

Appendix C
Biological Resources Report

BIOLOGICAL RESOURCES REPORT

HINKLEY GROUNDWATER REMEDIATION PROJECT SAN BERNARDINO COUNTY, CALIFORNIA

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Contents

Chapter 1	Project Information	C-1
1.1	Project Location	C-1
1.2	Project Description	C-1
Chapter 2	Methodology.....	C-3
2.1	Literature Review	C-3
2.2	Field Investigation.....	C-4
Chapter 3	Existing Conditions	C-9
3.1	Environmental Setting	C-9
3.2	Vegetation Communities/Land Use.....	C-9
3.3	Sensitive Natural Community	C-12
3.4	Soils	C-12
3.5	Critical Habitat	C-13
3.6	Plants and Wildlife	C-13
Chapter 4	References	C-25
4.1	Printed References.....	C-25
4.2	Personal Communications	C-28

Attachments

- A Site Photographs
- B Plant Species Observed
- C Wildlife Species Observed
- D Special-Status Species Information

Figures

	Follows Page
1 Regional Vicinity Map	C-2
2 Project Location	C-2
3 USGS Map	C-2
4 Vegetation Communities	C-10
5 Soils Map.....	C-12
6 Special-Status Species Map—Desert Tortoise	C-14
7 Special-Status Species Map—Other	C-14
8 Suitable Desert Tortoise and Mohave Ground Squirrel Habitat.....	C-16
9 Potential Jurisdictional Features.....	C-24

Table

	Page
1 Plant Communities.....	C-9

Acronyms and Abbreviations

ACEC	Areas of Critical Environmental Concern
AMSL	above mean sea level
BLM	U.S. Bureau of Land Management
BSA	biological survey area
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
chromium 6, Cr6	hexavalent chromium
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
RWQCB	California Regional Water Quality Control Board
DWMA	Desert Wildlife Management Area
EIR	Environmental Impact Report
ESA	Endangered Species Act
HCP	Habitat Conservation Plan
ICF	ICF International
MBTA	Migratory Bird Treaty Act
mph	miles per hour
NEPA	National Environmental Policy Act
NES	Natural Environment Study
NRCS	Natural Resources Conservation Service
PG&E	Pacific Gas and Electric Company
SR	State Road
SSC	species of special concern
station	PG&E Hinkley Compressor Station
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

This Biological Resources Report is being prepared to evaluate the potential special-status biological resources that may be present in potential groundwater remedial action areas for remediation of chromium plume related to the PG&E Hinkley Compressor Station. This report contains the results of a biological literature search, vegetation mapping, and special-status species habitat assessment conducted by ICF International (ICF) for the 21,032-acre biological study area (BSA) located in the community of Hinkley, San Bernardino County, California. Biological resources have been evaluated that pertain to the federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), California Endangered Species Act (CESA), and the California Fish and Game Code (e.g., protected species).

Judgments regarding likelihood of occurrence are based on evaluation of available biological information regarding regional and local conditions, species biology, available evaluations of the study area and vicinity, and professional experience conducting field investigations.

1.1 Project Location

The BSA is located on approximately 21,032 acres of land within the unincorporated community of Hinkley, California, with a small area extending into the city limits of Barstow (Figures 1 and 2). Regionally, the BSA is located northwest of Interstate 15 and is intersected by Highway 58. Specifically, the site is located between Hinkley Road and a portion of Highway 58 approximately 1.75 miles northwest of the intersection of Interstate 15 and Highway 58. The site is dominated by private property but also includes some lands managed by the Bureau of Land Management (BLM) as well as Caltrans right-of-way for Highway 58.

The site is in the following Townships, Ranges, and Quads of California, U.S. Geological Survey (USGS) 7.5-minute quadrangle maps (Figure 3): Township 9 North, Range 3 West and Township 10 North, Range 3 West of *Hinkley* (U.S. Geological Survey 1971a); Township 9 North, Range 2 West and Township 10 North, Range 2 West of *Barstow* (U.S. Geological Survey 1971b); and Township 11 North, Range 3 West of *Water Valley* (U.S. Geological Survey 1988).

1.2 Project Description

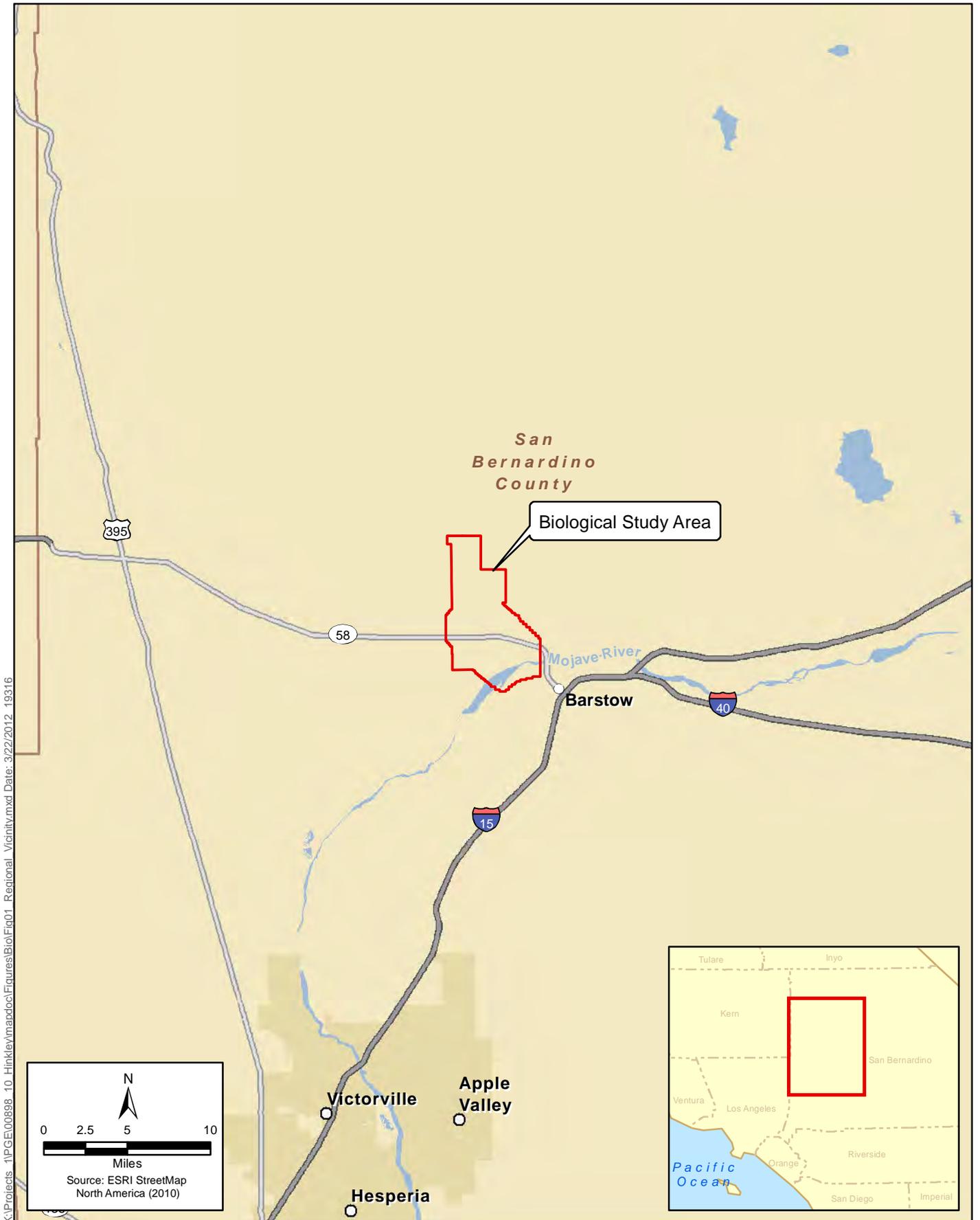
The chromium plume associated with the prior use of chromium at the PG&E Hinkley Compressor Station (station) is the subject of groundwater investigation and cleanup activities being directed by the California Regional Water Quality Control Board (RWQCB), Lahontan Region. The Hinkley Compressor Station, located approximately eight miles west of Barstow in San Bernardino County, pressurizes natural gas to facilitate its transport (flow) to Northern California. In the 1950s and 1960s, PG&E used and discharged water containing hexavalent chromium (chromium 6 or Cr6), which entered groundwater beneath the station. A plume of contaminated groundwater has been defined and characterized (California Regional Water Quality Control Board 2011). Under the

direction of the RWQCB, investigative and remedial activities have been underway for a number of years to characterize the plume, define its boundaries and remediate the plume.

To remediate the contaminated aquifer, and satisfy the requirements of the California Environmental Quality Act, the RWQCB is considering a range of alternatives to be implemented by PG&E to affect cleanup of the groundwater. As of late 2011—according to Addendum #3 to the Feasibility Study (Haley and Aldrich 2011)—more than 300 monitoring wells, 30 extraction wells, and six treatment systems have been installed.

A range of remedial measures that involve various configurations of aboveground and belowground treatment will likely be proposed. These measures will likely require installation of wells, pipelines aboveground treatment systems and agricultural land treatment units. The entire range of alternatives will be described as part of the Environmental Impact Report (EIR) in preparation.

Although the exact configuration of remedial measures is not yet known, the treatment alternatives could be dispersed over approximately 12 square miles—the area of land above and adjacent to the contaminated groundwater plume.



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Figure 1
Regional Vicinity Map
Biological Resources Report
Hinkley Groundwater Remediation Project

