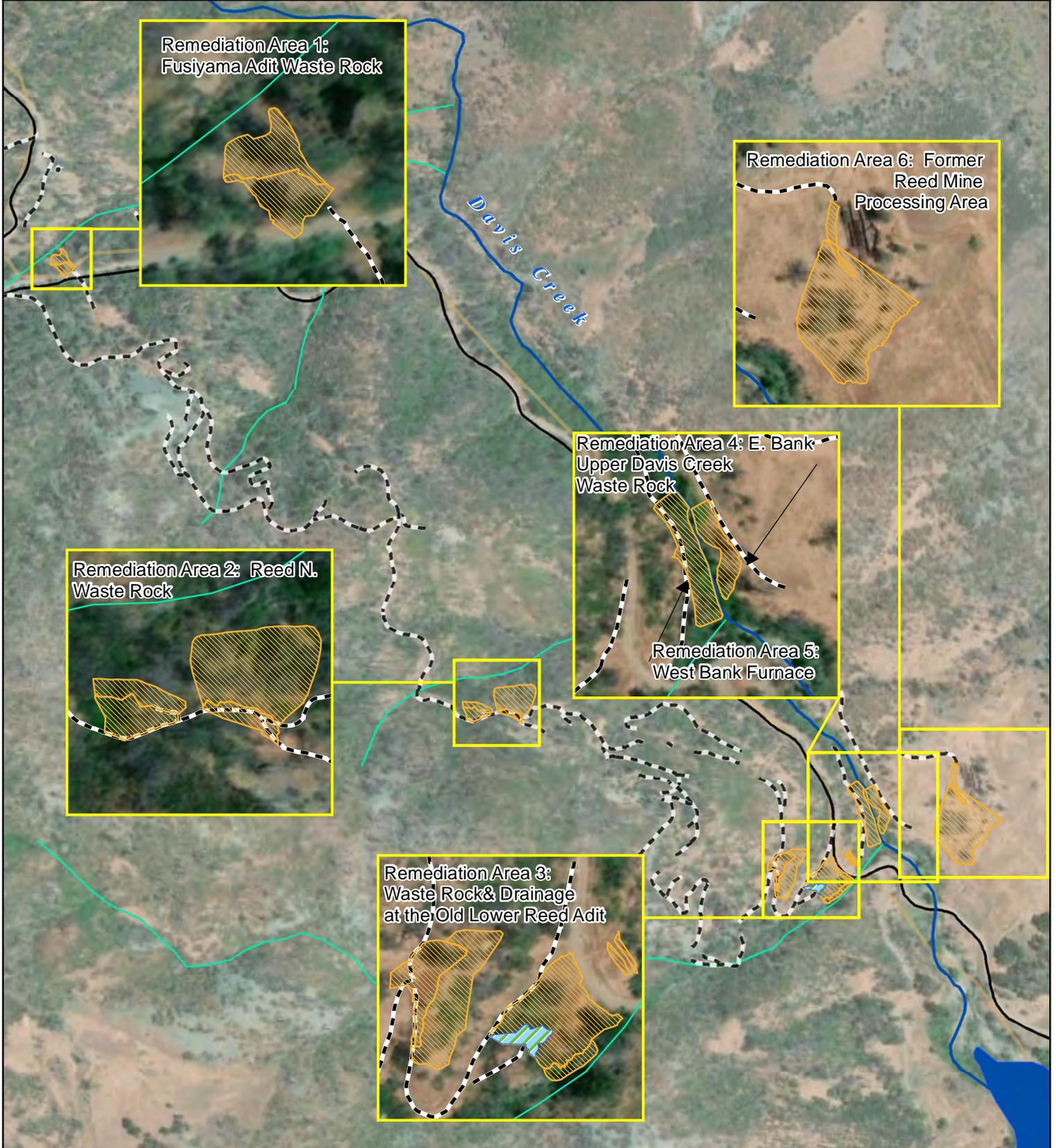


- Remediation Area 1-6
- Wetland (from adit)
- Davis Creek
- Davis Creek Tributary
- Old Mine Road
- County Roads

Source: USDA, USGS
Burleson 2018; ESRI 2012.

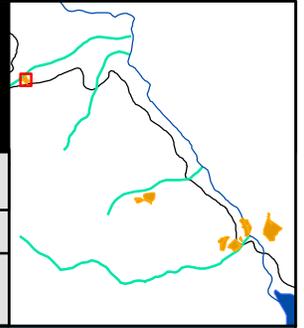
Burleson Consulting, Inc.

1 inch = 624.04 feet



Homestake Mining Company - Biological and Rare Plant Surveys for Reed Mine

Figure 3a - Remediation Area 1: Fusiuyama Adit Waste Rock - Vegetation Communities and Tree Locations



Vegetation Communities

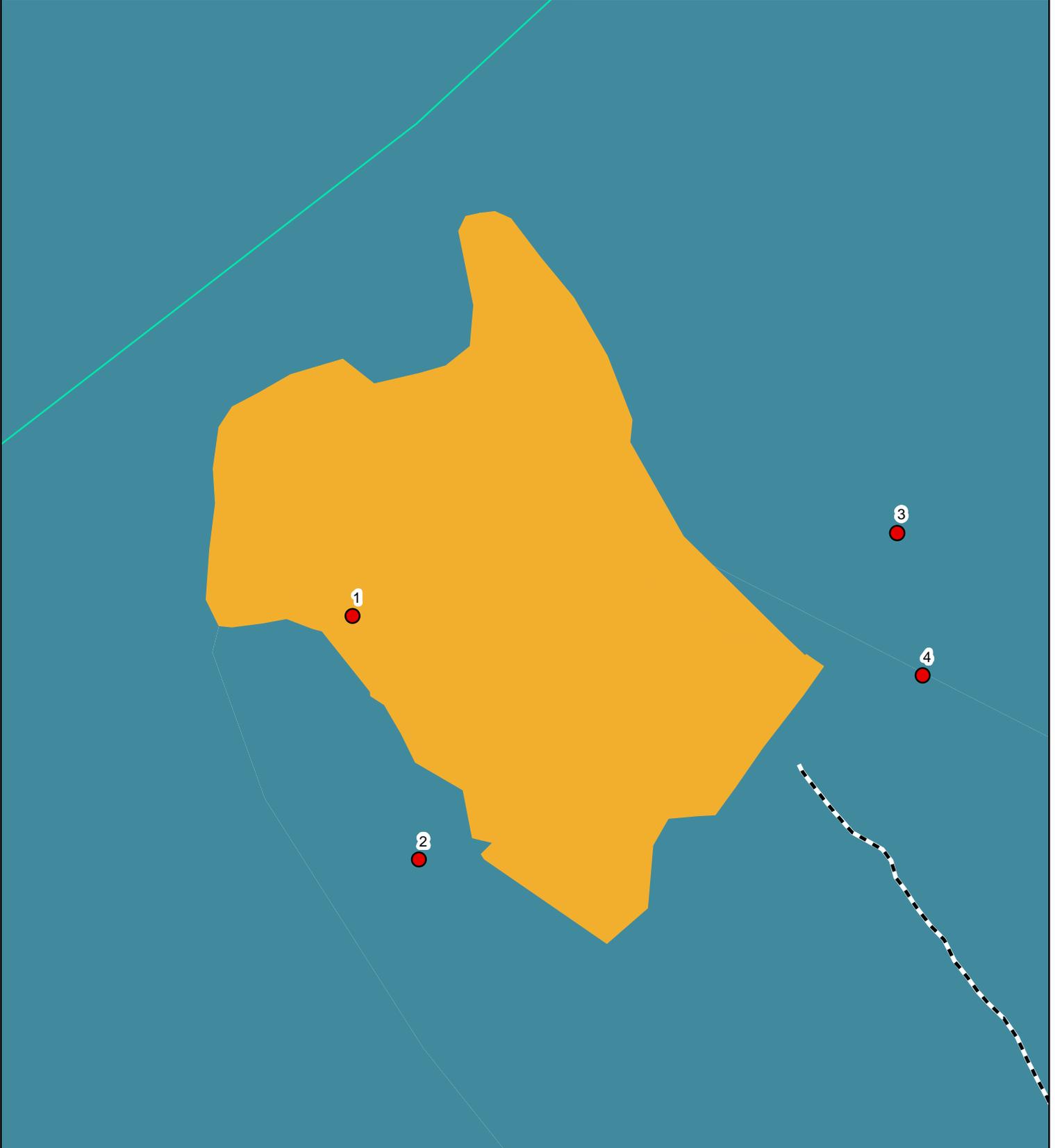
- Disturbed Area
- Mixed Chaparral

- Tree ID
- Remediation Area 1-6
- Davis Creek
- Davis Creek Tributary
- Old Mine Road
- County Roads

Source: USDA, USGS
Burleson 2018; ESRI 2012.

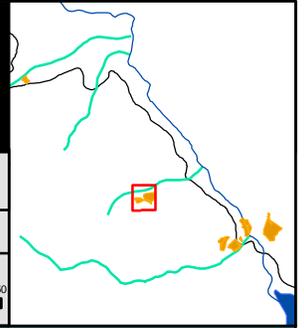


Burleson Consulting, Inc.



Homestake Mining Company - Biological and Rare Plant Surveys for Reed Mine

Figure 3b - Remediation Area 2: Reed North Waste Rock - Vegetation Communities and Tree Locations



Vegetation Communities

- Disturbed Area
- Mixed Chaparral

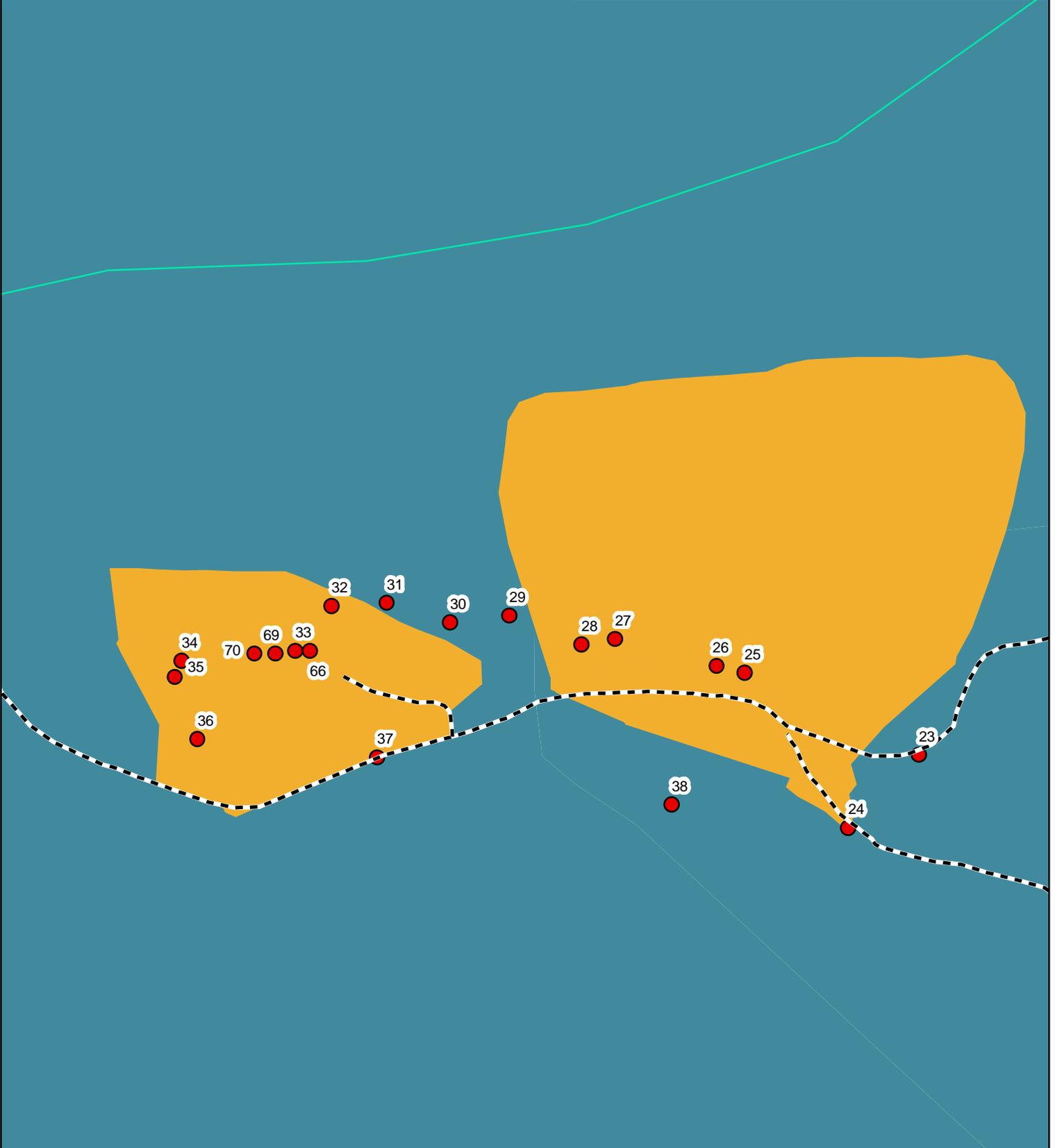
- Tree ID
- Remediation Area 1-6
- Davis Creek
- Davis Creek Tributary
- Old Mine Road
- County Roads

Source: USDA, USGS
Burleson 2018; ESRI 2012.



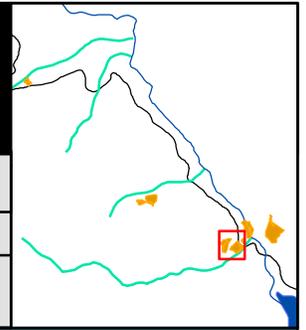
Burleson Consulting, Inc.

1 inch = 50 feet



Homestake Mining Company - Biological and Rare Plant Surveys for Reed Mine

Figure 3c - Remediation Area 3: Waste Rock and Drainage at the Lower Reed Adit - Vegetation Communities and Tree Locations



Vegetation Communities

- Disturbed Area
- Mixed Chaparral
- Wetland

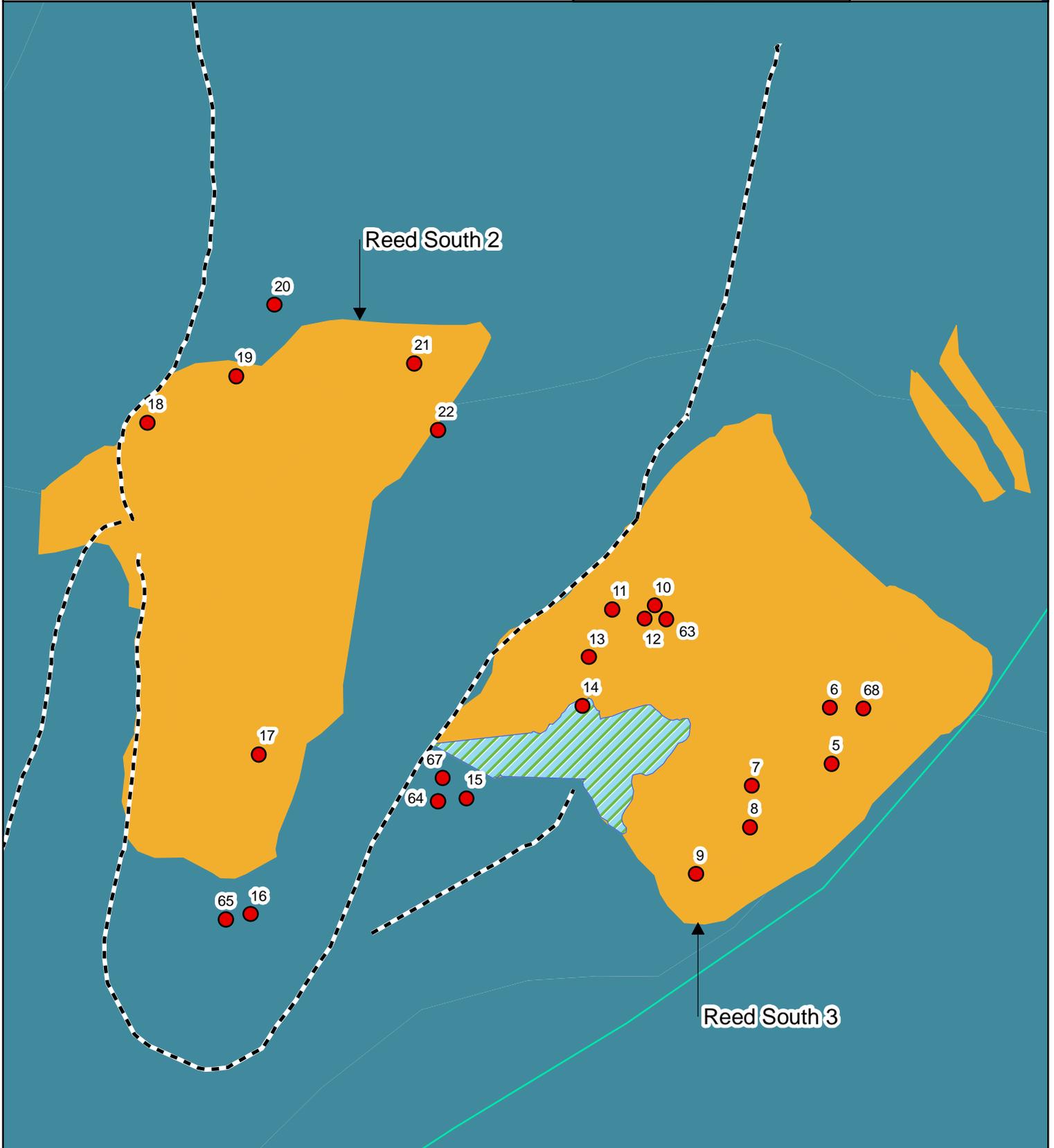
- Tree ID
- Remediation Area 1-6
- Davis Creek
- Davis Creek Tributary
- Old Mine Road
- County Roads

Source: USDA, USGS
Burleson 2018; ESRI 2012.



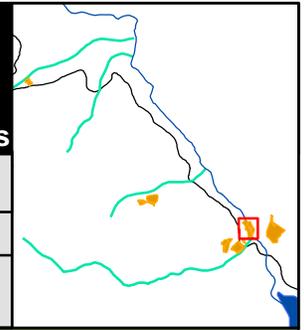
Burleson Consulting, Inc.

1 inch = 56.09 feet



Homestake Mining Company - Biological and Rare Plant Surveys for Reed Mine

Figure 3d - Remediation Area 4: E. Bank Upper Davis Creek Waste Rock Remediation Area 5: West Bank Furnace - Vegetation Communities and Tree Locations



Vegetation Communities

- Disturbed Area
- Mixed Chaparral
- Grassland
- Mixed Riparian

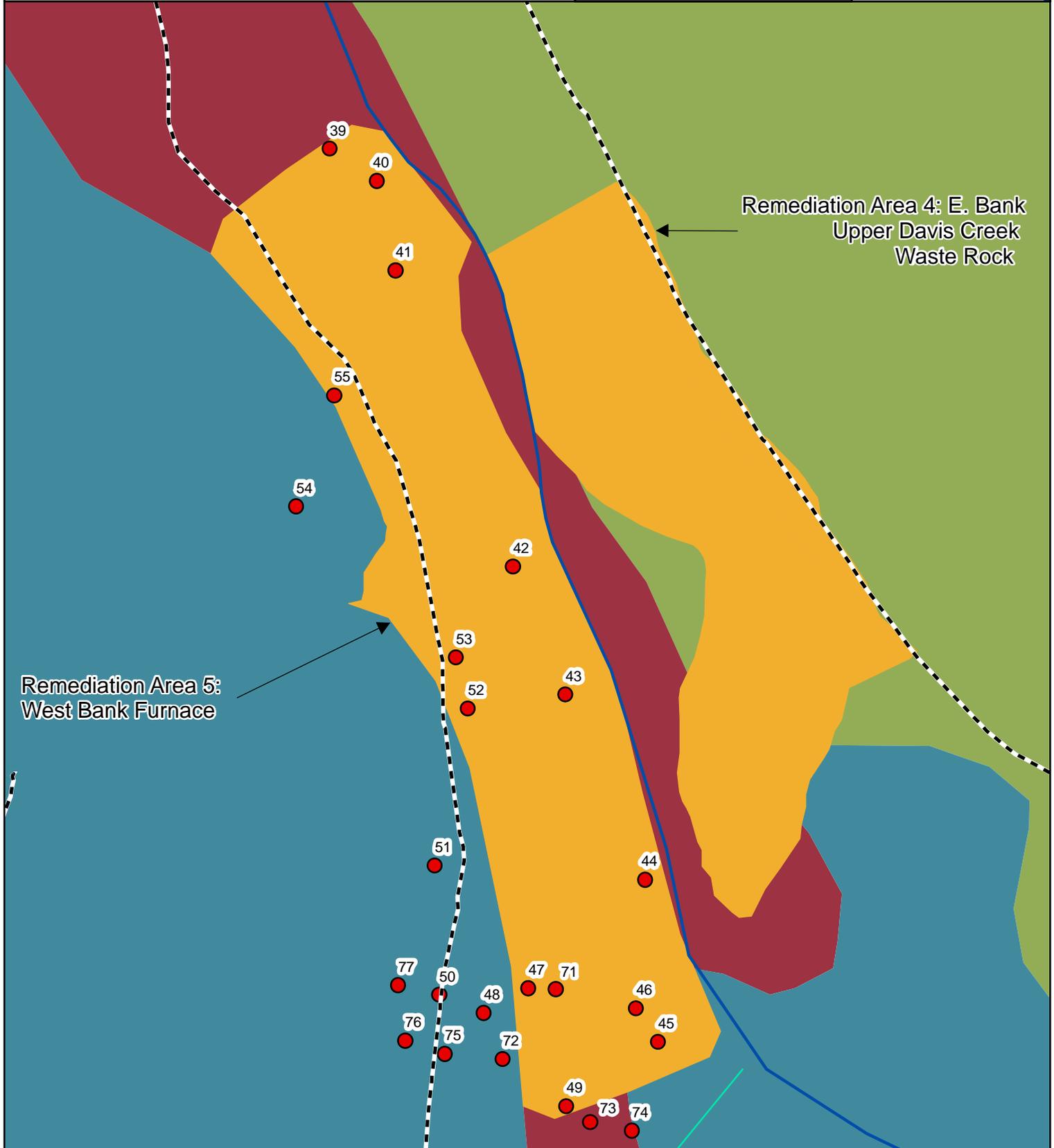
- Tree ID
- Remediation Area 1-6
- Davis Creek
- Davis Creek Tributary
- Old Mine Road
- County Roads

Source: USDA, USGS
Burleson 2018; ESRI 2012.



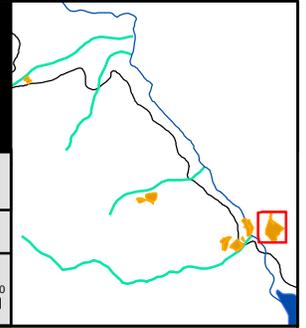
Burleson Consulting, Inc.

1 inch = 41.39 feet



Homestake Mining Company - Biological and Rare Plant Surveys for Reed Mine

Figure 3e - Remediation Area 6: Former Reed Mine Processing Area - Vegetation Communities and Tree Locations



Vegetation Communities

- Disturbed Area
- Grassland
- gray pine group (dead)