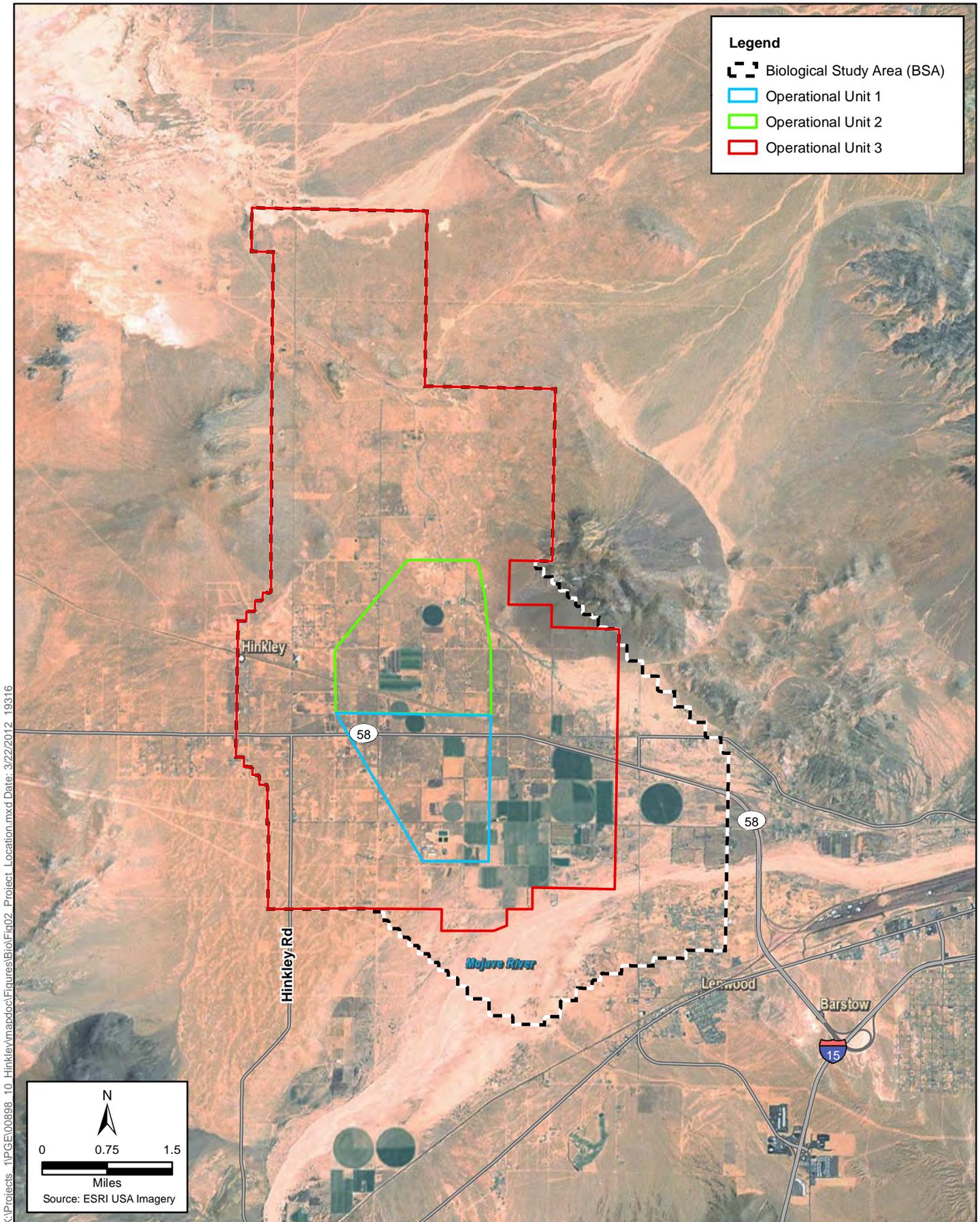
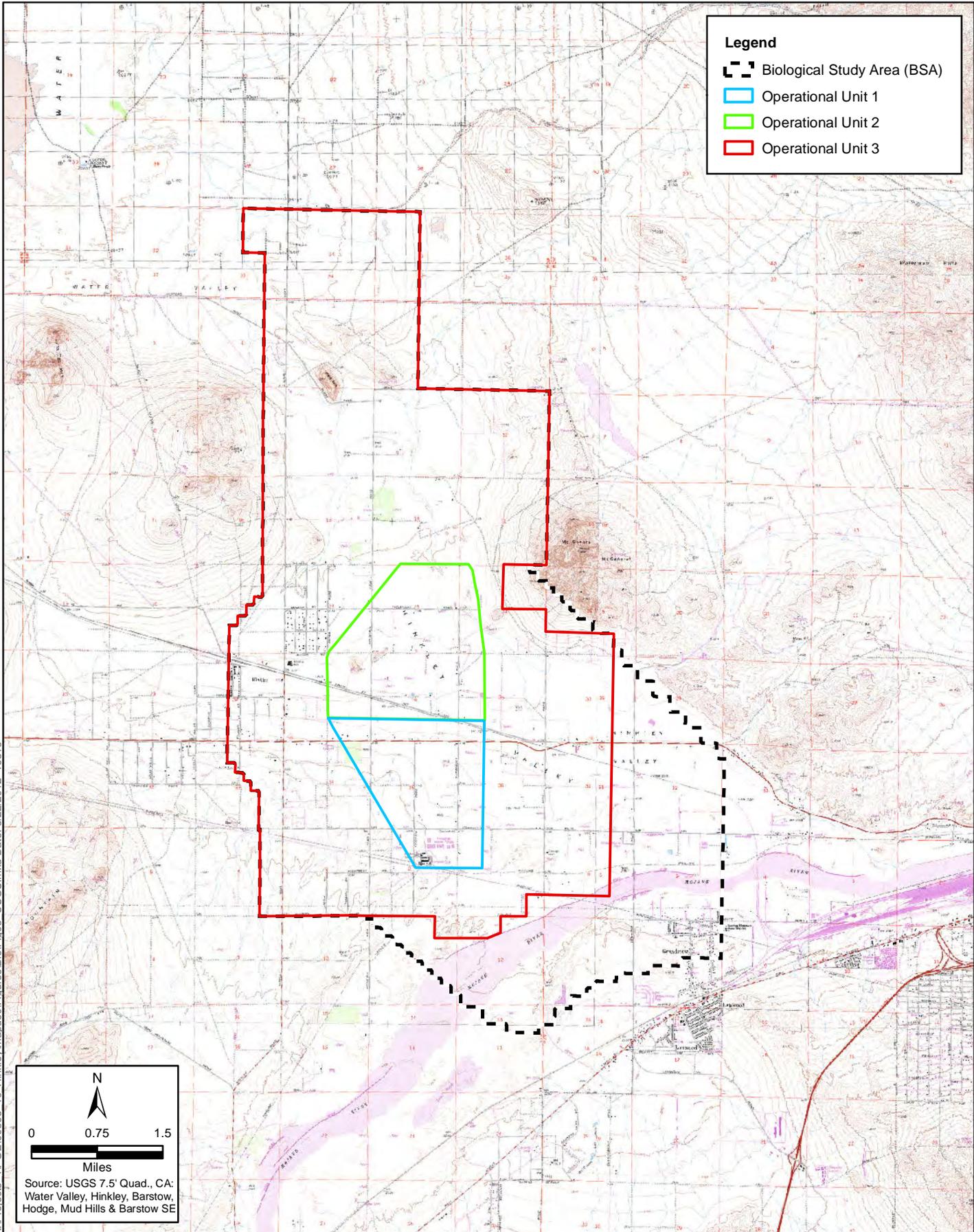


Figure 2
Project Location
Biological Resources Report
Hinkley Groundwater Remediation Project

Legend

-  Biological Study Area (BSA)
-  Operational Unit 1
-  Operational Unit 2
-  Operational Unit 3



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Figure 3
USGS Map
Biological Resources Report
Hinkley Groundwater Remediation Project

2.1 Literature Review

A comprehensive literature review was conducted to evaluate the environmental setting of the BSA and identify potential special-status species that may be found on the site. The review included a search of the California Natural Diversity Database (CNDDDB) (California Department of Fish and Game 2011a) and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (California Native Plant Society 2011) for the Hinkley, Barstow, Barstow SE, Mud Hills, Water Valley, Lockhart, Twelve Gauge Lake, Wild Crossing, and Hodge 7.5-minute USGS quadrangles. Additionally, literature detailing the habitat requirements of special-status species and the most recent U.S. Fish and Wildlife Service (USFWS) critical habitat maps were reviewed (U.S. Fish and Wildlife Service 2011b).

For the purpose of this document, special-status species are plants and animals are those that are legally protected under the federal ESA, CESA, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. Special-status species are defined as species that are:

- listed, proposed for listing, or candidates for listing under the federal ESA as threatened or endangered;
- listed or candidates for listing under the CESA as threatened or endangered;
- listed as rare under the Native Plant Protection Act; and
- a state species of special concern (SSC) or fully protected species
- A state species of special concern is a species, subspecies, or distinct population of a fish, amphibian, reptile, bird, or mammal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:
 - is extirpated from the State or, in the case of birds, in its primary seasonal or breeding role;
 - is listed as Federally-, but not State-, threatened or endangered or meets the State definition of threatened or endangered but has not formally been listed;
 - is experiencing, or formerly experienced, serious (non-cyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status;
 - has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.

The California Native Plant Society (CNPS) maintains lists of plants as rare or endangered. Unless separately listed by the state or federal government the plants on the CNPS' lists are not formally protected in law. The CNPS lists are as follows:

- California Rare Plant Rank List 1A: plants presumed extinct

- California Rare Plant Rank List 1B: plants rare, threatened, or endangered in California and elsewhere
- California Rare Plant Rank List 2: plants rare, threatened, or endangered in California, but more numerous elsewhere
- California Rare Plant Rank List 3: plants about which more information is needed—a review list
- California Rare Plant Rank List 4: plants of limited distribution—a watch list

Plants listed on CNPS List 1A, 1B, or 2 meet the definition of Section 1901, Chapter 10 (Native Plant Protection Act) and Sections 2062 and 2067 (CESA) of the California Fish and Game Code. Thus, for the purposes of this EIR, plants on CNPS List 1A, 1B, or 2 are considered “rare” plants for the purposes of impact evaluation.

Special-status species are thus also defined as including plant species with California Rare Plant Ranks (CRPR) of 1A, 1B, or 2 species.

In addition, the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (U.S. Department of Agriculture / Natural Resources Conservation Service 2011) was reviewed for the BSA. The soil data was then evaluated for the potential to support rare vegetation communities, plants, and/or wildlife.

2.2 Field Investigation

A site visit was conducted on December 20, 2011 by ICF Biologists Mikael Romich, Phil Richards, Paul Schwartz, and Lisa Franklin. The site visit was conducted between 8 a.m. and 5 p.m. Weather conditions during the site visit consisted of temperatures ranging from 7.2° to 13.3° Celsius (45° to 56° Fahrenheit), winds ranging from 0–3 miles per hour (mph) with partly cloudy to clear skies, and good visibility. The site visit focused on mapping vegetation and conducting habitat assessments for special-status plants and wildlife. Photographs of the site are provided in Attachment A.

The BSA was evaluated for the presence, absence, or likelihood of occurrence of special-status species and vegetation types, and for more general biological resource issues potentially posing a constraint to the project through applicable laws and regulations. Focused surveys for plants or wildlife were not performed during this site visit. Parameters evaluated for special-status plants included topography, soil conditions, elevation, hydrology, the site’s operational activities, and life history needs for the specific species. Special-status parameters for wildlife included connectivity to documented and potentially occurring habitat, hydrology, access to the site, foraging and nesting habitat, the site’s operational activities, and life history needs for each species.

All plant and wildlife species observed during the site visit were recorded in field notes. Plants were detected and identified through direct sight. Plants were identified to species based on previous experience with the species or identified to species using *A Field Guide to the Plants of Arizona* (Epple 1995) and *The Jepson Desert Manual: Vascular Plants of Southeastern California* (Baldwin et. al. 2002). Special-status rankings for plant species were identified through a review of the CDFG Special Plants, Bryophytes, and Lichens List (California Department of Fish and Game 2011b). Wildlife species were detected by sight, calls, tracks, scat, or other sign. Field guides were used to assist with identification of species during the site visit. Special-status rankings for wildlife were

identified through a review of the CDFG Special Animals List (California Department of Fish and Game 2011c).

2.2.1 Vegetation Mapping

Vegetation mapping was conducted in the field using approximate 1 inch to 400-foot scale aerials (aerial dated January 31, 2009), which were later transferred to a digital file using Google Earth and then converted to GIS shapefiles. Since the field visit, one polygon was added to the study area in the northeast portion. For this polygon, a Google Earth aerial (dated January 31, 2009) was used with reference to the vegetation mapping completed in the field to aerially interpret the vegetation. Where possible, the vegetation mapping followed the classifications defined in *A Manual of California Vegetation* (Sawyer et al. 2007); however, Holland (1986) was also conferred. A component of aerial interpretation was required for some of the remote and inaccessible locations of the study area, and was based on colorations and patterns as distinguishing features on the aerial photography.

2.2.2 Jurisdictional Resources

A formal jurisdictional delineation was not conducted for the BSA; however, potential jurisdictional features were noted and mapped during the habitat assessment. In addition, topographical maps and aerial photography were reviewed. All features that were noted during the field visit, visible on aerial photography, and mapped as blue-line features on USGS maps are included as potential jurisdictional resources. However, this should not be considered an exhaustive list because many features may not have been visited in the field, evident on aerial photography, or mapped as a USGS blue-line feature.

2.2.3 Regulatory Constraints

Applicable local, state, and federal laws and regulations, enacted to protect and/or manage biological resources were evaluated for their relevance and potential to constrain the proposed project. The analysis of constraints provided in this report is based on a combination of direct evaluation of the site, current regulatory information, and professional judgment.

The federal and state laws listed below are only some of the laws initially considered during all constraint analyses conducted by ICF. Note that many of the regulations listed below may not be applicable to the project at hand, but the applicability of each was considered to determine potential constraints to the project under consideration. For each law, applicable amendments to the original, resulting regulations empowered therein, and relevant judicial precedent were included.

2.2.3.1 Federal Laws

The federal laws listed below were considered during evaluation of the biological resources on the BSA. Note that this is not an exhaustive list of all federal laws that may be considered.

- Bald and Golden Eagle Protection Act.
- Endangered Species Act of 1973 (including designated critical habitat for listed species).
- Federal Noxious Weed Act of 1974.
- Federal Water Pollution Control Act (Clean Water Act).

- Fish and Wildlife Act of 1956.
- MBTA.
- National Environmental Policy Act (NEPA) of 1969.

2.2.3.2 State Laws and Regulations

The state laws and regulations listed below were considered during evaluation of the biological resources on the BSA. Note that this is not an exhaustive list of all state laws and regulations that may be considered. Applicable regulations will be discussed in greater detail in the project EIR.

- California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000–21177, State CEQA Guidelines Sections 15000–15387).
- California Fish and Game Code (including codes for the state Endangered Species Act, those similar to the federal MBTA, and those for Lake or Streambed Alteration Agreements).
- California Native Plant Protection Act
- The California Desert Native Plants Act (Division 23 of the California Food and Agriculture Code)
- The Mammal Hunting Regulations 2011-2012, Subdivision 2. Game and Furbearers, Chapter 5. Furbearing Mammals, §460 states that fisher, marten, river otter, desert kit fox and red fox may not be taken at any time.

2.2.3.3 Other Regulations

County of San Bernardino Plant Protection and Management

Chapter 88.01 (Plant Protection and Management) of the San Bernardino County Development Code (San Bernardino County 2007) regulates the removal or harvesting of specified desert native plants and the removal of vegetation within 200 feet of the bank of a stream, or in an area indicated as a protected riparian area on an overlay map or Specific Plan. Removal of specified desert native plants or vegetation within 200 feet of a bank or stream requires a Tree or Plant Removal Permit in compliance with Section 88.01.050 (Tree or Plant Removal Permits) and is subject to environmental review.

The following desert native plants, including parts but excepting fruit, will not be removed except under a Tree or Plant Removal Permit in compliance with Section 88.01.050.

- The following desert native plants with stems 2 inches or greater in diameter or 6 feet or greater in height: Smoke tree (*Psoralea argemone* synonym *Dalea spinosa*) and all species of the genus *Prosopis* (mesquites).
- All species of the family Agavaceae (century plants, nolin, yuccas).
- Creosote rings, 10 feet or greater in diameter.
- All Joshua trees (*Yucca brevifolia*).
- Any part of the following species, whether living or dead: desert ironwood (*Oleina tesota*), all species of the genera *Prosopis* (mesquites) and *Cercidium* (palos verdes).

The West Mojave Plan

The West Mojave Plan is a federal land use plan that outlines the strategy to conserve and protect more than 100 sensitive plant and animal species, as well as provide guidance for compliance with requirements of the California Endangered Species Act (CESA) and ESA, respectively (Bureau of Land Management 2005).

The West Mojave Plan lists certain requirements for implementing projects within habitat conservation areas. Per the record of decision (Bureau of Land Management 2006), the Plan only applies to federal land and does not apply to private land.

The Western Mojave Plan includes, but is not limited to, the following species for conservation:

- Desert tortoise (*Gopherus agassizii*).
- Mohave ground squirrel (*Xerospermophilus mohavensis*).
- Burrowing owl (*Athene cunicularia*).
- Mojave fringed-toed lizard (*Uma scoparia*).
- Desert cymopterus (*Cymopterus deserticola*).
- Mojave monkeyflower (*Mimulus mohavensis*).

The BSA partially overlaps habitat conservation areas designated for desert tortoise and Mohave ground squirrel in the West Mojave Plan. Within the BSA, the desert tortoise and Mohave ground squirrel conservation areas overlap each other completely, and are also called out as the Superior-Cronese Desert Wildlife Management Area (DWMA) to keep consistent with previous terminology.

The Recovery Plan for the Mojave Population of the Desert Tortoise

The Recovery Plan for desert tortoise (U.S. Fish and Wildlife Service 2011a) identifies six recovery units, in which one to four DWMAs were designated, and describes the development and implementation of specific recovery actions focused within the DWMAs. Maintaining high survivorship of adult desert tortoises was identified as the key factor in recovery (U.S. Fish and Wildlife Service 2011a). The BSA occurs within a portion the Superior-Cronese DWMA.

3.1 Environmental Setting

The BSA is located within the unincorporated community of Hinkley with a small area extending into the city limits of Barstow. The BSA is situated in Hinkley Valley east and southeast of Lynx Cat Mountain, west and southwest of Mount General, and south of Black and Opal Mountains. The BSA occurs within BLM-managed lands as well as privately owned lands (including lands owned by PG&E). Topographically, the BSA is relatively flat and contains one high point in the north named Red Hill on the *Hinkley* 7.5-minute USGS topographic map (U.S. Geological Survey 1971b). Elevations within the BSA range from approximately 2,100 to 2,300 feet above mean sea level (AMSL). The Mojave River flows through the southern portion of the BSA.

The BSA is vegetated with a mosaic of desert scrub communities mixed with agricultural areas, developed residential areas, and small private property holdings (Figure 4). Notable on the BSA are the series of drainage features and corresponding broad fans created from flows draining southwest from Mount General and the Mud Hills, then flowing northwest to Harper Dry Lake. Land use located northeast, north, and west of the BSA are largely undeveloped open space. The West Mohave Desert Ecological Reserve, owned and managed by the California Department of Fish and Game, occurs north of the BSA.

3.2 Vegetation Communities/Land Use

Thirteen distinct vegetation communities and land uses were mapped within the BSA (Figure 4 and Table 1). A detailed description for each vegetation community/land use is provided below.

Table 1. Plant Communities

Community	Acres
Allscale Scrub	10,143
Allscale Scrub—Sparse Playa	1,736
Allscale Scrub—Disturbed	428
Fourwing Saltbush Scrub	2
Creosote Bush Scrub	2,306
California Joint Fir Scrub	263
Mojave River Wash	702
Desert Dunes	721
Tamarisk Thickets	22
Red Brome or Mediterranean Grass Grassland Semi-Natural Herbaceous Stands	25
Ruderal/Disturbed/Barren	2,157
Agriculture	1,263
Developed	1,264
Total	21,032

3.2.1 Allscale Scrub (*Atriplex polycarpa* Shrubland Alliance)

This vegetation community is present throughout the project area (Figure 3.7-1). Typical conditions where allscale scrub occurs within the project area include washes (or surface drainages, primarily seasonal in the project area), dissected alluvial fans, rolling hills, terraces, and edges of large, low-gradient washes. Soils are carbonate rich, alkaline, sandy, or sandy clay loams. Within the project area allscale scrub (*Atriplex polycarpa*) is characterized as dominant in the shrub canopy. Other shrubs include creosote bush (*Larrea tridentata*), white bur-sage (*Ambrosia dumosa*), four-wing saltbush (*Atriplex canescens*), burrobush (*Ambrosia salsola*), spiny hopsage (*Grayia spinosa*), sticky snakeweed (*Gutierrezia microcephala*), and peach desert thorn (*Lycium cooperi*). The herbaceous layer is variable with seasonal annuals and non-native grasses such as Eriastrum (*Eriastrum* sp.), red-stemmed filaree (*Erodium cicutarium*), red brome (*Bromus madritensis* ssp. *rubens*), cheat grass (*Bromus tectorum*), and common Mediterranean grass (*Schismus barbatus*).

3.2.2 Allscale Scrub—Sparse Playa

This vegetation community consists of approximately 1,736 acres and is located in the northern and eastern portions of the BSA associated with an unnamed wash that conveys flows northwest through the BSA to Harper Dry Lake (Figure 4). This community generally comprises the same species composition as the allscale scrub vegetation community; however, the density of shrub and herb cover is notably less. In addition, this community contains areas of washes and playa lakebeds and shores that contain fine silty, cracked, alkaline soils supporting only a few scattered shrubs (e.g., allscale) and herbs (e.g., red-stemmed filaree, cheat grass, and common Mediterranean grass). Mojave spineflower (*Chorizanthe spinosa*) was observed within several of the northern playa features within this habitat.

3.2.3 Allscale Scrub—Disturbed

This vegetation community consists of approximately 428 acres and is located in the northern portion of the BSA in association with developed lands (Figure 4). It appears that this area has been cleared to various degrees and that the allscale scrub is starting to re-vegetate. This community generally comprises the same species composition as the allscale scrub vegetation community; however, the density of shrub and herb cover is notably less due to anthropogenic impacts.

3.2.4 Fourwing Saltbush Scrub (*Atriplex canescens* Shrubland Alliance)

The Fourwing Saltbush Scrub vegetation community is distributed in a small area in the central portion of the project area immediately north of Santa Fe Ave (Figure 3.7-1). Habitats within the project area include playas, dissected alluvial fans, and rolling hills. Soils are carbonate- rich, alkaline, sandy, or sandy clay loams. Four-wing saltbush is the dominant or co-dominant vegetation in the shrub canopy with creosote bush, white bur-sage, or allscale. Other shrubs include burrobush, spiny hopsage, sticky snakeweed, winterfat (*Krascheninnikovia lanata*), peach desert thorn, and bush seepweed (*Suaeda moquini*). The shrub layer canopy is open or intermittent. The herbaceous layer is variable with seasonal herbs and non-native grasses such as galleta grass (*Pleuraphis rigida*), Indian ricegrass (*Stipa hymenoides*), red brome, cheat grass, and common Mediterranean grass.

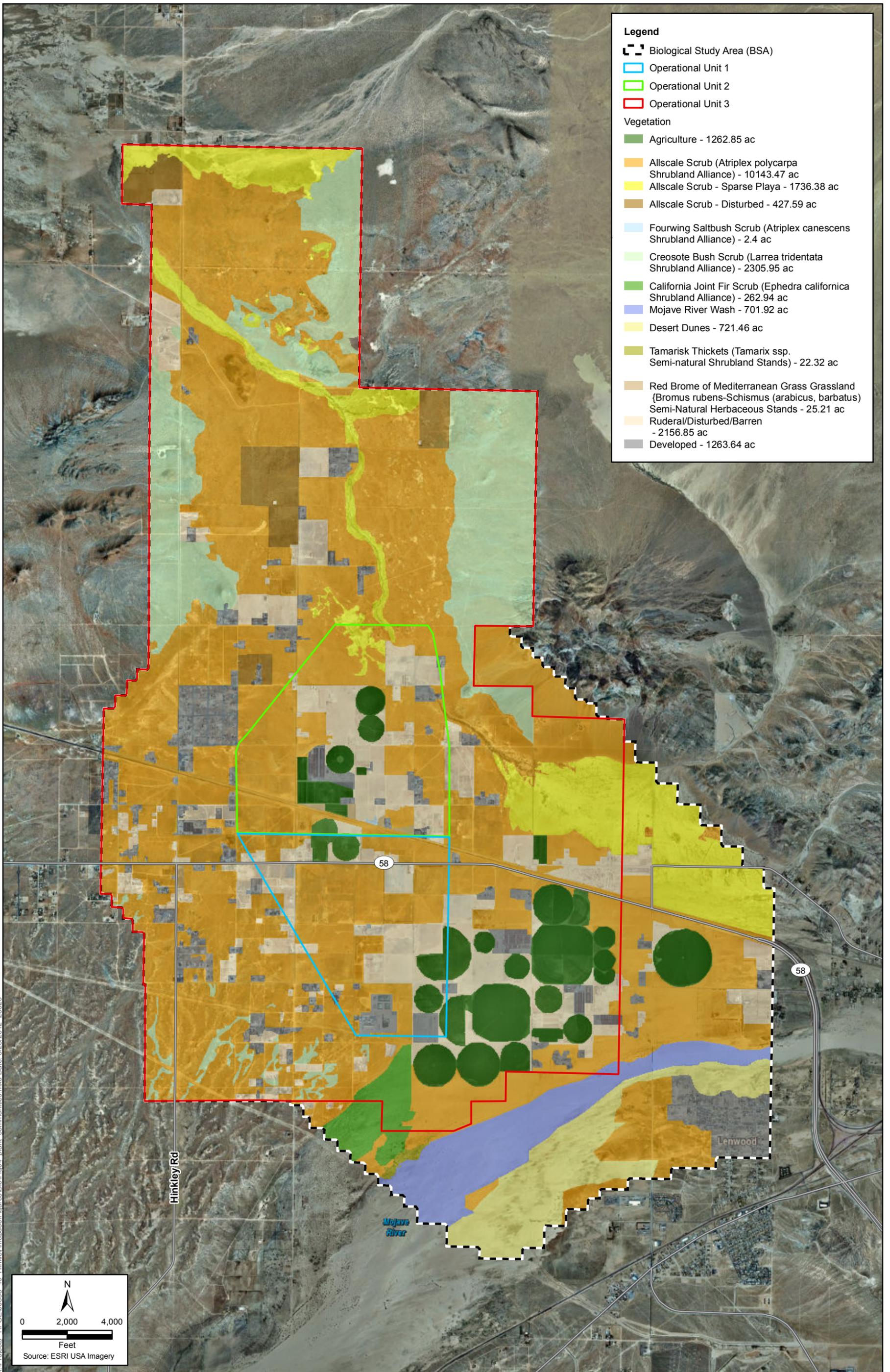


Figure 4
Vegetation Communities
Biological Resources Report
Hinkley Groundwater Remediation Project

3.2.5 Creosote Bush Scrub (*Larrea tridentata* Shrubland Alliance)

This vegetation community consists of approximately 2,306 acres and is located in the northern and southwestern portions of the BSA (Figure 4). Habitats within the BSA include alluvial fans, bajadas, upland slopes, and minor intermittent washes. Soils are well drained. This vegetation community is characterized by the presence of creosote bush as the dominant or co-dominant in the shrub canopy with fourwing saltbush, white bur-sage, or allscale. Other shrubs include burrobrush, spiny hopsage, sticky snakeweed, California joint fir (*Ephedra californica*), and peach desert thorn. Canopy of the shrub layer is intermittent to open. The herbaceous layer is variable with seasonal annuals or perennial grasses such as galleta grass, Indian ricegrass, red brome, cheat grass, and common Mediterranean grass.