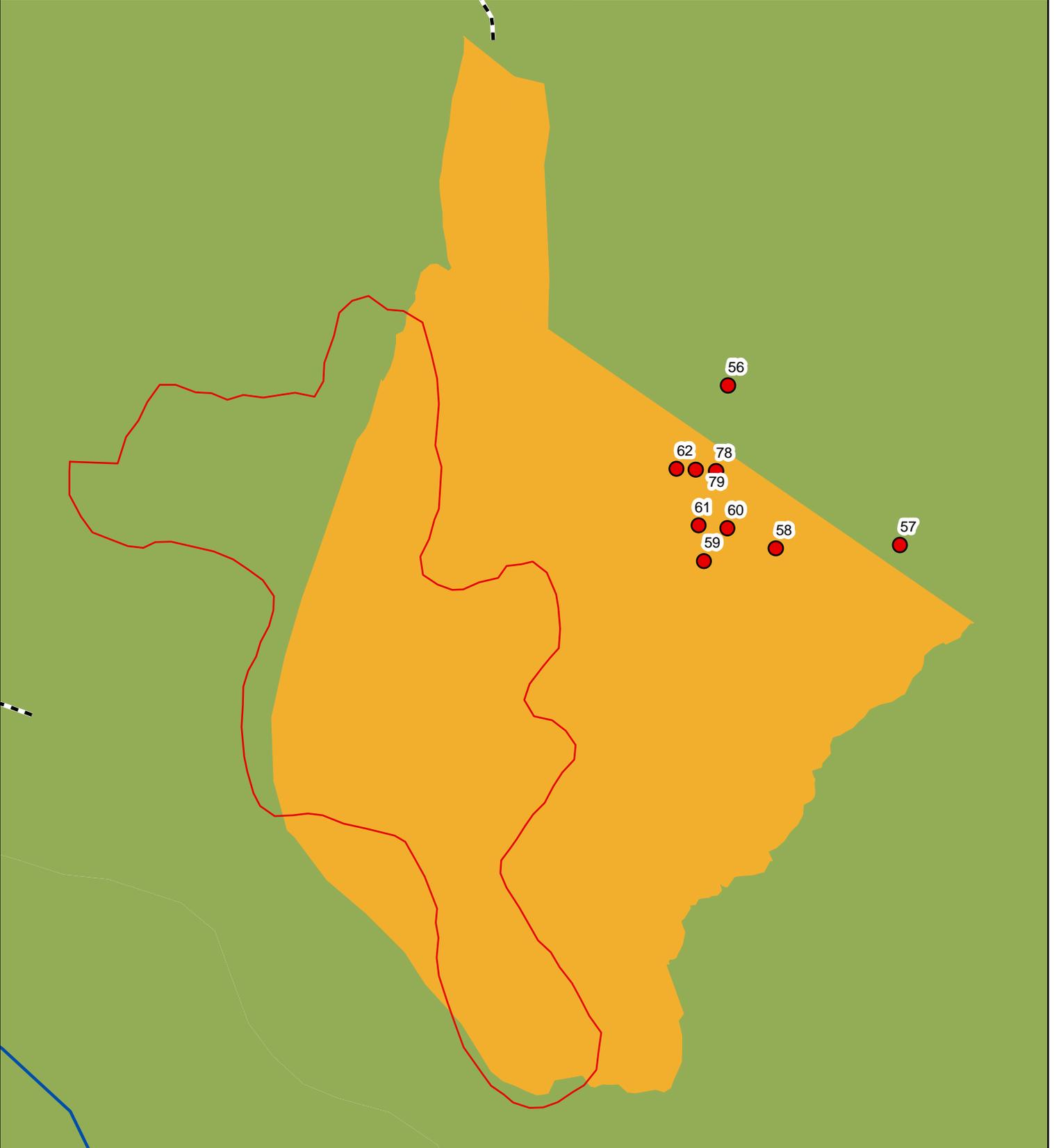
- Tree ID
- Remediation Area 1-6
- Davis Creek
- Davis Creek Tributary
- Old Mine Road
- County Roads

Source: USDA, USGS
Burleson 2018; ESRI 2012.



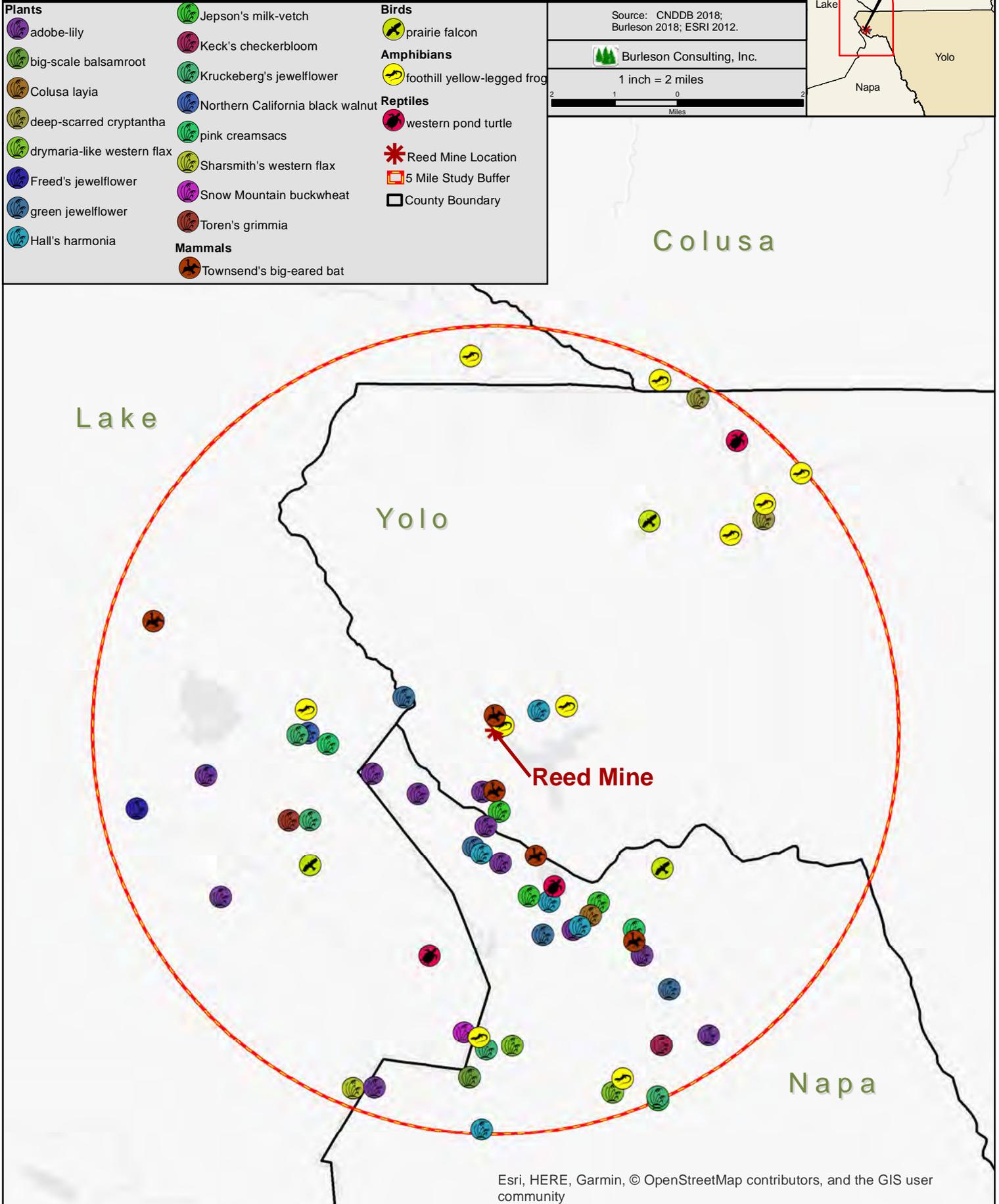
Burleson Consulting, Inc.