3.2.6 California Joint Fir Scrub (*Ephedra californica* Shrubland Alliance)

This vegetation community consists of approximately 263 acres and is located in the southern portion of the BSA (Figure 4). Habitats within the BSA include intermittently flooded arroyos, washes, and adjacent alluvial fans. Soils are coarse to medium sands, loamy sands, and sandy clay loams. This vegetation community is characterized with California joint fir as the dominant or co-dominant in the shrub canopy with four-wing saltbush, white bur-sage, or allscale. Canopy of the shrub layer is open to intermittent. The herbaceous layer is variable with seasonal annuals or perennial grasses such as galleta grass, Indian ricegrass, red brome, cheat grass, and common Mediterranean grass.

3.2.7 Mojave River Wash

This vegetation community consists of approximately 702 acres and is located along the southern end of the study site (Figure 4). The area surrounding the Mojave River is subject to annual rainfall events that can cause heavy flooding and scouring, thereby keeping the channel largely clear of vegetation.

3.2.8 Desert Dunes

This vegetation community consists of approximately 721 acres and is located adjacent and south of the Mojave River where aeolian sands have accumulated. These are wind-blown sand formations range from sparsely vegetated to moderately vegetated. The aerial photography analysis revealed that this wind-blown sand community can be highly variable on the amount of vegetation that is supported from year to year (based on major flood and wind events), and ranged in vegetation cover from low to moderate during the field assessment.

3.2.9 Tamarisk Thickets (*Tamarix* ssp. Semi-Natural Shrubland Stands)

This vegetation community consists of approximately 22 acres and is located within the Mojave River in the BSA. This vegetation community is characterized by saltcedar (*Tamarix ramosissima*) as the dominant shrub. Canopy of the shrub layer is open and the herbaceous layer is sparse.

3.2.10 Red Brome or Mediterranean Grass Grassland Semi-Natural Herbaceous Stands

This vegetation community consists of approximately 25 acres and is located in the central portion of the BSA north of Santa Fe Ave. This vegetation community is characterized by red brome, common Mediterranean grass, or Arabian schismus (*Schismus arabicus*) as dominant or co-dominant with other nonnatives in the herbaceous layer. Within the BSA, these areas are typically on or adjacent to developed areas and/or anthropogenic disturbances including grazing and off-road vehicles.

3.2.11 Ruderal/Disturbed/Barren

This vegetation community consists of approximately 2,157 acres and is located throughout the BSA. This vegetation community is characterized by mostly bare disturbed soils dominated by low growing ruderal (weedy) vegetation and few native species. This vegetation community is associated with anthropogenic disturbances, including agricultural practices, residential clearing and grubbing, refuse dumping, dirt roads, and powerline easements.

3.2.12 Agriculture

This vegetation type/land use consists of approximately 1,263 acres and is located in the central and southern portions of the BSA. This vegetation community is characterized by active or recently active agricultural fields and orchards. In addition, this classification includes the agricultural treatment units, such as alfalfa, that have been established to remove chromium.

3.2.13 Developed

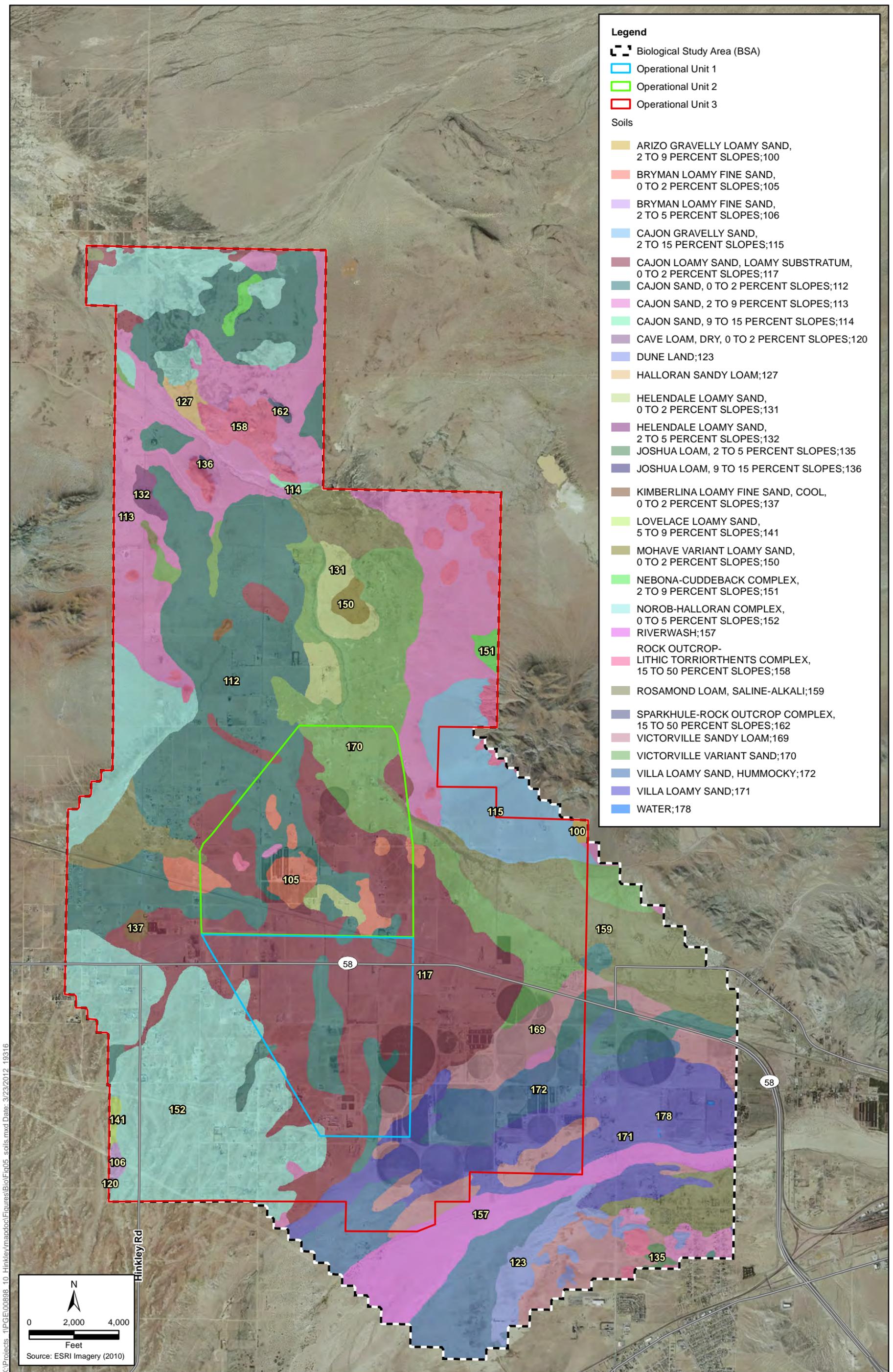
Developed areas are distributed throughout the project area. These areas have been physically altered and typically include hardscape features and adjacent land commonly observed in association with the various development types located within the project area (i.e., such as houses, yards, barns and stock ponds), as well as ornamental planting associated with such features.

3.3 Sensitive Natural Community

The California joint fir scrub and desert dunes plant communities are located in the BSA and listed by CDFG as a high priority for inventory, which typically means they are rare. The Mojave River wash may also be considered a sensitive natural community. No riparian habitat within the BSA was observed during the field evaluation.

3.4 Soils

Nineteen different soils series encompassing 28 distinct soil types (USDA/NRCS 2011) were mapped as being present in the BSA: Arizo, Bryman, Cajon, Cave Loam, Dune Land, Halloran, Helendale, Joshua, Kimberlina, Lovelace, Mohave, Nebona, Norob, Riverwash, Rock Outcrop, Rosamond, Victorville, Villa, and Water. Figure 5 depicts the mapped location of each soil series and type for the site.



3.5 Critical Habitat

Based on a review of USFWS Critical Habitat documentation and maps, critical habitat for the desert tortoise (*Gopherus agassizii*) is mapped within a small portion of the BSA located on the eastern boundary just south of Mount General (Figure 6) (U.S. Fish and Wildlife Service 2011b).

Critical habitat for the desert tortoise was designated in 1994. This critical habitat consists of the following primary constituent elements: (1) sufficient space to support-viable populations and provide for movements, dispersal, and gene flow; (2) sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species; (3) suitable substrates for burrowing, nesting, and overwintering; (4) burrows, caliche caves, and other shelter sites; (5) sufficient vegetation for shelter from temperature extremes and predators; and (6) habitat protected from disturbance and human-caused mortality. Designated critical habitat for the desert-tortoise encompasses portions of the Mojave and Colorado Deserts (59 Fed. Reg. 5,820, 5,822 (Feb. 8, 1994)). Based on a review of USFWS Critical Habitat documentation and maps, critical habitat for the desert tortoise is mapped within a small portion of the project area located on the eastern boundary just south of Mount General (Figure 3.7-2) (U.S. Fish and Wildlife Service 2011b).

3.6 Plants and Wildlife

During the December 20, 2011 site visit a variety of plant species and wildlife were observed. Plants observed within and adjacent to the BSA were relatively common to the region. One special-status plant observed during the site visit, Mojave spineflower (*Chorizanthe spinosa*), is designated by the CNPS as a CRPR 4.2 species. This plant and additional special-status plants identified through the literature search and determined to have the potential to occur within the BSA are discussed below. Attachment B lists all the plant species observed within the BSA during the site visit.

Twenty four vertebrate species consisting of 21 birds and three mammals were observed or detected during the field visit. All of the observed species are relatively common to the area during the winter months. Of the 21 birds species observed, northern harrier (*Circus cyaneus*) and loggerhead shrike (*Lanius ludovicianus*) are considered by CDFG to be special status when nesting. These two species, as well as additional special-status wildlife identified through the literature search and determined to have the potential to occur within the BSA, are discussed below. Attachment C lists all the wildlife species observed during the site visit.

3.6.1 Threatened and Endangered Species

3.6.1.1 Plants

Attachment D lists the special-status plant species reviewed and their likelihood of occurrence in the BSA. The determinations were based on a combination of factors, including the species' requirements for some combination of soils, hydrology, habitats, elevation range, and/or disturbance tolerance, along with consideration of the BSA conditions and observed resources. Lane Mountain milkvetch (*Astragalus jaegerianus*), a species that is federally designated as threatened, is identified in the literature review and habitat assessment as having some potential to occur in the BSA. This species is discussed below.

Lane Mountain Milkvetch

Lane Mountain milkvetch is a perennial herb in the pea family (Fabaceae) designated as federally endangered and a CRPR 1B.1 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This plant occurs within Joshua tree woodland and Mojavean desert scrub in association with shallow sandy soils with exposed bedrock from 2,952–3,936 feet elevation. Additionally, this plant is known to bloom from April through June (California Native Plant Society 2011).

Critical habitat consists of the mixed desert scrub community within the range of milk-vetch that is characterized by shallow soils at elevations between 3,100 and 4,200 feet (945 to 1,280 m) and host shrubs at those same elevations (Final Revised Designation of Critical Habitat for *Astragalus Jaegerianus*, 76 Fed. Reg. 29,108, 29,127 (May 19, 2011) (to be codified at 50 C.F.R. pt. 17)). The designated critical habitat for milk-vetch is located several miles from the project area.