1 inch = 60.59 feet



Homestake Mining Company - CNDDDB Map

Figure 4 - CNDDDB Occurrence Map



**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Plants				
Napa false indigo	<i>Amorpha californica var. napensis</i>	- / - / 1B.2	Perennial deciduous shrub. Suitable habitat includes broadleaved upland forest (openings), chaparral, and cismontane woodland. Found between 120 - 2000m. Blooms from April to July.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Bent-flowered fiddleneck	<i>Amsinckia lunaris</i>	- / - / 1B.2	Annual herb. Suitable habitat includes coastal bluff scrub, cismontane woodland, and valley and foothill grassland. Found between 300 - 500m. Blooms from March and June.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Jepson's milk-vetch	<i>Astragalus rattanii var. jepsonianus</i>	- / - / 1B.2	Annual herb. Commonly on serpentine in meadows and on grassy hillsides within woodland, valley and foothill grassland, and chaparral. Known from 150-700m elevation. Blooms from April through June.	High: Several CNDDDB occurrences within 5 mile buffer zone. Suitable habitat is present.
Big-scale balsamroot	<i>Balsamorhiza macrolepis</i>	- / - / 1B.2	Perennial herb. Suitable habitat are slopes found in valley grasslands or foothill woodlands. Known from <1970m elevation. Blooms from March through June.	Low: One CNDDDB occurrence within 5-mile buffer zone. Suitable habitat is present.
pink creamsacs	<i>Castilleja rubicundula ssp. rubicundula</i>	- / - / 1B.2	Annual herb. Suitable habitat is serpentine soils in chaparral openings, woodlands, meadows, seeps, and valley/foothill woodlands. Known from < 1000m elevation. Blooms from April through June.	Moderate: Two CNDDDB occurrences within 5-mile buffer zone. Suitable habitat is present.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Sonoma ceanothus	<i>Ceanothus sonomensis</i>	- / - / 1B.2	Perennial evergreen shrub. Suitable habitat includes chaparral (sandy, serpentinite or volcanic). Found between 215 - 800m. Blooms from February to April.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Pappose tarplant	<i>Centromadia parryi</i> ssp. <i>parryi</i>	- / - / 1B.2	Annual herb. Suitable habitat is in chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic). Known from < 420m elevation. Blooms from May to November.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Deep-scarred cryptantha	<i>Cryptantha excavata</i>	- / - / 1B.1	Annual herb. Suitable habitat is in cismontane woodland (sandy or gravelly) Known from 100-500m elevation. Blooms from April to May.	Moderate: Two CNDDDB occurrences within 5-mile buffer zone. Suitable habitat is present.
Jepson's coyote-thistle	<i>Eryngium jepsonii</i>	- / - / 1B.2	Perennial herb. Suitable habitat is in valley and foothill grassland, vernal pools. Known from 3-300m elevation. Blooms from April to August.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Snow Mountain buckwheat	<i>Eriogonum nervulosum</i>	- / - / 1B.2	Annual herb. Habitat is serpentine areas within chaparral communities. Known from 300 - 2105m elevation. Blooms June through September.	Low: One CNDDDB occurrences within 5-mile buffer zone. Suitable habitat is present.
San Joaquin spearscale	<i>Extriplex joaquinana</i>	- / - / 1B.2	Annual herb. Habitat is in chenopod scrub, meadows and seeps, playas, and valley and foothill grassland. Known from < 835m elevation. Blooms April to October.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Adobe-lily	<i>Fritillaria pluriflora</i>	- / - / 1B.2	Perennial herb. Occurs in adobe and in general, serpentine soils of chaparral, woodland, and foothill grassland within interior foothills. Known from <900m elevation. Blooms from February through April.	High: Several CNDDDB occurrences within 5 mile buffer zone. Suitable habitat is present.
Toren's grimmia	<i>Grimmia torenii</i>	- / - / 1B.3	Moss. Habitat includes openings, rocky, boulder and rock walls, carbonate, volcanic; chaparral, cismontane woodland, and lower montane coniferous forest. Known from 325 - 1160m elevation.	Low: One CNDDDB occurrence within 5-mile buffer zone. Suitable habitat is present.
Hall's harmonia	<i>Harmonia hallii</i>	- / - / 1B.2	Annual herb. Occurs in open sites, hills and ridges, open rocky areas, and disturbed areas in serpentine chaparral. Known from 500-1000m elevation. Blooms from April through June.	High: Several CNDDDB occurrences within 5 mile buffer zone. Significant suitable habitat is present.
Two-carpellate western flax	<i>Hesperolinon bicarpellatum</i>	- / - / 1B.2	Annual herb. Habitat is serpentine areas within chaparral communities. Known from 60 - 1005m elevation. Blooms May to July.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Drymaria-like western flax	<i>Hesperolinon drymarioides</i>	- / - / 1B.2	Annual herb. Suitable habitat is serpentine soil within chaparral, valley grassland, foothill woodland, and closed-cone pine forests. Known from 100 - 1130m elevation. Blooms from May through August.	Moderate: Two CNDDDB occurrences within 5-mile buffer zone. Suitable habitat is present.
Sharsmith's western flax	<i>Hesperolinon sharsmithiae</i>	- / - / 1B.2	Annual herb. Habitat is serpentine areas within chaparral communities. Known from 270 - 300m elevation. Blooms May to July.	Low: One CNDDDB occurrence within 5 mile buffer zone of ranch. Suitable habitat is present.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Northern California black walnut	<i>Juglans hindsii</i>	- / - / 1B.1	Tree. Suitable habitat is within foothill woodland, wetland-riparian, and riparian communities. Known from < 1100m elevation. Blooms from April through May.	No: One CNDDDB occurrences within 5-mile buffer zone. Suitable habitat is present. No occurrences observed during previous surveys. Not likely to be established by time construction takes place.
Burke's goldfields	<i>Lasthenia burkei</i>	FE/SE/1B.1	Annual herb. Occurs in meadows and seeps (mesic) and vernal pools. Known from 15 - 600 m elevation. Blooms from April through June.	No: Not known to occur within 5-mile buffer zone. Suitable habitat is not present.
Colusa layia	<i>Layia septentrionalis</i>	- / - / 1B.2	Annual herb. Found in serpentine or sandy soils of openings on grassy slopes within chaparral, valley grassland, and foothill woodland communities. Known from 100-900m elevation. Blooms from April through June.	Low: One CNDDDB occurrence within 5-mile buffer zone. Suitable habitat is present.
Jepson's leptosiphon	<i>Leptosiphon jepsonii</i>	- / - / 1B.2	Annual herb. Occurs usually in volcanic; chaparral, cismontane woodland, and valley and foothill grassland. Known from 100 - 500m elevation. Blooms from March to May.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Cobb Mountain lupine	<i>Lupinus sericatus</i>	- / - / 1B.2	Perennial herb. Occurs in broadleafed upland forest, chaparral, cismontane woodland, and lower montane coniferous forest. Known from 275 - 1525m elevation. Blooms from March to June.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Porter's navarretia	<i>Navarretia paradoxinota</i>	- / - / 1B.3	Annual herb. Found in serpentine soils within; openings, vernal mesic, often drainages, and meadows/seeps. Known from 165 - 840m elevation. Blooms from May through June/July.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Marin County navarretia	<i>Navarretia rosulata</i>	- / - / 1B.2	Annual herb. Found in serpentine soils within; closed-cone coniferous forest and chaparral. Known from 200 - 635m elevation. Blooms from May through July.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Sonoma beardtongue	<i>Penstemon newberryi</i> var. <i>sonomensis</i>	- / - / 1B.3	Perennial herb. Found in chaparral (rocky) communities. Known from 700 - 1370m elevation. Blooms from April to August.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Bearded popcornflower	<i>Plagiobothrys hystericulus</i>	- / - / 1B.1	Annual herb. Found often in vernal swales, valley and foothill grassland (mesic), and vernal pools margins. Found in < 274m elevation. Blooms from April to May.	No: Not known to occur within 5-mile buffer zone. Suitable habitat is not present.
Freed's jewel-flower	<i>Streptanthus brachiatus</i> <i>ssp. hoffmanii</i>	- / - / 1B.2	Annual herb. Suitable habitat is serpentine soils within chaparral or foothill woodland communities. Known from 490 - 1220 m elevation. Blooms May through July.	Low: One CNDDDB occurrence within 5-mile buffer zone. Suitable habitat is present.
Green jewel-flower	<i>Streptanthus hesperidis</i>	- / - / 1B.2	Annual herb. Occurs in serpentine barrens associated with openings in chaparral and oak woodland and cypress woodland. Known from 250-600m elevation. Blooms from May through July.	High: Several CNDDDB occurrences within 5-mile buffer zone. Suitable habitat is present.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Three Peaks jewelflower	<i>Streptanthus morrisonii</i> <i>ssp. elatus</i>	- / - / 1B.2	Perennial herb. Found in serpentine soil, chaparral communities. Known from 90 - 815m elevation. Blooms from June to Sep.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Kruckeberg's jewelflower	<i>Streptanthus morrisonii</i> <i>ssp. kruckebergii</i>	- / - / 1B.2	Perennial herb. Found in serpentine soil, cismontane woodland communities. Known from 215 - 1035m elevation. Blooms from April to July.	High: Several CNDDB occurrences within 5-mile buffer zone. Suitable habitat is present.
Keck's checker-mallow	<i>Sidalcea keckii</i>	FE / - / 1B.1	Annual herb. Occurs in valley grassland and foothill woodlands between elevations 75-500m. Blooms from April-May.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Invertebrates				
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	FT / - / -	Inhabit highly turbid water in vernal pools. Cysts hatch and shrimp become active when pools fill during the winter rainy season.	No: No occurrences documented in the proposed project vicinity. No vernal pools on site.
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT / - / -	Endemic with patchy distribution. Valley elderberry longhorn beetles are completely dependent on their host plant, the elderberry shrub. Adult active period is from March to June.	Low: No occurrences documented within project area. Suitable habitat present due to presence of elderberry shrubs found within the Project Site.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Reptiles and Amphibians				
Western pond turtle	<i>Emys marmorata</i>	– /CSC/ –	Aquatic turtle that requires basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks. Associated with permanent or nearly permanent water.	High: Known to occur within 5-mile buffer zone. Significant suitable habitat is present. Species has been observed in DCR and Davis Creek.
California red-legged frog	<i>Rana aurora draytonii</i>	FT/CSC/ –	Largest native frog in the Western United States. Requires dense, shrubby or emergent vegetation associated with deep still or slow-moving water. Requires 11-20 weeks of permanent water. Breeds from November through March.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Foothill yellow-legged frog	<i>Rana boylei</i>	– /CSC/ –	Frequents rocky streams and rivers in forests and woodlands. Eats aquatic and terrestrial invertebrates.	High: Several CNDDB occurrences within 5-mile buffer zone. Significant habitat is present. Species has been observed in the vicinity of the DCR.
Birds				
Tricolored blackbird	<i>Agelaius tricolor</i>	– /CSC/ –	Common throughout the central valley of California. Breeds near fresh water in emergent vegetation. Feeds mostly on insects.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Golden eagle	<i>Aquila chrysaetos</i>	– /CFP/ –	Found in open country, especially around mountains, hills, and cliffs within shrublands, grasslands, coniferous forests, farmland, and areas along rivers and streams.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Burrowing owl	<i>Athene cunicularia</i>	–/CSC/–	Found primarily in the Central Valley and other open, flat areas of the state; absent from steep terrain, foothill habitats, and higher elevations.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.
Swainson's hawk	<i>Buteo swainsoni</i>	–/ST/–	Primarily a summer resident of the Central Valley and northeastern California; small year-round population in the Delta. Nests in riparian areas and isolated tree stands in open desert, grassland, and cropland. Forages in grasslands, pastures, and suitable grain or alfalfa fields.	No: Not known to occur within 5-mile buffer zone. Suitable habitat is not present
Bald Eagle	<i>Haliaeetus leucocephalus</i>	–/CFP/–	Requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches. Feeds on birds, fish, or scavenges. Nesting is in large, old-growth forests, typically ponderosa pine.	High: Suitable habitat is present. Several species observations during site visits.
Prairie Falcon	<i>Falco mexicanus</i>	BCC/WL/–	Uncommon permanent resident of California. Feeds mostly on small mammals and some birds. Requires sheltered cliff ledges for cover and nesting. Breeding is from mid-February through mid-September	Low: One CNDDB occurrences within 5-mile buffer zone. Suitable habitat is present.
Bank Swallow	<i>Riparia riparia</i>	–/ST/–	Neotropical migrant found primarily in riparian and lowland habitats. Forages on insects near riparian areas, wetlands, grasslands, and croplands. Primarily a colonial breeder on sandy banks or cliffs.	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Northern Spotted Owl	<i>Strix occidentalis caurina</i>	FT/CSC/ –	Resides in old-growth, multi-layered mixed conifer, redwood, Douglas-fir habitats. Feeds on small mammals. Probably requires a permanent water source. Typically nests in a tree or snag cavity, or in broken top of large tree.	No: Not known to occur within 5-mile buffer zone. Suitable habitat is not present
Fish				
Delta smelt	<i>Hypomesus transpacificus</i>	FT/FE/ –	Salt-tolerant. Endemic to the Sacramento–San Joaquin estuary, where it spends most of its adult life. Spawn in shallow, fresh or slightly brackish water upriver from the mixing zone. Spawning occurs in fresh water between January and July.	No: Not known to occur within 5-mile buffer zone. Suitable habitat is present. No habitat on site.
Mammals				
Pallid bat	<i>Antrozous pallidus</i>	– /CSC/ –	Species occurs in variety of semi-arid and arid habitats ranging from desert scrub grassland, shrubland, woodland, and mixed conifer forest. Found <1830 m; on ANF at 335-2012 meters	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	– /CSC/ –	Found throughout California in all habitats that are not subalpine or alpine. Feeds on small moths and a variety of beetles. Roosts require caves, mines, tunnels, or buildings. Requires a source of drinking water.	High: Several CNDDDB occurrences within 5-mile buffer zone. Significant habitat is present on site. Species observed during bat survey at Remediation Area 6.

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
Western red bat	<i>Lasiurus blossevillii</i>	- /CSC/ -	Found throughout California from Sierra/Cascade foothills west to the coast; absent from northern California. Roosts primarily in foliage of mature trees, especially willows, cottonwoods, sycamores, and walnuts, in edge habitats adjacent to streams, open fields, orchards,	Low: Not known to occur within 5-mile buffer zone. Suitable habitat is present

**Table 1:
Special-status Species Likelihood of Occurrence List**

Common Name	Scientific Name	Status Federal/State/ CRPR	Suitable Habitat and Critical Seasonal Periods	Likelihood of Occurrence (No, Low, Moderate, High) in Project Site and Comments
<p>SOURCE: U.S. Fish and Wildlife Service, 2018; California Natural Diversity Data Base, 2018; California Native Plant Society Rare Plant Inventory, 2018.</p> <p>a. STATUS CODES</p> <p>FEDERAL: U.S. Fish and Wildlife Service and National Marine Fisheries Service</p> <p>FE : Listed as Endangered by the Federal Government</p> <p>FT Listed as Threatened by the Federal Government</p> <p>FC Candidate for Federal Listing</p> <p>FSC U.S. Fish and Wildlife Service (USFWS) designated "Species of Concern"</p> <p>FP: CDFG fully protected</p> <p>BCC: Birds of Conservation Concern</p> <p>STATE: California Department of Fish and Game</p> <p>SE: Listed as Endangered by the State of California</p> <p>ST: Listed as Threatened by the State of California</p> <p>SR: Listed as Rare by the State of California</p> <p>CFP: California Department of Fish and Game (CDFG) designated "Fully Protected" or "Protected" - Permit required for "take"</p> <p>CSC: California Department of Fish and Game (CDFG) designated "Species of Special Concern"</p> <p>WL: Watch List</p> <p>CRPR: California Rare Plant Rank</p> <p>1A Plants presumed extirpated in California and either rare or extinct elsewhere</p> <p>1B Plants rare, threatened, or endangered in California and elsewhere</p> <p>2A Plants presumed extirpated in California but common elsewhere</p> <p>2B Plants rare, threatened, or endangered in California but more common elsewhere</p> <p>Threat Rank: Ranks at each level also include a threat rank (e.g., CRPB 4.3) and are determined as follows:</p> <p>0.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)</p> <p>0.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)</p> <p>0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)</p> <p>b. Likelihood of occurrence evaluations:</p> <p>A rating of "High" indicates that the species has been observed at the project site or species has multiple occurrences within the 5-mile buffer zone, and suitable habitat and conditions are present on-site and the species is expected to occur in the project area.</p> <p>A rating of "Moderate" indicates that the species has two occurrences within the 5-mile buffer zone, and suitable habitat and conditions are present on-site and the species is expected to occur in the project area.</p> <p>A rating of "Low" indicates that it is not known if the species is present, but suitable habitat exists in the project area or a single occurrence within the 5-mile buffer zone.</p> <p>A rating of "No" indicates that no recorded occurrences or suitable habitat(s) occur within the project area to support this species.</p>				

Table 2. Tree Survey Observations with > 6 inch DBH.

Tree ID	Species	Condition	Remediation Site Location
1	gray pine	alive	1
2	gray pine	alive	1
3	gray pine	dead	1
4	gray pine	dead	1
5	Oak sp.	alive	3
6	gray pine	dead	3
7	gray pine	dead	3
8	gray pine	alive	3
9	gray pine	dead	3
10	toyon	alive	3
11	coffeeberry	alive	3
12	gray pine	alive	3
13	elderberry	alive	3
14	willow	alive	3
15	gray pine	dead	3
16	gray pine	dead	3
17	gray pine	dead	3
18	Oak sp.	alive	3
19	Oak sp.	alive	3
20	Oak sp.	alive	3
21	Oak sp.	alive	3
22	gray pine	dead	3
23	gray pine	dead	2
24	gray pine	dead	2
25	gray pine	dead	2
26	Oak sp.	dead	2
27	gray pine	dead	2
28	elderberry	alive	2
29	gray pine	dead	2
30	gray pine	dead	2
31	Oak sp.	dead	2
32	Oak sp.	dead	2
33	gray pine	alive	2
34	gray pine	dead	2
35	gray pine	dead	2
36	gray pine	dead	2
37	gray pine	dead	2
38	Oak sp.	dead	2
39	willow	alive	4/5
40	willow	alive	4/5

41	willow	alive	4/5
42	willow	alive	4/5
43	willow	alive	4/5
44	alder	alive	4/5
45	bay	dead	4/5
46	willow	alive	4/5
47	gray pine	dead	4/5
48	gray pine	dead	4/5
49	gray pine	dead	4/5
50	gray pine	dead	4/5
51	gray pine	dead	4/5
52	gray pine	dead	4/5
53	gray pine	dead	4/5
54	gray pine	dead	4/5
55	gray pine	dead	4/5
56	gray pine	alive	6
57	gray pine	dead	6
58	gray pine	alive	6
59	gray pine	dead	6
60	gray pine	dead	6
61	gray pine	dead	6
62	gray pine	alive	2
63	willow	alive	3
64	elderberry	alive	3
65	madrone	alive	3
66	sycamore	dead	2
67	toyon	alive	3
68	gray pine	dead	3
69	gray pine	dead	2
70	Oak sp.	dead	2
71	gray pine	dead	4/5
72	gray pine	dead	4/5
73	gray pine	dead	4/5
74	gray pine	dead	4/5
75	gray pine	dead	4/5
76	gray pine	dead	3, 4/5
77	gray pine	dead	3, 4/5
78	gray pine	alive	6
79	gray pine	dead	6

6.0 References

Calflora Website. 2018. Available online: <http://www.calflora.org>. Accessed May 24, 2012.

California Department of Fish and Wildlife (CDFW). 2018. California Natural Diversity Database, Rare Find Version 3.0.5. Last updated June 2018. Available online: <http://www.dfg.ca.gov/bdb/html/cnddb.html>. Accessed September 2018.

[California Herps Website. 2018. Available online: http://www.californiaherps.com](http://www.californiaherps.com)

California Native Plant Society (CNPS) Website. 2018. <http://www.cnps.org>. Accessed September 2018.

U.S. Department of Fish and Wildlife (USFWS). 2018. Dataset provided by Information for Planning and Consultation (IPaC) in response to the listed species and habitats within the Proposed Action. Accessed September 2018.

UC Davis, 2017. McLaughlin Natural Reserve. Available at <https://naturalreserves.ucdavis.edu/mclaughlin-reserve>

West, Ed. 2018. 2018 Reed Mine Bat Survey

APPENDIX A

Biological Survey Photo Log

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>General overview of Reed Mine project site. DCR is shown in rear of photo. Mixed chaparral and annual grassland vegetation communities can be seen across area.</p>	<p>↙</p>	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>General view of Remediation Area 1: Fusiya Adit Waste Rock. The area is disturbed and surrounded by mixed chaparral and gray pines.</p>	<p>→</p>	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
View of Remediation Area 1: Fussyama Adit Waste Rock downslope.	↗	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>General view of Remediation Area 2: Reed North Waste Rock showing habitat within and surrounding area.</p>	<p>↖</p>	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>General view of Remediation Area 3 Waste Rock and Drainage at the Old Lower Reed Adit (OLRA). Reed South 2 is located on the upper slope and Reed South 3 is located at the lower portion of the photograph.</p>	<p>←</p>	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>View of wetland feature at Remediation Area 3: Waste Rock and Drainage at the Old Lower Reed Adit (OLRA). Shovel indicates within wetland and biologist is sitting within upland.</p>	<p>↑</p>	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>General overview of West Bank Furnace area (left side of photograph) and East Bank Upper Davis Creek Waste Rock area (right side of photograph) and transitioning habitat.</p>	<p>↖</p>	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
View of the upland area of the West Bank Furnace area showing disturbed habitat with mixed chaparral before transitioning into riparian habitat at the creek.	↖	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
View of East Bank Upper Davis Creek Waste Rock area showing transition into annual grassland habitat.	↓	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>General view of riparian habitat within Remediation Area 4 and 5: East Upper Davis Creek Waste Rock and West Bank Furnace Area.</p>	<p>↖</p>	

Photograph Log
Reconnaissance Level Biological and Rare Plant
Biological Survey Report for Reed Mine

Photo Description	Viewing Direction ↑=North	Photo
<p>General view of Remediation Area 6: Former Reed Mine Processing Area showing annual grassland habitat with scattered gray pines.</p>	<p>←</p>	

APPENDIX B

List of Plant Species Observed

LIST OF PLANT SPECIES OBSERVED

Fusiyama Adit (FA), OLRA Waste Rock & Drainage (OL), East & West Bank Davis Creek (DC),
Former Reed Mine Processing Area (PA), and Reed North (RN)

May 23 and 24, 2018

This is a list of plant species observed in May 2018 and should not be considered a comprehensive list.

Plant taxonomy is according to the Jepson Interchange, UC Berkeley.

Latin Name	Common Name	Status	Site				
			FA	OL	DC	PA	RN
MONOCOTS							
ALLIACEAE							
<i>Allium falcifolium</i>	Sickle leaf onion	native	X				
CYPERACEAE							
<i>Carex nudata</i>	Torrent sedge	native			X		
IRIDACEAE							
<i>Iris sp.</i>	Iris	native	X				X
JUNCACEAE							
<i>Juncus balticus ssp. ater</i>	Baltic rush	native		X			
<i>Juncus oxymuris</i>	Pointed rush	native			X		
LILIACEAE							
<i>Calochortus luteus</i>	Yellow mariposa	native			X		
<i>Fritillaria affinis var. affinis</i>	Checker lily	native					X
ORCHIDACEAE							
<i>Epipactis gigantea</i>	Stream orchid	native	X				
POACEAE							
<i>Aegilops triuncialis</i>	Goatgrass	invasive					X
<i>Aira caryophyllea</i>	Silvery hairgrass	invasive			X		
<i>Avena barbata</i>	Slim oat	invasive					
<i>Avena fatua</i>	Wildoats	invasive	X	X	X	X	X
<i>Bromus carinatus</i>	California brome	native			X		
<i>Bromus diandrus</i>	Ripgut brome	invasive	X	X	X	X	X
<i>Bromus hordeaceus</i>	Soft chess	invasive	X	X	X	X	X
<i>Bromus laevipes</i>	Narrow flowered brome	native	X				X
<i>Bromus madritensis ssp. madritensis</i>	Foxtail chess	non-native	X	X	X	X	X
<i>Bromus madritensis ssp. rubens</i>	Foxtail brome	invasive		X	X	X	X
<i>Cortaderia selloana</i>	Pampas grass	invasive		X			
<i>Cynosurus echinatus</i>	Dogtail grass	invasive			X	X	X
<i>Dactylis glomerata</i>	Orchardgrass	invasive		X			
<i>Elymus caput-medusae</i>	Medusa head	invasive		X			
<i>Elymus elymoides</i>	Squirrel tail grass	native	X				X
<i>Elymus glaucus</i>	Blue wildrye	native	X	X	X		X
<i>Elymus repens</i>	Quack grass	non-native			X	X	
<i>Festuca microstachys</i>	Small fescue	native	X				

Latin Name	Common Name	Status	Site				
			FA	OL	DC	PA	RN
<i>Festuca myuros</i>	Rattail sixweeks grass	invasive			X		X
<i>Festuca perennis</i>	Italian rye grass	invasive		X			
<i>Melica californica</i>	California melic	native			X		X
<i>Melica torreyana</i>	Torrey's melica	native	X				
<i>Polypogon monspeliensis</i>	Annual beard grass	invasive		X	X		
THEMIDACEAE							
<i>Brodiaea elegans ssp. Elegans</i>	Harvest brodiaea	native			X		X
<i>Dichelostemma volubile</i>	Twining brodiaea	native			X		X
TYPHACEAE							
<i>Typha sp.</i>	Cattail			X			
EUDICOTS							
ADOXACEAE							
<i>Sambucus nigra ssp. caerulea</i>	Blue elderberry	native		X	X	X	X
ANACARDIACEAE							
<i>Toxicodendron diversilobum</i>	Poison oak	native	X	X	X	X	X
APIACEAE							
<i>Angelica tomentosa</i>	Woolly angelica	native	X	X	X		X
<i>Daucus pusillus</i>	Wild carrot	native			X		X
<i>Lomatium dasycarpum ssp. dasycarpum</i>	Woolly fruited lomatium	native					
<i>Lomatium macrocarpum</i>	Large fruited lomatium	native					X
<i>Sanicula crassicaulis</i>	Pacific sanicle	native		X	X		
<i>Torilis arvensis</i>	Field hedge parsley	invasive	X		X		X
APOCYNACEAE							
<i>Asclepias fascicularis</i>	narrow leaf milkweed	native		X	X		
ASTERACEAE							
<i>Achillea millefolium</i>	Yarrow	native	X	X	X		X
<i>Agoseris grandiflora</i>	Giant mountain dandelion	native			X		X
<i>Artemisia douglasiana</i>	California mugwort	native			X		
<i>Carduus pycnocephalus</i>	Italian thistle	invasive		X	X		X
<i>Centaurea melitensis</i>	Tocalote	invasive		X			X
<i>Centaurea solstitialis</i>	Yellow starthistle	invasive		X	X	X	X
<i>Cirsium vulgare</i>	Bullthistle	invasive		X			
<i>Eriophyllum lanatum var. achilleoides</i>	Yarrow leaved woolly sunflower	native	X	X	X		X
<i>Grindelia camporum</i>	Gumweed	native	X	X			
<i>Lactuca serriola</i>	Prickly lettuce	invasive	X	X	X	X	X
<i>Madia exigua</i>	Small tarweed	native					X
<i>Madia gracilis</i>	Gumweed	native			X	X	X
<i>Malacothrix floccifera</i>	Woolly malacothrix	native					
<i>Pseudognaphalium californicum</i>	Ladies' tobacco	native				X	
<i>Solidago velutina ssp. californica</i>	Oreja de liebre	native	X	X	X		
<i>Sonchus asper</i>	Spiny sowthistle	invasive		X	X	X	X
<i>Tragopogon dubius</i>	Goat's beard	invasive			X		
<i>Uropappus lindleyi</i>	Silver puffs	native	X				X

Latin Name	Common Name	Status	Site				
			FA	OL	DC	PA	RN
BORAGINACEAE							
<i>Amsinckia menziesii</i>	Fiddleneck	native		X	X		
<i>Cryptantha hispidula</i>	Napa cryptantha	native	X				
<i>Cynoglossum grande</i>	Houndstongue	native					X
<i>Eriodictyon californicum</i>	Yerba santa	native	X	X	X	X	X
<i>Phacelia imbricata</i>	Imbricate phacelia	native					X
BRASSICACEAE							
<i>Unknown brassica</i>	Mustard	non-native			X	X	
CALYCANTHACEAE							
<i>Calycanthus occidentalis</i>	Spicebush	native			X		
CAPRIFOLIACEAE							
<i>Lonicera hispidula</i>	Pink honeysuckle	native					
CONVOLVULACEAE							
<i>Calystegia collina ssp. collina</i>	Hillside morning glory	native					X
<i>Calystegia purpurata ssp. purpurata</i>	Smooth western morning glory	native					
<i>Convolvulus arvensis</i>	Field bindweed	invasive		X	X		X
CUCURBITACEAE							
<i>Marah fabacea</i>	California man-root	native			X		
ERICACEAE							
<i>Arctostaphylos manzanita ssp. manzanita</i>	Common manzanita	native	X	X			X
<i>Arctostaphylos viscida</i>	Whiteleaf manzanita	native					X
FABACEAE							
<i>Acmispon brachycarpus</i>	Short podded lotus	native	X				X
<i>Acmispon glaber</i>	Deerweed	native					X
<i>Acmispon wrangelianus</i>	Chilean trefoil	native	X				
<i>Cercis occidentalis</i>	Western redbud	native	X				X
<i>Hoita macrostachya</i>	California hemp	native	X	X	X		
<i>Lupinus microcarpus var. microcarpus</i>	Chick lupine	native		X		X	
<i>Medicago polymorpha</i>	California burclover	invasive	X		X		X
<i>Melilotus albus</i>	White sweetclover	invasive	X	X			
<i>Melilotus indicus</i>	Annual yellow sweetclover	non-native	X	X	X		X
<i>Pickeringia montana</i>	Chaparral pea	native	X				X
<i>Trifolium albopurpureum</i>	Indian clover	native				X	
<i>Trifolium dubium</i>	Shamrock	non-native	X				
<i>Trifolium hirtum</i>	Rose clover	invasive	X	X	X	X	X
<i>Trifolium microcephalum</i>	Small head clover	native					X
<i>Vicia villosa ssp. varia</i>	Smooth vetch	non-native	X	X	X	X	X
<i>Quercus berberidifolia</i>	Inland scrub oak	native	X	X	X		X
<i>Quercus douglasii</i>	Blue oak	native		X		X	
<i>Quercus durata var. durata</i>	Leather oak	native	X	X			
GARRYACEAE							
<i>Garrya elliptica</i>	Coast silk tassel	native					X
GERANIACEAE							
<i>Erodium cicutarium</i>	Coastal heron's bill	invasive		X	X		X