Lane Mountain milkvetch is known to occur at three distinct locations north of Barstow on the slopes of Lane Mountain and within Paradise Valley (California Department of Fish and Game 2011a, Consortium of California Herbaria 2012). The BSA provides potentially suitable desert scrub; however, the BSA is below the known elevation range of the species. Due to the close proximity of the historical records and given the relatively large amount of desert scrub on the site, it was determined that Lane Mountain milkvetch has a low to moderate potential to occur within the allscale and creosote scrub habitats within the BSA, particularly on the eastern side of the BSA in association with lower Coon Canyon and the western slopes of Mount General.

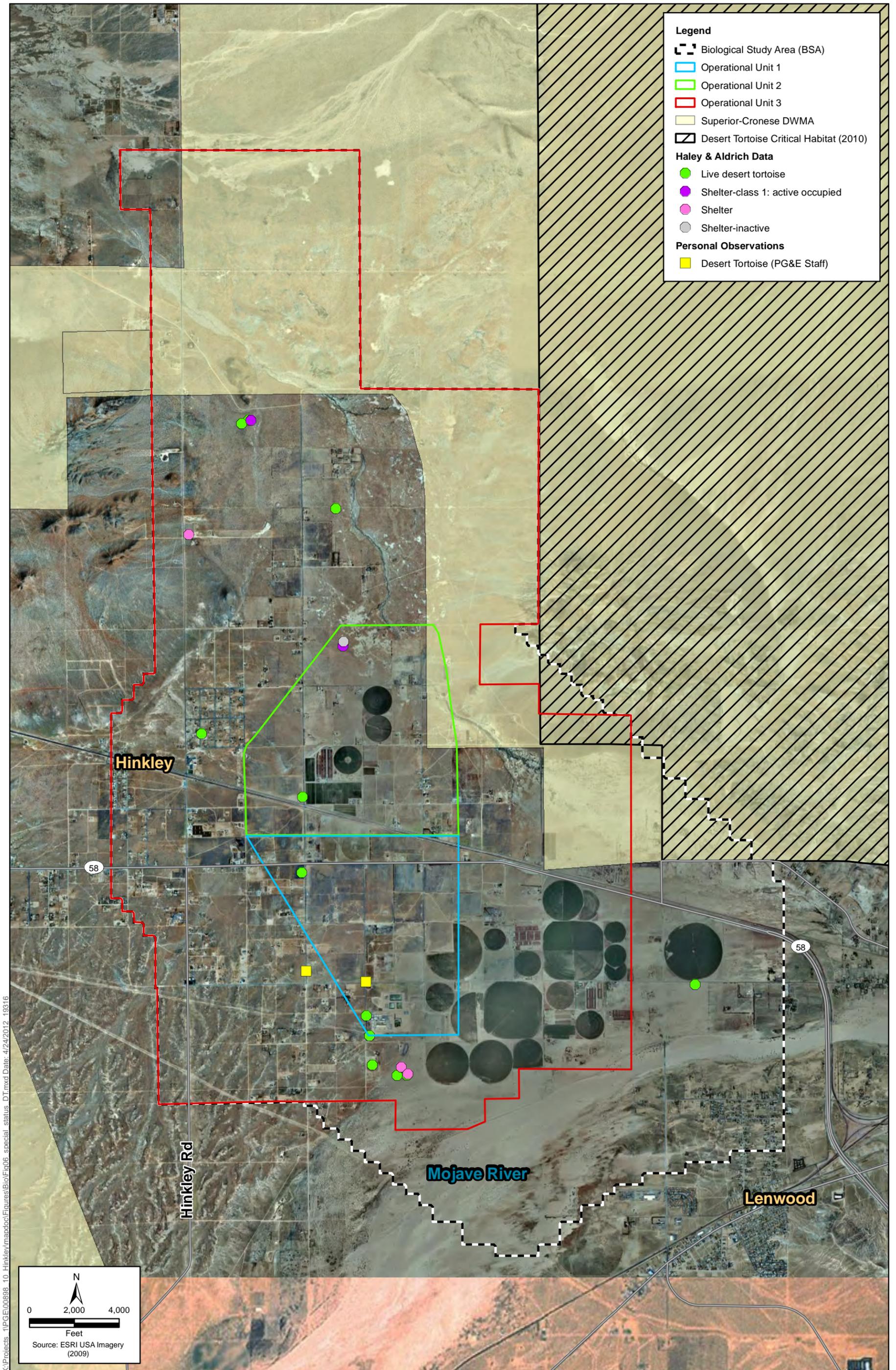
3.6.1.2 Wildlife

Attachment D lists the special-status wildlife species and their likelihood of occurrence within the BSA, and Figures 6 and 7 depict special-status wildlife species occurrences in the BSA. These determinations are based on a combination of factors, including the species' requirements for some combination of soils, hydrology, habitats, elevation range, and/or disturbance tolerance, along with consideration of the BSA condition and observed resources. Of the six federally and/or state-listed threatened and endangered wildlife species reviewed to have some potential to occur within the geographical vicinity of the BSA (California Department of Fish and Game 2011a), two, desert tortoise and Mohave ground squirrel, were determined to have some potential to occur based on observed conditions during the field evaluation.

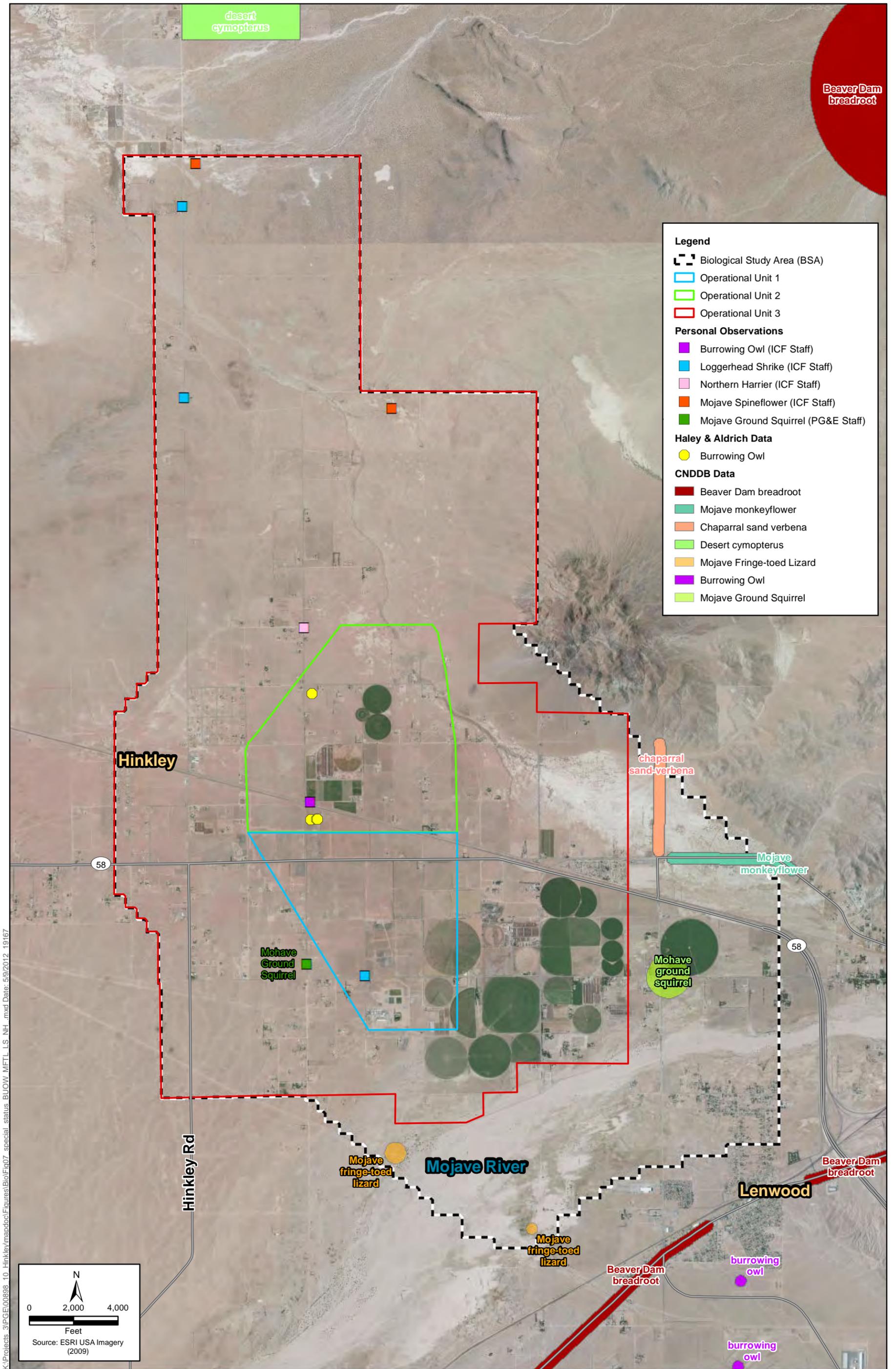
Desert Tortoise

The Mojave population of desert tortoise (*Gopherus agassizii*) was listed by USFWS as threatened on April 2, 1990 (U.S. Fish and Wildlife Service 1990). Throughout most of the Mojave Desert, tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and where there is sparse cover of low-growing shrubs, which allows establishment of herbaceous plants. Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. Typical habitat for the desert tortoise in the Mojave Desert has been characterized as creosote bush scrub below 5,500 feet, where precipitation ranges from 2 to 8 inches, the diversity of perennial plants is relatively high, and production of ephemerals is high (U.S. Fish and Wildlife Service 2011a).

Plant species play a major role in defining desert tortoise habitat. Creosote bush, white bur-sage, Mojave yucca (*Yucca schidigera*), and blackbrush (*Coleogyne ramosissima*) generally distinguish



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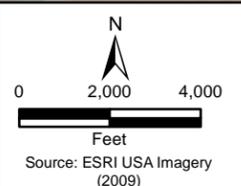


Figure 7
Special-Status Species Map
Biological Resources Report
Hinkley Groundwater Remediation Project

desert tortoise habitat. At higher elevations, Joshua tree (*Yucca brevifolia*) and galleta grass (*Pleuraphis rigida*) are common plant indicators (U.S. Fish and Wildlife Service 2011a).

The desert tortoise's most active periods are April through May and September through October (U.S. Fish and Wildlife Service 2010a). Tortoises dig deep burrows (usually located under shrubs on bajadas) for winter hibernation and summer estivation due to generally warm summers and cold winters (U.S. Fish and Wildlife Service 2011a). Diet composition varies throughout the tortoise's range. If winter rainfall is sufficient to germinate annuals, these are consumed, as are herbs, grasses, some shrubs, and the new growth of cacti and cacti flowers. Desert tortoises are preyed upon by several native species of mammals, reptiles, and birds; the best-documented predator of small tortoises is the common raven (*Corvus corax*).

The size of desert tortoise home ranges varies according to location and year (Berry 1986). Females have long-term home ranges that can be as little as or less than half that of that of the average male, which can range to 200 acres (Berry 1986, Duda et al. 1999, Harless et al. 2009). Use of core areas within the lifetime home range of desert tortoises depends on the number of burrows used within those areas (Harless et al. 2009). Over its lifetime, a desert tortoise can use more than 1.5 square miles of habitat and might make periodic forays of more than 7 miles at a time (Berry 1986). Historically, desert tortoise gene flow and movement occurred in a diffuse pattern across the landscape unless otherwise constrained to more narrow, concentrated pathways created by topographic barriers (Hagerty and Tracy 2010, Hagerty et al. 2010).

The BSA partially overlaps portions of the Superior-Cronese DWMA, which is designated by BLM as an Areas of Critical Environmental Concern (ACEC) (Figure 6), and is located within the western recovery unit for desert tortoise (U.S. Fish and Wildlife Service 2011a).

The CNDDDB data reports that desert tortoise is thought to occupy the majority of the northern portion of the BSA and exist within the extreme southwestern portion of the BSA (Figure 6). The CNDDDB data also contains two locations for desert tortoise sightings: one occurring just east of the BSA on the western slopes of Mount General, the second occurring west of the BSA on the east side of Indian Wells Road just north of State Road (SR) 58.