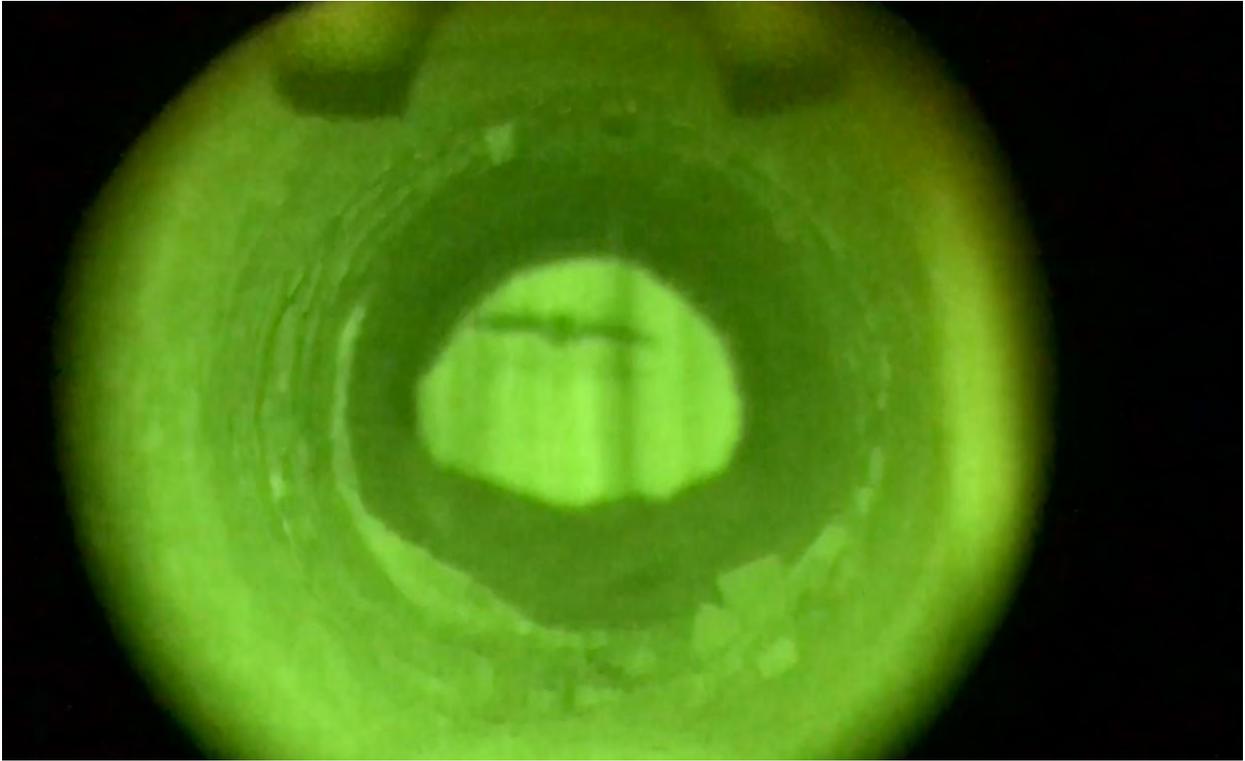
Latin Name	Common Name	Status	Site				
			FA	OL	DC	PA	RN
<i>Geranium sp.</i>	Geranium				X		
GROSSULARIACEAE							
<i>Ribes malvaceum</i>	Chaparral currant	native					X
LAMIACEAE							
<i>Lamium amplexicaule</i>	Henbit	non-native	X				
<i>Lepechinia calycina</i>	Pitcher sage	native					X
<i>Monardella viridis ssp. viridis</i>	Green monardella	native					X
<i>Salvia columbariae</i>	Chia sage	native					
<i>Stachys albens</i>	Cobwebby hedge nettle	native	X		X		X
LAURACEAE							
<i>Umbellularia californica</i>	California bay	native	X	X			X
LINACEAE							
<i>Hesperolinon californicum</i>	California western flax	native		X			X
MALVACEAE							
<i>Malacothamnus fremontii</i>	Fremont's bush mallow	native					X
MELANTHIACEAE							
<i>Toxicoscordion sp.</i>		native					X
MONTIACEAE							
<i>Claytonia parviflora ssp. parviflora</i>	Miner's lettuce	native			X		
OLEACEAE							
<i>Fraxinus dipetala</i>	Two petaled ash	native					X
ONAGRACEAE							
<i>Clarkia concinna</i>	Red ribbons	native	X		X		X
<i>Clarkia purpurea ssp. quadrivulnera</i>	Purple clarkia	native	X	X	X		X
OROBANCHACEAE							
<i>Castilleja foliolosa</i>	Texas paintbrush	native					
PAPAVERACEAE							
<i>Ehrendorferia chrysantha</i>	Golden eardrops	native					
<i>Eschscholzia californica</i>	California poppy	native		X	X	X	
PHRYMACEAE							
<i>Diplacus aurantiacus</i>	Sticky monkeyflower	native					X
PLANTAGINACEAE							
<i>Penstemon heterophyllus</i>	Foothill penstemon	native					
POLYGONACEAE							
<i>Eriogonum dasyanthemum</i>	Chaparral buckwheat	native					
<i>Eriogonum nudum var. oblongifolium</i>	Oblong leaved buckwheat	native	X				X
<i>Rumex crispus</i>	Curly dock	invasive		X			
RANUNCULACEAE							
<i>Clematis ligusticifolia</i>	Creek clematis	native			X		
<i>Delphinium uliginosum</i>	Swamp larkspur	native					
<i>Thalictrum fendleri var. polycarpum</i>	Torrey's meadow rue	native	X				
RHAMNACEAE							
<i>Ceanothus integerrimus</i>	Deer brush	native	X	X	X		X
<i>Ceanothus jepsonii</i>	Musk brush	native	X				X

Latin Name	Common Name	Status	Site				
			FA	OL	DC	PA	RN
<i>Frangula californica</i>	California coffeeberry	native	X	X		X	X
ROSACEAE							
<i>Adenostoma fasciculatum</i>	Chamise	native		X			X
<i>Cercocarpus betuloides var. betuloides</i>	Birch leaf mountain mahogany	native	X	X	X		X
<i>Heteromeles arbutifolia</i>	Toyon	native	X	X	X		X
RUBIACEAE							
<i>Galium andrewsii ssp. andrewsii</i>	Phlox leaved bedstraw	native	X				X
<i>Galium aparine</i>	Cleavers	native	X		X		X
<i>Galium porrigens</i>	Climbing bedstraw	native			X		X
SALICACEAE							
<i>Salix laevigata</i>	Red willow	native			X		
<i>Salix lasiolepis</i>	Arroyo willow	native	X				
SAPINDACEAE							
<i>Aesculus californica</i>	Buckeye	native		X	X		X
SCROPHULARIACEAE							
<i>Scrophularia californica</i>	California bee plant	native					X
SOLANACEAE							
<i>Solanum parishii</i>	Parish's purple nightshade	native					X
VITACEAE							
<i>Vitis californica</i>	California wild grape	native			X		X
<u>GYMNOSPERMS</u>							
PINACEAE							
<i>Pinus sabiniana</i>	Bull pine	native	X	X	X	X	X
TAXACEAE							
<i>Torreya californica</i>	California nutmeg	native					X

APPENDIX C

2018 Reed Mine Bat Survey

2018 Reed Mine Bat Survey



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Introduction

Homestake Mining Company is planning to conduct mine waste removal activities at the Reed Mine/Upper Davis Creek abandoned mine site in Yolo County, California (Figure 1). Prior to these activities, surveys for bats need to be conducted to determine if there are any active bat roosts within the project area and what protective measures may be needed. This report provides the results of the visual and acoustic surveys conducted for bats at the Reed Mine and provides recommendations for mitigation measures to avoid disturbance of the bats during remediation activities..

Methods

Site Reconnaissance

A reconnaissance survey of all the adits at or near the proposed remediation sites at Reed Mine (Figure 2) was conducted on May 23 and 24, 2018 by Dr. Ed West and Kevin Ghalambor to determine the locations of any existing and potential bat roosts. All known adits, shafts, buildings and associated mining structures in the area were carefully searched for openings and bat sign (incl. roosting bats, bat vocalizations, guano, urine stains and insect part middens) to determine bat presence. The existing condition of each mine adit and the presence or absence of bats or bat sign was detailed in field notes.

Bat Surveys

A bat emergence survey was conducted at the rotary furnace (Figure 3) on June 6, 2018 by Dr. Ed West, Brian Keeley, and Ryan Byrnes. Visual monitoring was conducted with binoculars and a binocular night scope (Armasight Discovery 5x Gen 3). Acoustic monitoring was conducted with a Pettersson M500 ultrasonic microphone connected to a Surface Pro laptop computer running Sonobat Live[®] (Figure 4), a real-time bat species identification software program. No live captures were conducted during this study.

Results

Table 1 lists the Reed Mine adits surveyed and the reconnaissance survey findings. All adits surveyed were closed and largely covered with chaparral vegetation except for Andalusia Pit Decline, Sky High Adit and North Reed Decline. Andalusia Pit Decline (Figure 5) was open but caved in behind the gate on the inside end of the concrete portal. Only a small amount of guano was found within the portal, indicating the portal was probably used as an occasional

night roost, but the adit does not likely support a day roost. Sky High Adit had a small linear opening (Figure 6) in the hillside road cut. No bat sign was found there. North Reed Decline had one medium sized and two small openings (Figures 7 and 8), all at ground surface level. No bat sign was found at any of these openings.

Table 1. Adit opening status and presence of bats at Reed Mine and associated structures.

Map #	Adit	Status	Bat Sign
1	Andalucia Pit Decline	Open concrete gated portal	Guano
2	Sky High Adit	1 small opening	No
3	Upper Reed Adit	Closed	No
4	Upper Reed Adit No. 2	Closed	No
5	Lower Fusiya Adit	Closed	No
6	Fusiya Shaft	Closed	No
7	Willow Adit	Closed	No
8	Big Adit	Closed	No
9	North Reed Decline	1 medium and 2 small openings	No
10	Main Reed Decline	Closed	No
11	Old Caved Adit	Closed	No
12	Lower Reed Adit	Closed	No
13	Old Adit	Closed	No
14	Old Lower Reed Adit	Closed	No
15	Rotary Furnace	Open at both ends	Active bat roost

The reconnaissance survey of the rotary furnace revealed bats were actively using the furnace as a day roost. The follow-up emergence survey showed that Townsend's big-eared bats (*Corynorhinus townsendii*) and one or more species of *Myotis* were roosting in the furnace (Figure 9 and 10). The Townsend's big-eared bat was visually identified using the night scope. However, because of the similar size and shape of *Myotis* bats, the identity of the *Myotis* species flying in the furnace could not be determined. The acoustic recordings (Figures 11 - 16) suggest they were either California myotis (*Myotis californicus*) or fringed myotis (*Myotis thysanodes*).

Discussion and Mitigation Recommendations

Because of the absence of bat colonies at the mine adits, no bat avoidance mitigation measures will be needed at any of existing Reed Mine adits for the proposed remediation actions (Figure 1). However, the bats roosting in the rotary furnace will need to be excluded from the furnace prior to its removal. The bats should be excluded by a qualified bat biologist using one-way

gates at each end of the furnace. Once the bats have been excluded, the furnace can be sealed and removed. The exclusion should be conducted only after the breeding season (April 15 - August 31), but before the hibernation season (October 15 - March 1), or between March 31 and April 15 - after the hibernation season but before the reproductive season. No disturbance of the furnace site should occur during the bat breeding season.