Raw desert tortoise data collected by CH2M Hill was provided by Haley & Aldrich on February 15, 2012, based on biological surveys implemented by PG&E in the study area. It is noted that some of the desert tortoise depicted could be domesticated individuals (not wild). Figure 6 shows these desert tortoise sightings. The majority of these observations occurred in the allscale scrub plant community, with some individuals observed in California joint fir scrub, as well as disturbed and developed areas.

Based on the habitat conditions within the BSA and the previous desert tortoise locations, the desert tortoise was determined to have low to high potential to occur throughout the undeveloped portions of the BSA. Figure 8 shows a broad overview of the suitability of the habitat based on the following breakdown of mapped plant communities: moderate-quality to high-quality suitable habitat includes allscale scrub, allscale scrub—sparse playa, allscale scrub—disturbed, fourwing saltbush scrub, creosote bush scrub, and California joint fir scrub; low-quality suitable habitat includes, Mojave River wash, desert dunes, tamarisk thickets, red brome or Mediterranean grass grassland, semi-natural herbaceous stands, and ruderal/disturbed/barren; unsuitable desert tortoise habitat includes developed and agriculture.

Vegetation communities considered to have a low potential lack the quantity and quality of characteristics typically associated with occupied habitats. For example, desert tortoises require a burrowing substrate; however, communities such as Mojave River Wash and Desert Dunes are dynamic and may lack stabilized soils suitable for burrowing. Although these conditions might preclude occupation of a burrow, foraging and movement may occur. Other vegetation communities within the study area, such as tamarisk thickets, red brome or Mediterranean grass grasslands, semi-natural herbaceous stands, and ruderal/disturbed/barren, are of such poor quality in terms of foraging material, soils, and magnitude of disturbances that occupation might be precluded or occur at a low level. However, if these low-quality habitats are located adjacent to and interspersed with moderate- to high-potential vegetation communities, the likelihood of occurrence is increased.

Mohave Ground Squirrel

Mohave ground squirrel was listed as threatened under CESA in 1993. There is currently no federal listing for this species. The Mohave ground squirrel is a generalist in relation to plant community preference; it has been found in the exact proportion as the distribution of plant communities within its range (Bureau of Land Management 2005). The plant communities with the highest percentage of occurrence and therefore the highest percentage of Mohave ground squirrel occurrence are Mojave creosote brush scrub, desert saltbush scrub, and Mojave mixed woody scrub (Bureau of Land Management 2005). The Mohave ground squirrel is absent from steep, very rocky areas and playas (i.e., a sandy, salty, or mud-caked flat floor of a desert drainage basin that is periodically covered with water). Soil characteristics are important because Mohave ground squirrels construct burrows to shelter from temperature and humidity extremes, to escape predators, and to give birth (U.S. Fish and Wildlife Service 2010b).

Mohave ground squirrels are only active and above ground generally February through July (adults) or August (juveniles) and spend the remainder of year underground in a state of dormancy (U.S. Fish and Wildlife Service 2010b). The length of the active season and Mohave ground squirrel movement can also be affected by rainfall amounts, such that the number of individuals in an area appears to decline during dry years, and movements and home range size shrink (Harris and Leitner 2004). In dry years where no reproduction has occurred, adults may enter dormancy as early as the end of April. Burrows are used for aestivation and hibernation, predator avoidance, and thermoregulation. Chenopods, particularly winterfat and spiny hopsage, are common components of Mohave ground squirrel diet in its northern range (Leitner 1996 as cited in Bureau of Land Management 2005); however, it is hypothesized that these plant species are equally important in the southern portion of its range (Bureau of Land Management 2005).

Trapping success rates correspond to high incidences of winterfat and hopsage, and support the hypothesis that chenopods may be important to Mohave ground squirrel foraging ecology (Bureau of Land Management 2005). These plant species were observed with the BSA. Generally, leaves, flowers, fruits, and seeds from a variety of plants, arthropods (caterpillars), and fungi comprise Mohave ground squirrel diet (Best 1995, U.S. Fish and Wildlife Service 2010b). When available in spring, nearly all of the diet of Mohave ground squirrel is new, tender, green vegetation (Best 1995). This species is also known to eat alfalfa (Best 1995).

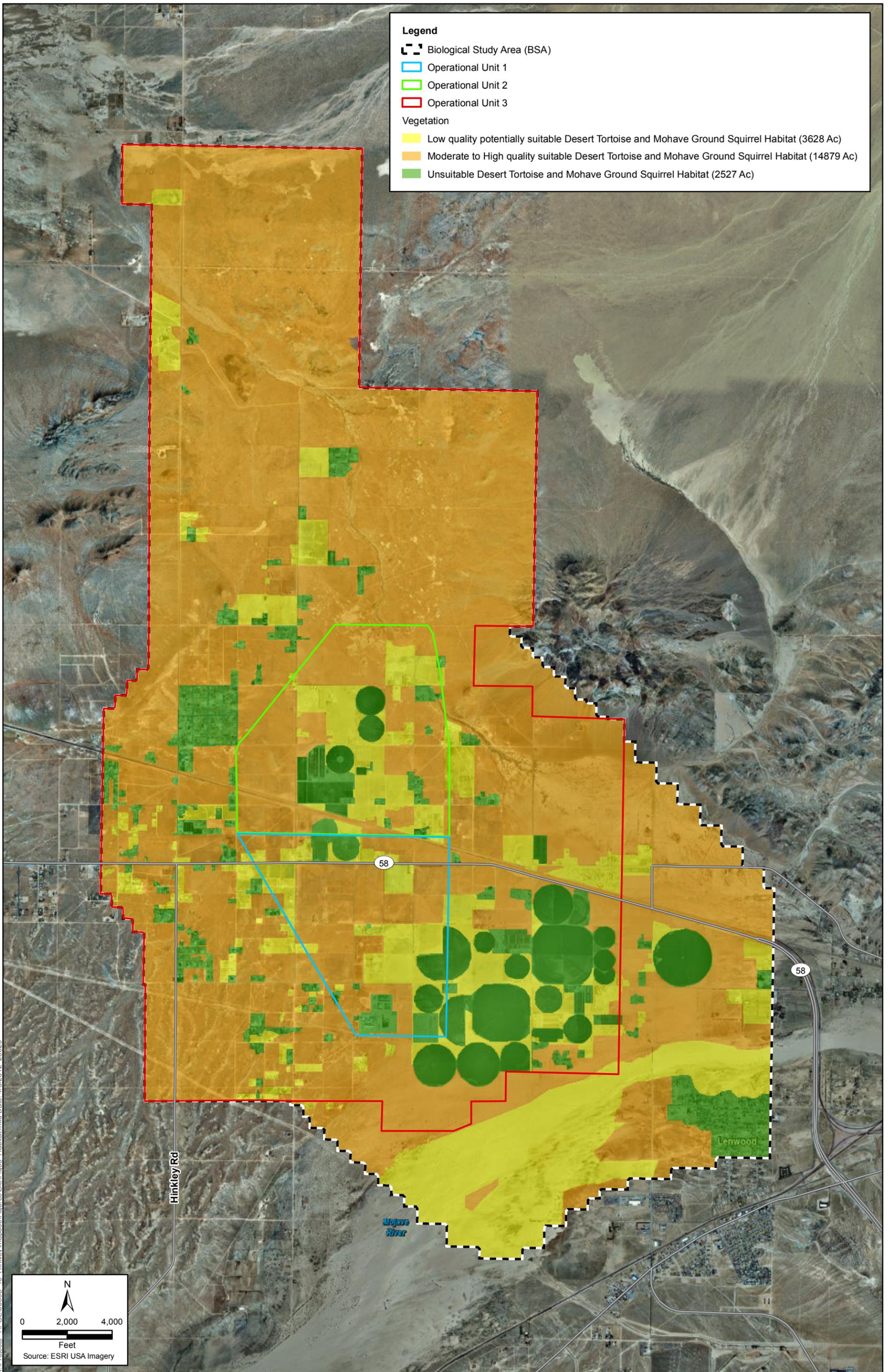
The BSA overlaps the easternmost extent of the current range known range of the Mohave ground squirrel (Bureau of Land Management 2005, Leitner 2008, U.S. Fish and Wildlife Service 2010b). The north and northeastern portions of the BSA overlap the Mohave Ground Squirrel Conservation Area established by the West Mojave Plan (Leitner 2008). There are four recognized important areas for

Legend

-  Biological Study Area (BSA)
-  Operational Unit 1
-  Operational Unit 2
-  Operational Unit 3

Vegetation

-  Low quality potentially suitable Desert Tortoise and Mohave Ground Squirrel Habitat (3628 Ac)
-  Moderate to High quality suitable Desert Tortoise and Mohave Ground Squirrel Habitat (14879 Ac)
-  Unsuitable Desert Tortoise and Mohave Ground Squirrel Habitat (2527 Ac)



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the Mohave ground squirrel with proximity to the BSA (Leitner 2008, U.S. Fish and Wildlife Service 2010b): Coolgardie Mesa–Superior Valley located northeast of the BSA, Edwards Air Force Base located southwest of the BSA, Boron-Kramer Junction located west of the BSA, and Pilot-Knob located north of the BSA. Leitner (2008) suggests that although the elevation is lower and the habitat is of lesser quality, the area extending from the vicinity of Harper’s Dry Lake (immediately northwest of the BSA) southwest to Edwards Air Force Base represents a linkage from the Coolgardie Mesa–Superior Valley Core Area and the Edwards Air Force Base Core Area.

Mohave ground squirrel has been recorded within and in the region of the BSA. The CNDDDB lists two historic records for this species as occurring within the Barstow, Hinkley and Water Valley USGS quads (California Department of Fish and Game 2011a). One record dated 1982 is from the Barstow area, where one Mohave ground squirrel was detected just northwest of the Fort Irwin Road/SR-58 junction. A second report dated 1990 was recorded as occurring within the BSA at the junction of Lenwood Road and Community Boulevard (Figure 7) where all scale scrub was mapped during this habitat assessment. This record states that an unknown number of individuals were recorded in the area between March 1 and April 30 by Critchlow as reported in a summary document prepared by D. Clark in 1992. Leitner (2008) describes a non-specific location of Mohave ground squirrel detected at the edge of an alfalfa field near Harper Dry Lake.

Raw Mohave ground squirrel data was provided by Arcadis on May 8, 2012, based on biological surveys implemented by PG&E in the study area. A biological consultant working for PG&E biologists observed an animal that was potentially a Mohave ground squirrel on February 23, 2012 within the BSA in a burrow along existing barbed wire fencing approximately 25 feet north of Frontier Road (unpaved) (Figure 7). This road is currently used by residents of the area. The plant community around the burrow and unpaved roads consists primarily of allscale scrub. Saltbush is the dominant floral species observed in this area. The Mohave ground squirrel was first observed foraging for food and then in front of the burrow.

Due to the historic records and the presence of suitable habitat and recent detection of one Mohave ground squirrel, it is concluded that Mohave ground squirrel has the potential to occur within the BSA. Figure 8 shows a broad overview of the suitability of the habitat, which at this broad level of mapping mimics desert tortoise habitat suitability, as discussed in the section above.

3.6.2 Non-Listed Special-Status Plants

Non-listed special-status species are species that are not listed under the California Endangered Species Act or the federal Endangered Species Act, but are sufficiently rare to require special consideration and are either tracked in the California Natural Diversity Database (CNDDDB) or designated as “sensitive” by the Bureau of Land Management. Thirteen non-listed special-status plants were identified in the literature search and habitat assessment as occurring in the vicinity of the project area (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a, California Native Plant Society 2011). Based on observed conditions during the field survey, eight were determined to have a moderate or higher potential to occur within the project area:

Clokey’s Cryptantha

Clokey’s cryptantha is an annual herb in the borage family (Boraginaceae) designated as a CRPR 1B.2 species (California Department of Fish and Game 2011b, California Native Plant Society 2011).

This plant occurs in Mojavean desert scrub from 2,378–4,477 feet elevation. In addition, this species is known to bloom in April (California Native Plant Society 2011).

Several collections of this species were made in the 1930s immediately north of Barstow; however, no new collections have been made in the area since (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA supports potentially suitable desert scrub. As such, it was determined that this species has low to moderate potential to occur within the BSA, particularly in association with the allscale scrub habitat on the west facing slopes of Mount General.