Figures

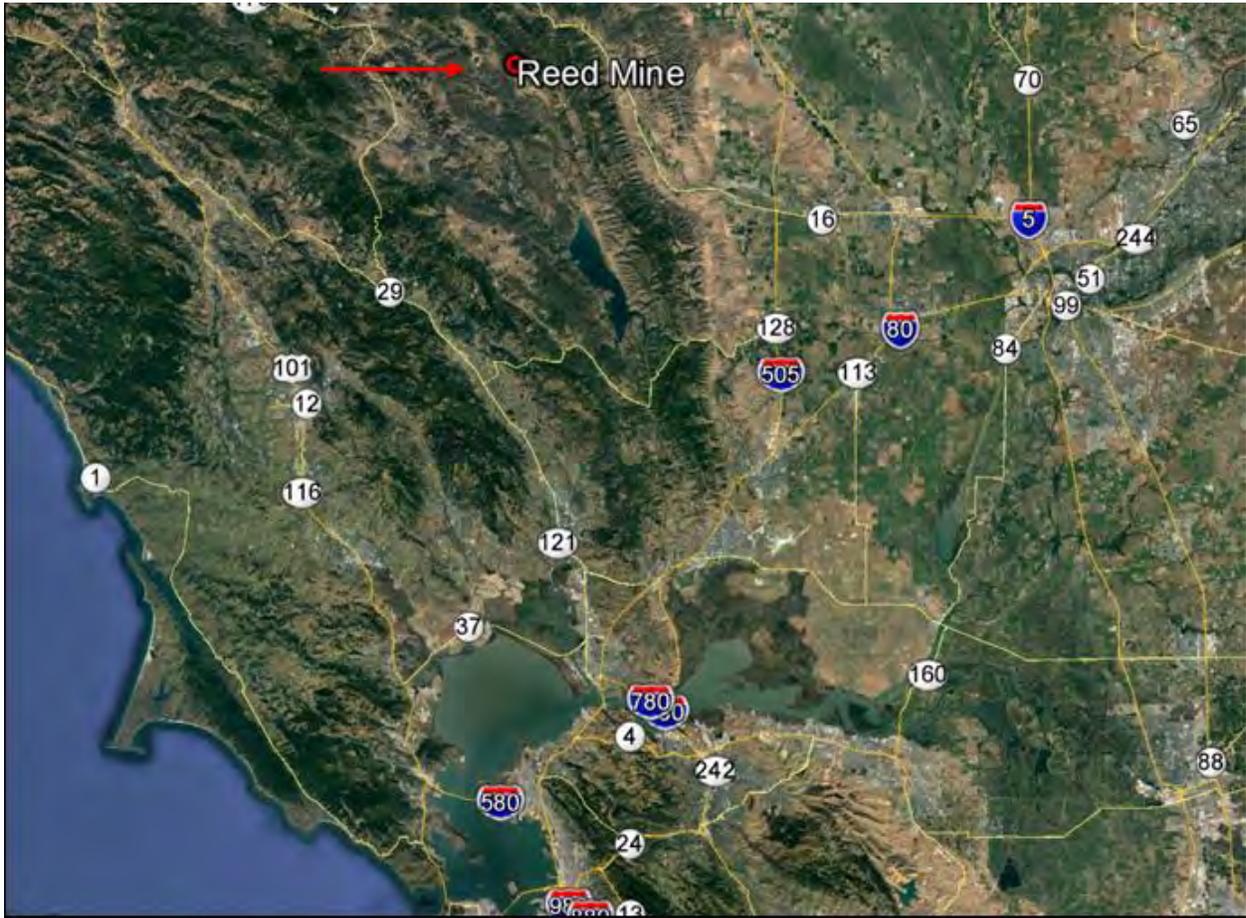


Figure 1. Location of Reed Mine.

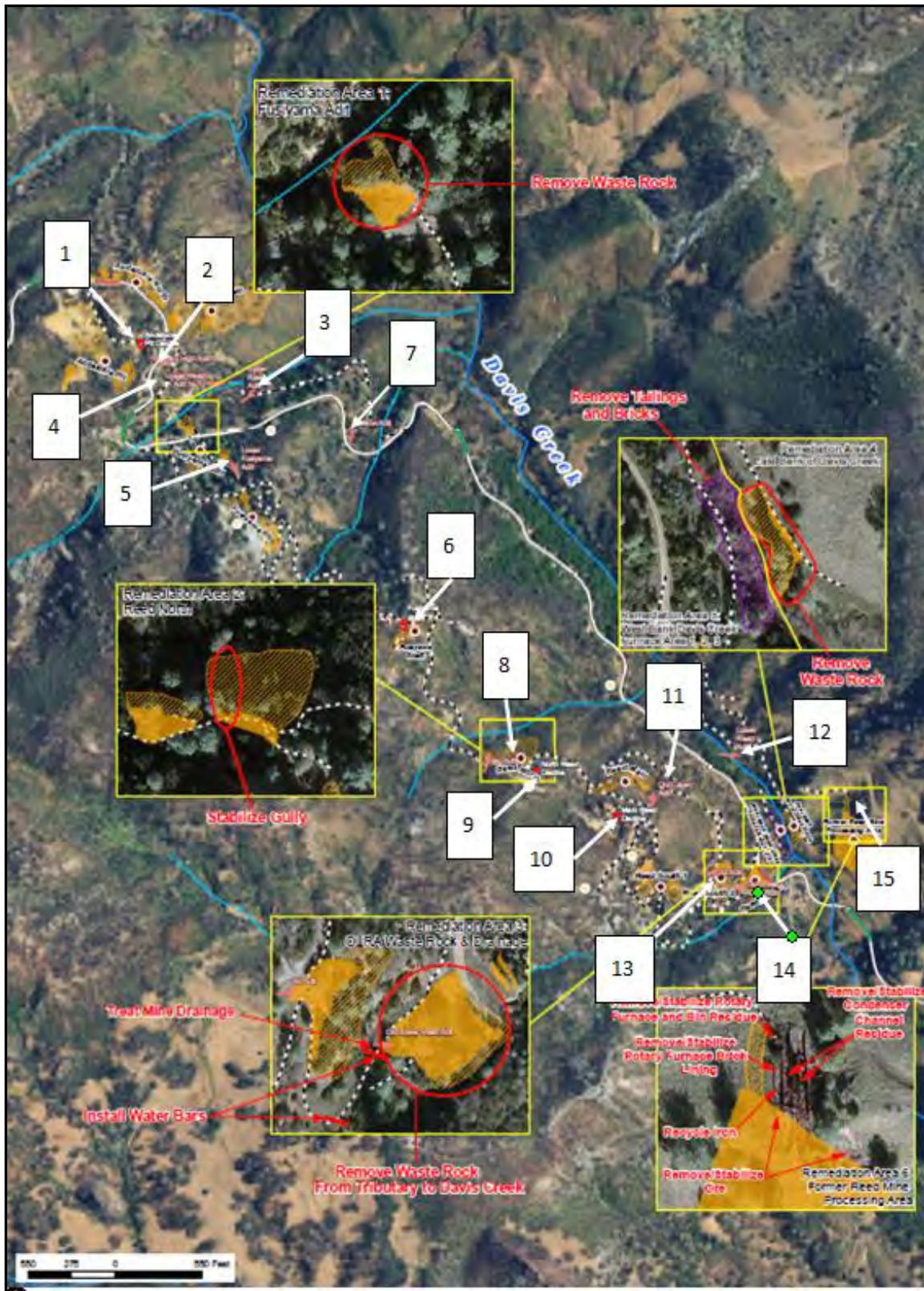


Figure 2. Locations of survey sites and proposed remediation. The site location numbers correspond to those in Table 1.



Figure 3. Reed Mine rotary furnace: top: red arrow; lower - close-up. (Homestake photo (top); lower photo by B. Keeley)



Figure 4. Acoustic monitoring equipment showing the ultrasonic microphone on the pole and a Sonobat Live display of a bat call on the laptop. (Photo by B. Keeley)



Figure 5. Andaluca Pit Decline. A few pieces of guano were found on the floor of the concrete portal. (Homestake photo)



Figure 6. Sky High mine adit. No bat sign was found here. (Homestake photo)



Figure 7. Reed North Decline. No bat sign was found at this portal. (Homestake photos)



Figure 8. Additional openings at Reed North Decline. No bat sign was found at either opening. (Photos by E. West)



Figure 9. The Reed Mine rotary furnace showing a linear view through the furnace. The bat roost was located at the center of the brick-lined furnace. (Photo by R. Byrnes)

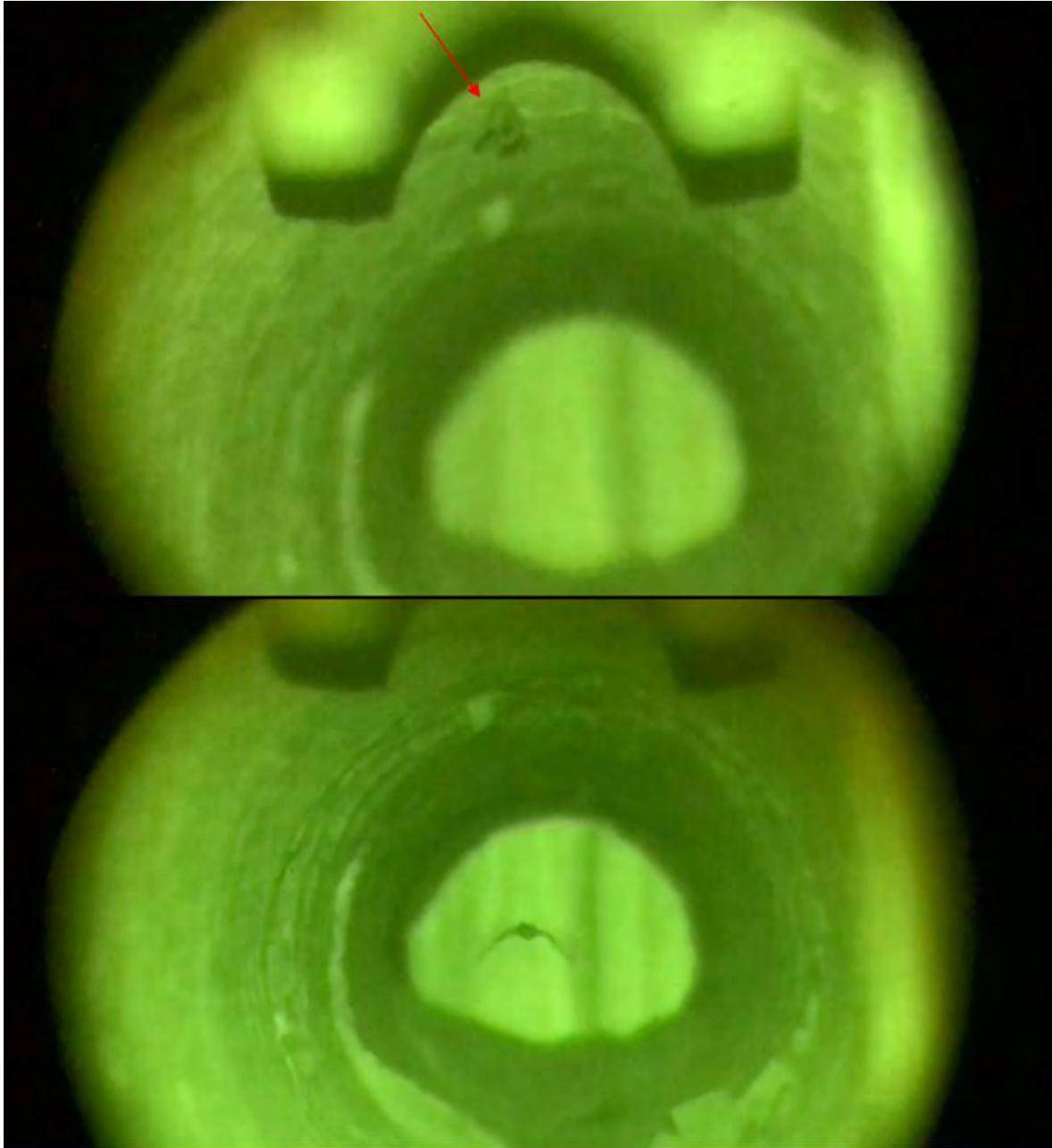


Figure 10. Night scope photographs of Townsend's big-eared bat (top, red arrow) and a flying *Myotis* species (lower - silhouette). (Photos by R. Byrnes)

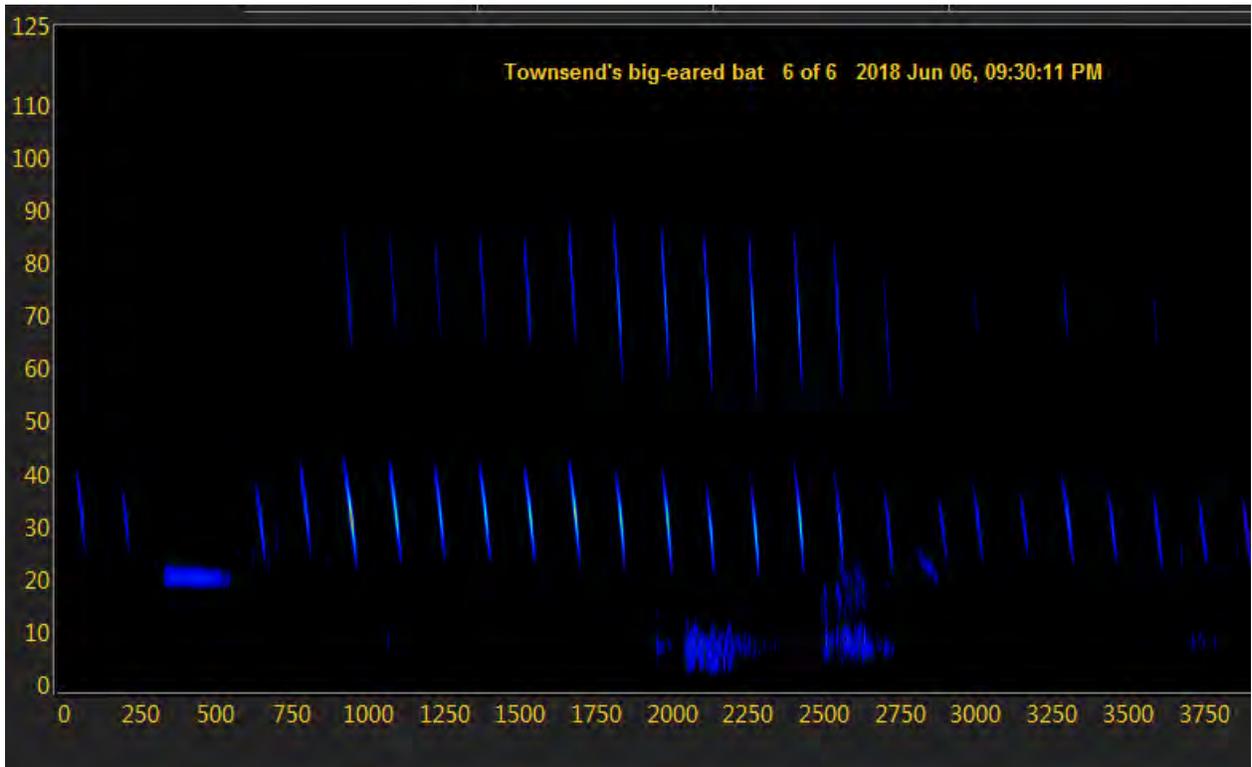


Figure 11. Sonogram of a Townsend's big-eared bat (*Corynorhinus townsendii*) echolocation call recorded at the Reed mine rotary furnace.