Desert Cymopterus

Desert cymopterus is a perennial herb in the carrot family (Apiaceae) designated as a CRPR 1B.2 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This species occurs within Joshua tree woodland and Mojavean desert scrub with sandy soils from 2,066–4,920 feet elevation. In addition, this species is known to bloom from March through May (California Native Plant Society 2011).

Several collections of desert cymopterus have been made in the vicinity of the BSA. In particular, desert cymopterus was collected north of the BSA east of Harper's Dry Lake (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA supports potentially suitable desert scrub. As such, due to the close proximity of Harper's Dry Lake to the BSA, and the relatively large amount of desert scrub habitat on site, it was determined that this species has moderate to high potential to occur in the allscale and creosote scrub habitats within the BSA.

Barstow Woolly Sunflower

Barstow woolly sunflower is an annual herb in the sunflower family (Asteraceae) designated as a CRPR 1B.2 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This species occurs in saltbush scrub, Mojavean desert scrub and within playas from 1,650–3,148 feet elevation. In addition, this species is known to bloom from March through May (California Native Plant Society 2011).

Several collections of this species have been made east and north of the BSA near Barstow (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA supports potentially suitable allscale and creosote scrub habitat for this species. As such, it was determined that this species has moderate to high potential to occur within the allscale and creosote scrub habitats in the BSA.

Mojave Menodora

Mojave menodora is a perennial deciduous shrub in the olive family (Oleaceae) designated as a CRPR 1B.2 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This species occurs in Mojavean desert scrub on rocky slopes and within rocky canyons from 2,263–6,560 feet elevation. This species is often found in association with andesite gravel. In addition, this species is known to bloom from April through May (California Native Plant Society 2011).

This species has been collected northeast of the BSA at the highpoint of Waterman Hills (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA supports potentially suitable desert scrub habitat. As such, it was determined that this species has low to

moderate potential to occur on site within the allscale and creosote scrub habitats, particularly the eastern portion of the BSA associated with the western slopes of Mount General.

Creamy Blazing Star

Creamy blazing star is an annual herb in the loasa family (Loasaceae) designated as a CRPR 1B.3 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This species occurs in Mojavean desert scrub in association with gravelly, rocky and/or sandy substrates from 2,296–3,805 feet elevation. In addition, this species is known to bloom from March through May (California Native Plant Society 2011).

This plant has been collected east of the BSA in the Waterman Hills (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA supports potentially suitable desert scrub in association with rocky, gravelly, and sandy substrates. As such, it was determined that this species has a moderate potential to occur within the BSA in the allscale and creosote scrub habitats, particularly the eastern portion of the BSA associated with the western slopes of Mount General.

Mojave Monkeyflower

Mojave monkeyflower is an annual herb in the lopseed family (Phrymaceae) designated as a CRPR 1B.2 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This species occurs in Joshua tree woodland and Mojavean desert scrub in association with sandy or gravelly substrates from 1,968–3,936 feet elevation and is often associated with washes. In addition, this species is known to bloom in June (California Native Plant Society 2011).

This species is known to occur in the BSA from a single 1941 collection. This collection was made just east of the intersection of Lenwood Road and Santa Fe Avenue on the eastern side of the BSA. Several other occurrences are mapped in the vicinity of the BSA (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA supports potentially suitable rocky to sandy desert scrub. As such, it was determined that this species has moderate to high potential to occur on the site in the allscale and creosote scrub as well as in the desert dune and Mohave river wash habitats within the BSA.

Beaver Dam Breadroot

Beaver Dam breadroot is a perennial herb in the pea family (Fabaceae) designated as a CRPR 1B.2 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This species occurs in Joshua tree woodland and Mojavean desert scrub from 2,000–5,002 feet elevation. This species is often found in association with road cuts and sandy washes. In addition, this species is known to bloom from April through June (California Native Plant Society 2011).

Several collections of this species have been made both south and east of the BSA (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA supports potentially suitable desert scrub. As such, it was determined that this species has moderate potential to occur within the allscale and creosote scrub habitat in the BSA.

Parish's Phacelia

Parish's phacelia is an annual herb in the borage family (Boraginaceae) designated as a CRPR 1B.1 species (California Department of Fish and Game 2011b, California Native Plant Society 2011). This

species occurs within Mojavean desert scrub and within clay or alkaline playas from 1,771–3,936 feet elevation. In addition, this species is known to bloom from April through June (California Native Plant Society 2011).

Several collections of this species have been made east of the BSA in the vicinity of Barstow (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). The BSA contains potentially suitable desert scrub and playa habitat. As such, it was determined that this species has low to moderate potential to occur within the allscale and creosote scrub habitats within the BSA.

3.6.3 Non-Listed Special-Status Wildlife

Attachment D lists the special-status wildlife species and their likelihood of occurrence within the BSA. These determinations are based on a combination of factors including the species' requirements for a combination of soils, hydrology, habitats, elevation range, and/or disturbance tolerance, along with consideration of the BSA condition and observed resources. Six non-listed special-status species are reviewed to have some potential to occur within the geographical vicinity of the BSA (California Department of Fish and Game 2011a) (Attachment D). Burrowing owl, loggerhead shrike, northern harrier, American badger (*Taxidea taxus*), Mohave river vole (*Microtus californicus mohavensis*), and Mojave fringe-toed lizard are judged to have moderate or greater potential for occurrence based on current habitat conditions within the BSA and are discussed in more detail below. Special-status species detected within the BSA during field work in December 2011 include loggerhead shrike and northern harrier.

Burrowing Owl

Burrowing owl is designated a California species of special concern (SSC) by CDFG and a BLM sensitive species. The burrowing owl requires habitat with three basic attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles. Habitat in California includes open, dry, nearly or quite level grassland, prairie, and desert floor. Burrowing owls have been recorded in grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands, urban vacant lots, and the margins of airports, golf courses, and roads. Throughout their range, most burrowing owls rely on burrows excavated by ground squirrels, badgers, foxes, desert tortoises, and coyotes. Where the number and availability of natural burrows is limited (for example, where burrows have been destroyed or ground squirrels eradicated), owls will occupy drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures. Many researchers and observers have noted a strong association between burrowing owls and burrowing mammals, especially ground squirrels (*Spermophilus* spp.) and kit foxes (*Vulpus macrotis*).

Burrowing owls in California typically begin pair formation and courtship in February or early March, when adult males attempt to attract a mate. Beginning in April, eggs are laid at least 1 day apart and are incubated by both adults for about 3–4 weeks. Young owlets are brooded underground for another 3–4 weeks, at the end of which time they can sometimes be seen at the burrow entrance. Nestlings emerge asynchronously and tentatively in early June. The burrowing owl is active during day and night, but is generally most active near dawn and dusk. During the breeding season, burrowing owls spend most of their time within 160–325 feet of their nest or satellite burrows during daylight hours and forage diurnally in the vicinity of the natal burrow.

Burrowing owls have been recorded in the vicinity of the BSA, with several recorded to the west and south of the BSA in 2007 (California Department of Fish and Game 2011a). They have also been observed within the BSA near the intersection of Acacia Street and the Santa Fe Railroad (Knutson pers. comm.) (Figure 7). In addition, raw burrowing owl data was provided by Haley & Aldrich on February 15, 2012 based on biological surveys implemented by PG&E in the study area. Figure 7 shows these burrowing owl sightings.

The majority of the BSA (outside of developed areas but including alfalfa fields) provides low- to high-quality foraging habitat for this species, and any areas with suitable burrows would provide potential nesting habitat, shelter, and refuge. Alfalfa fields can provide high-quality foraging habitat for burrowing owl: such fields might be particularly attractive to burrowing owl as foraging areas in the BSA.

Loggerhead Shrike

Loggerhead shrike is designated an SCC¹ by CDFG that breeds mainly in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. They require tall shrubs or trees (also use fences or power lines) for hunting perches, territorial advertisement, and pair maintenance; open areas of short grasses, forbs, or bare ground for hunting; and large shrubs or trees for nest placement. They also need impaling sites for prey manipulation or storage; such sites can include sharp, thorny, or multi-stemmed plants and barbed-wire fences (Yosef 1996). Nests are generally well hidden in taller shrubs or low in trees, and are often located in areas where there is a break in the landscape, such as at the base of slopes or edge of a woodland or clump of trees (Yosef 1996).

The literature search provided two observation records for loggerhead shrikes located south of Harper Dry Lake approximately six miles east of the BSA (California Department of Fish and Game 2011a). During the December 20, 2011 site visit, ICF staff observed loggerhead shrikes in two separate locations in the northern portion of the BSA along Hinkley Road (Figure 7). These individuals were observed perched on the overhead telephone line located on the west side of Hinkley Road and appeared to be foraging to the east within the BSA.

The majority of the BSA (outside of the developed areas) provides high-quality foraging and nesting habitat for loggerhead shrike.

Northern Harrier

Northern harrier is designated an SSC² by CDFG. This species is known to breed and forage in a variety of habitats that provide appropriate vegetation cover, abundance of prey and suitable perch sites (Shuford and Gardali 2008). These habitats typically include fresh, brackish, and saltwater marshes; meadows, lake margins, rivers, and streams; grasslands, open fields, pastures, and some croplands such as alfalfa and grain; sagebrush flats, and desert sinks (Shuford and Gardali 2008). The northern harrier is a ground-nesting bird and often nests within areas of dense, tall undisturbed vegetation. The northern harrier preys on a variety of small- to medium-sized vertebrates such as rodents and passerines.

¹ CDFG designates the loggerhead shrike as a California SSC only when nesting. All other non-nesting occurrences of loggerhead shrike would not be considered sensitive.

² CDFG designates the northern harrier as a California SSC only when nesting. All other non-nesting occurrences of northern harrier would not be considered to be sensitive.

During the site visit, a single male northern harrier was observed within the northern portion of the BSA at the intersection of Mountain View Road and Tindall Road (Figure 7). Shuford and Gardali (2008) conclude that while northern harrier is historically known to breed northwest of the BSA at Harper's Dry Lake, no breeding activity has been observed at the lake since the mid-1990s. It is possible that northern harriers might occasionally nest in agricultural areas in the West Mojave (Garrett and Molina undated).

The northern harrier was determined to forage in the BSA and has low potential to occur within the BSA in a breeding capacity. The majority of the BSA provides suitable foraging habitat for the northern harrier. Suitable nesting habitat in the BSA is nearly absent due to the lack of dense, tall undisturbed vegetation, although the agricultural areas may provide suitable nesting habitat.

American Badger

American badger is designated an SSC by CDFG that is most abundant in drier open stages of most shrub and herbaceous habitats, with friable soils (Ahlborn 1988–1990). Badgers dig burrows in friable soil for cover and frequently reuse old burrows, although some may dig a new den each night, especially in summer (Messick and Hornocker 1981). Long (1973) and Jager et al. (2006) have shown that badgers are born approximately in late March and early April and leave the natal den in late June and early July.

The literature search provided two observation records for American badger located approximately 2.5 and 3 miles west of the BSA and north of SR 58.

The majority of the BSA (outside of developed areas) provides moderate quality foraging and denning habitat for this species.

Mojave River Vole

Mojave River vole is designated an SSC by CDFG. This species occurs in habitat that is moist, including meadows, freshwater marshes, and irrigated pastures, in locations in the vicinity of the Mojave River. Suitable habitat is associated with ponds and irrigation canals along with the Mojave River proper, as well as adjacent irrigated land, such as alfalfa fields (Williams 1986). In the Mojave River, this vole has been recorded in cattail marsh/wetland habitat that is subjected to annual flooding and riparian-associated habitats that provide refuge during annual flooding. They also utilize adjoining upland habitat during unusually high water levels.

The closest recorded location of Mojave River vole is 7 miles to the northwest of the BSA (California Department of Fish and Game 2011a). The closest suitable native habitat in the Mojave River (based on aerial photography analysis) appears to be approximately 5 miles to the southwest. Alfalfa fields located 1.6 miles southwest of the Mojave River could provide suitable habitat for this vole.

The observed areas of the Mojave River that occur in the project area provide do not provide suitable moist habitats for the Mojave River vole. However, numerous areas of alfalfa fields and other fallow fields in close proximity to the Mojave River could provide suitable habitat. Within the project area, irrigated land in pasture or used to grow alfalfa have low potential to support Mojave River vole.