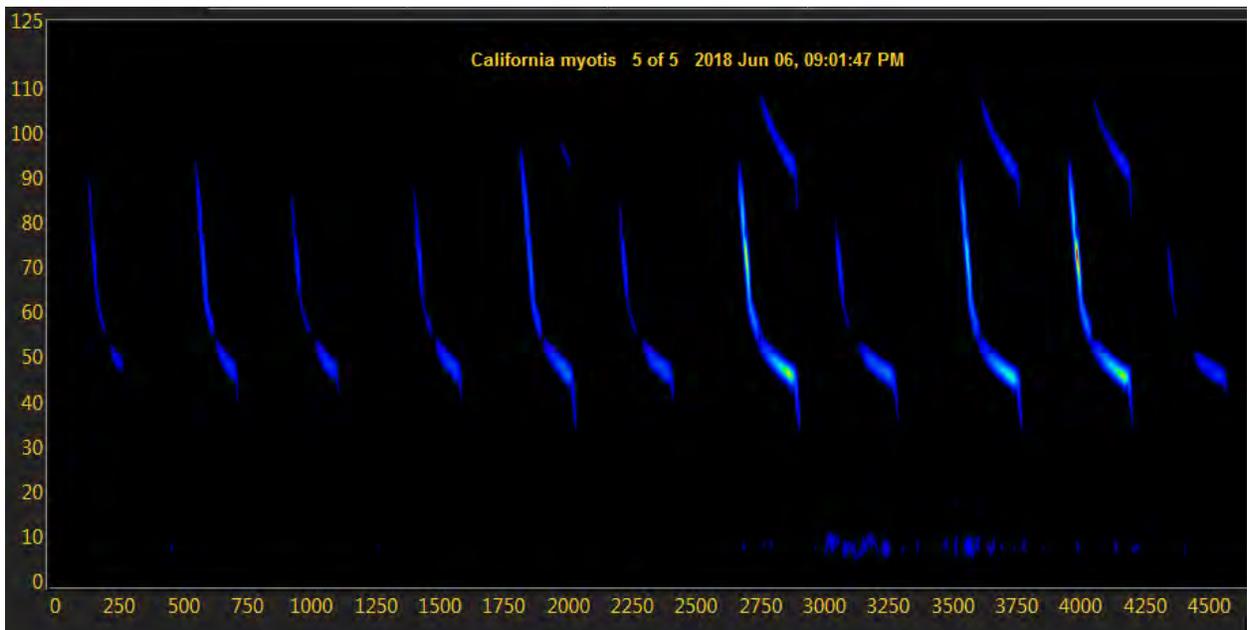


Figure 12. Sonogram of a California myotis (*Myotis californicus*) echolocation call recorded at the Reed mine rotary furnace.

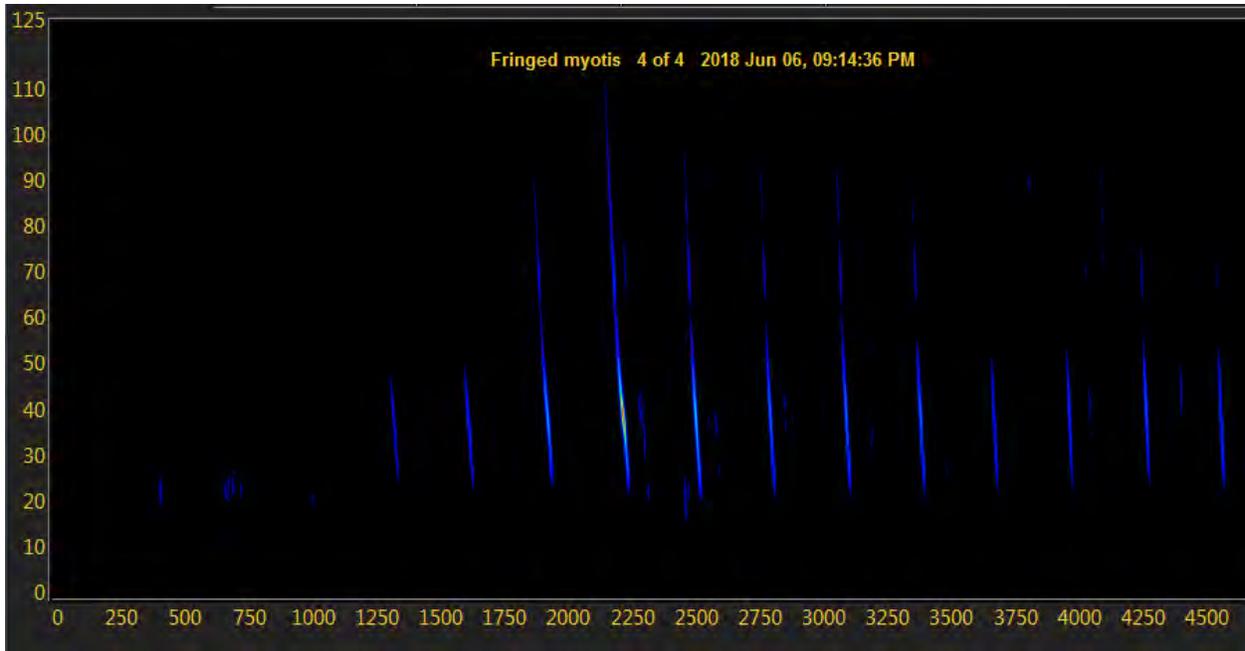


Figure 13. Sonogram of a Fringed myotis (*Myotis thysanodes*) echolocation call recorded at the Reed mine rotary furnace.

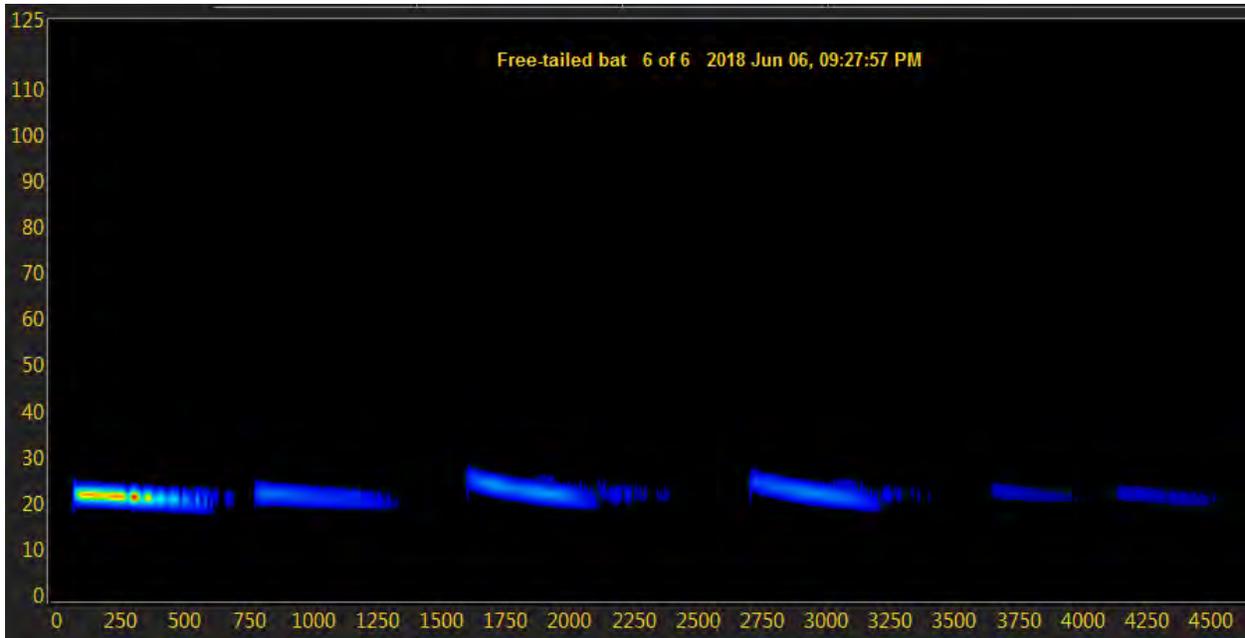


Figure 14. Sonogram of a Brazilian free-tailed bat (*Tadarida brasiliensis*) echolocation call recorded at the Reed mine rotary furnace.

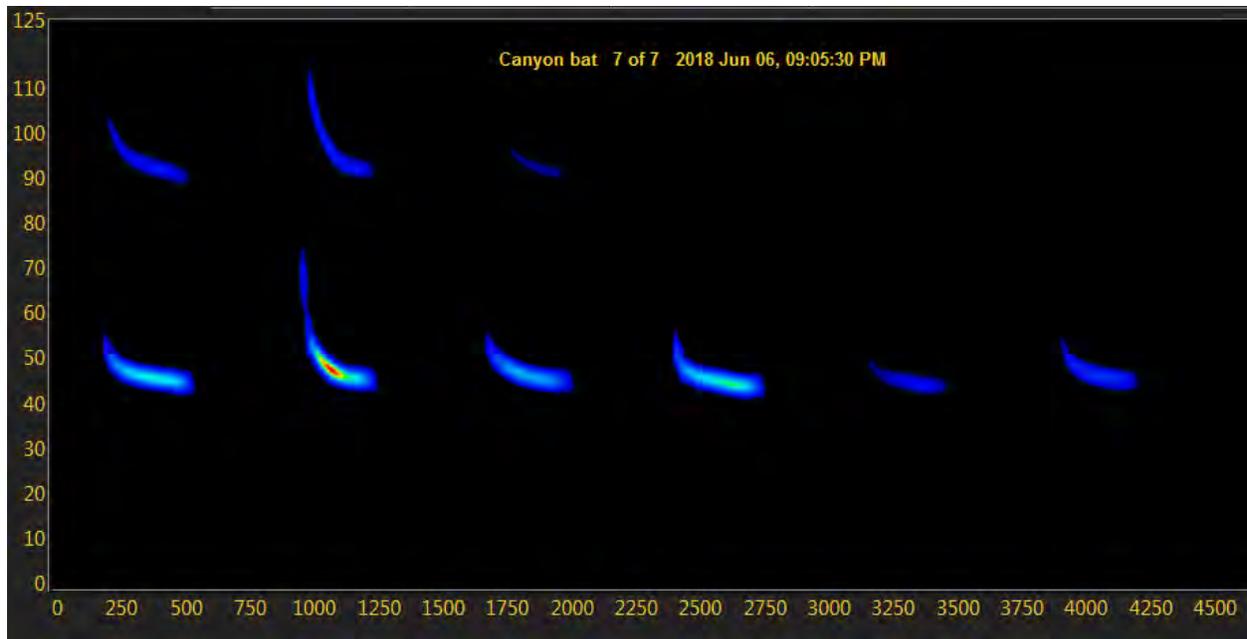


Figure 15. Sonogram of a canyon bat (*Parastrellus hesperus*) echolocation call recorded at the Reed mine rotary furnace.