Mojave Fringe-Toed Lizard

Mojave fringe-toed lizard is designated an SSC and a BLM sensitive species. This species is restricted to areas with fine, aeolian sand (or sands that are formed by winds), including both large and small dunes, margins of dry lakebeds and washes, and isolated pockets against hillsides (Stebbins 1944, 1985; Smith 1946; Norris 1958). These areas are generally within creosote scrub desert between elevations of 300–3,000 feet (90–10 m; Norris 1958; Stebbins 1985). Sand dune ecosystems, including their source sand and sand corridors, are necessary for the long-term survivorship of aeolian sand specialists, such as fringe-toed lizards (Barrows 1996). Breeding activity occurs between April and July (Mayhew 1964b). Females lay 1 to 5 eggs in hummocks or sandy hills during the months of May through July (Stebbins 1985). Hatchlings appear in September (Miller and Stebbins 1964).

As shown in Figure 3.7-3, Mojave-fringe-toed lizards were recorded at two locations in the southwestern portion of the project area in 2010 (California Department of Fish and Game 2011), specifically within California joint fir scrub and desert dunes communities (Figure 3.7-1).

Based on information in recent records, areas within the study area classified as California joint fir scrub, desert dunes, and the intervening Mojave river wash are considered highly suitable habitat for Mojave-fringe-toed lizards.

Desert Kit Fox

Desert kit fox is protected by CDFG code under mammal hunting regulations. It occurs in desert areas with annual grasslands or grassy open stages of vegetation dominated by scattered brush, shrubs, and scrub. Cover is provided by dens that are dug in open, level areas with loose-textured, sandy and loamy soils. Egoscue (1962) reports that most pups born February through April, following a gestation period of 49 to 55 days.

The majority of the project area (outside of developed areas) provides moderate quality foraging and denning habitat for this species.

3.6.3.2 Wildlife Corridors

The open nature of the project area provides the opportunity for wildlife movement. The species expected to move across the project area include small- to medium-sized mammals, birds, and reptiles, including the desert tortoise and Mohave ground squirrel. Wildlife movement is expected to be higher along the natural corridors of the project area, such as the east-west corridor along the Mohave River. Additionally, the large open areas of desert scrub habitat provide relatively unrestricted movement across the project area.

3.6.4 Raptor Foraging

The BSA was evaluated for its potential to support raptor foraging activities. A variety of raptor species were observed during the site visit, including red-tail hawk (*Buteo jamaicensis*), northern harrier, prairie falcon (*Falco mexicanus*) and American kestrel (*Falco sparverius*), and burrowing owls are known to occur within the BSA. The primary agricultural crop grown in the study area is alfalfa, which has been shown to have a positive relationship with raptor species (Smallwood 1995, Pandolfino et al. 2011). Due to the relatively open nature of the desert scrub within the BSA in

combination with the patchwork of active agricultural and non-active disturbed fields, the BSA was determined to provide quality foraging opportunities for raptor species in the region.

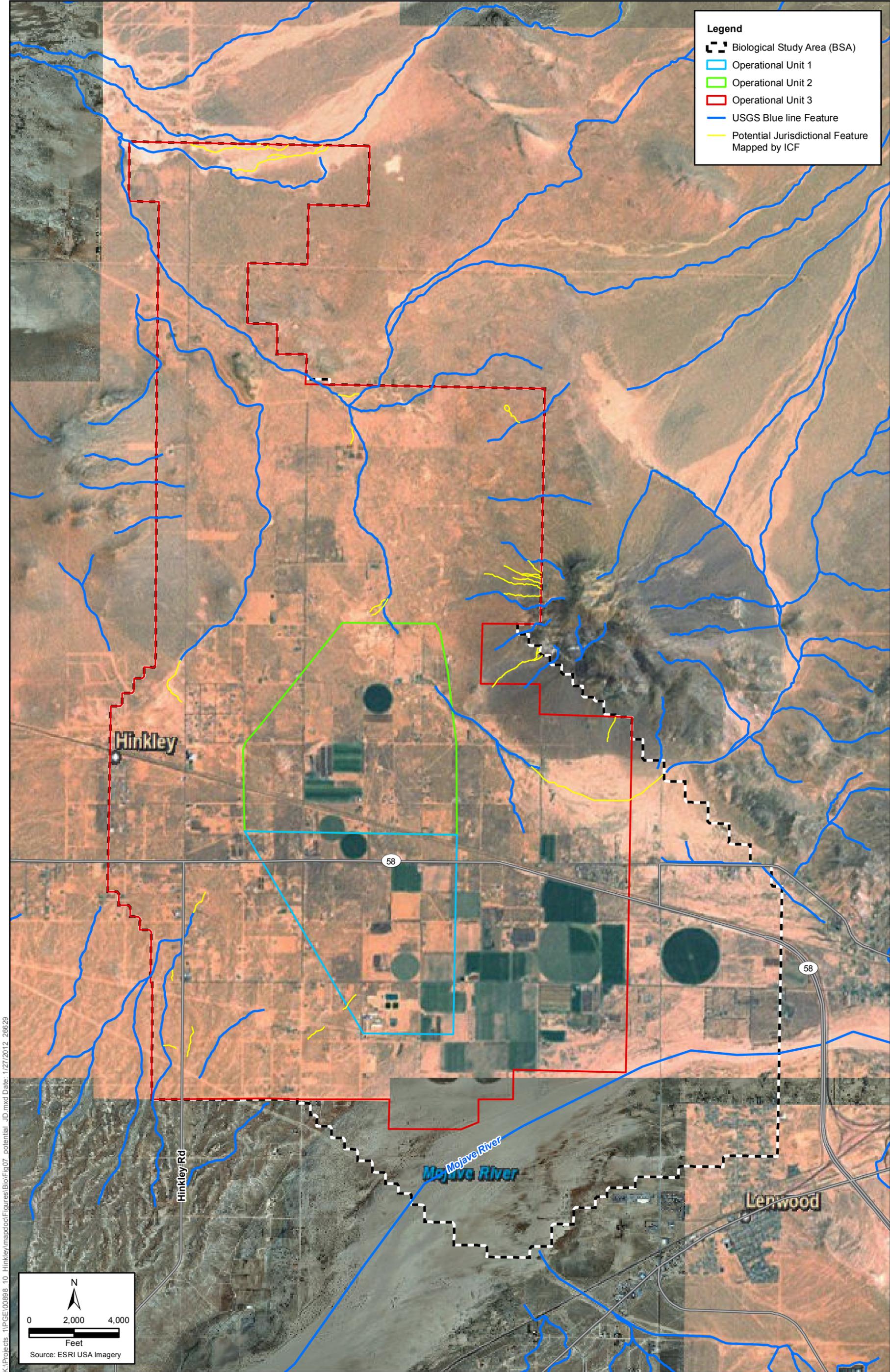
3.6.5 Nesting Birds

The BSA has abundant nesting opportunities for common bird species throughout the BSA. In addition, special-status species that may nest within the BSA include burrowing owl and loggerhead shrike.

3.6.6 Jurisdictional Resources

The study area contains features that are potentially subject to the jurisdiction of the U.S. Army Corps of Engineers, RWQCB, and CDFG. A review of the topographical maps prepared for the BSA and vicinity shows that the majority of the features mapped within the BSA flow northeast through the BSA, and flow out of the BSA to Harper Dry Lake. It appears that only a few features might convey flows south to the Mojave River. Figure 9 depicts the BSA and associated USGS blue-line features as well as the potential jurisdictional features mapped by ICF.

Tributaries to the Mojave River, including desert washes, may be waters of the United States, but no Jurisdictional Determination for the project has been prepared. Drainages to Harper Lake, which are the bulk of the drainages in the project area, are considered state waters and are subject to state jurisdiction under the Porter-Cologne Water Quality Control Act and CDFG.



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4.1 Printed References

- Ahlborn, G. 1988–1990. *American Badger—California's Wildlife* Vol. I–III. D. C. Zeiner, W. F. Laudenslayer, Jr., K. E. Mayer, and M. White, eds. California Department of Fish and Game. Sacramento, CA.
- Baldwin B. G., Boyd S., Ertter B. J., Patterson R. W., Rosatti T. J., Wilken D. H., eds. 2002. *The Jepson Desert Manual: Vascular Plants of Southeastern California*. University of California Press. Berkeley, CA.
- Barrows, C. 1996. An Ecological Model for the Protection of a Dune Ecosystem. *Conservation Biology* 10(3):888–891.
- Berry, K. H. 1986. Desert Tortoise (*Gopherus Agassizii*) Relocation: Implications of Social Behavior and Movements. *Herpetologica* 42:113–125.
- Best, T. L. 1995. Spermophilus Mohavensis. *American Society of Mammalogists: Mammalian Species* 509:1–7.
- California Department of Fish and Game. 2011a. California Natural Diversity Database. Accessed December 2011. Wildlife Habitat Data Analysis Branch, Habitat Conservation Division, California Department of Fish and Game, Sacramento, CA. Element reports for the Hinkley, Barstow, Barstow SE, Mud Hills, Water Valley, Lockhart, Twelve Gauge Lake, Wild Crossing, and Hodge 7.5-Minute Quadrangle Maps.
- _____. 2011b. Special Vascular Plants, Bryophytes, and Lichens List. April 2011. California Department of Fish and Game. Sacramento, CA.
- _____. 2011c. Special Animals List. January 2011. California Department of Fish and Game. Sacramento, CA.
- California Native Plant Society. 2011. Inventory of Rare and Endangered Plants (online edition, v7-11). Sacramento, CA. Available: <<http://www.cnps.org/inventory>>. Accessed: December 2011.
- California Regional Water Quality Control Board Lahontan Region. 2011. Project Update. Lahontan Water Board's Actions Requiring PG&E to Clean Up Waste Chromium Discharged from the Hinkley Compressor Station. Available: <http://www.waterboards.ca.gov/rwqcb6/water_issues/projects/pge/docs/dec2011_fs.pdf>. Accessed: January 2012.
- Consortium of California Herbaria. 2012. Accession Results for *Abronia villosa* var. *aurita*, *Astragalus jaegerianus*, *Astragalus preussii* var. *laxiflorus*, *Chorizanthe spinosa*, *Cryptantha clokeyi*, *Cymopterus deserticola*, *Eriophyllum mohavense*, *Menodora spinescens* var. *mohavensis*, *Mentzelia tridentata*, *Mimulus mohavensis*, *Pediomelum castoreum*, *Phacelia parishii*, *Sarcocornia utahensis* and *Wislizenia refracta* ssp. *palmeri*. Available: <<http://ucjeps.berkeley.edu/consortium>>. Accessed January 2012.

- Duda, J. J., A. J. Krzysik, and J. E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. *Journal of Wildlife Management* 63:1181–1192.
- Egoscue, H. J. 1975. Population dynamics of the kit fox in western Utah. *Southern Calif. Acad. Sci.* 74:122-127. As cited in Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. *California's Wildlife. Vol. I-III.* California Depart. of Fish and Game, Sacramento, California. Kit fox account.
- Epple, A. O., and L. E. Epple. 1995. *A Field Guide to the Plants of Arizona.* The Globe Pequot Press. Guilford, CT.
- Ernst, C. H., R. W. Barbour, and J. E. Lovich. 1994. *Turtles of the United States and Canada.* pp. 466–478. Smithsonian Institution Press. Washington D.C.
- Garrett and Molina. undated. Northern Harrier *Circus cyaneus*. Section of Vertebrates, Natural History Museum of Los Angeles County. Available: <http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pdfs/cdd_pdfs.Par.6e63c345.File.pdf/>. Accessed: April 24, 2012.
- Hagerty, B. E., and C. R. Tracy. 2010. Defining Population Structure for the Mojave Desert Tortoise. *Conservation Genetics* 11 (5): 1795–1807.
- Hagerty, B. E., K. E. Nussear, T. C. Esque, and C. R. Tracy. 2010. Making Molehills out of Mountains: Landscape Genetics of the Mojave Desert Tortoise. *Landscape Ecology* 26(2):267–280.
- Haley and Aldrich, Inc. 2011. Addendum #3 to the Feasibility Study Pacific Gas and Electric Company Hinkley Compressor Station, Hinkley, CA. September. Prepared for the Pacific Gas and Electric Company. San Francisco, CA.
- Harless, M. L., A. D. Walde, D. K. Delaney, L. L. Pater, and W. K. Hayes. 2009. Home Range, Spatial Overlap, and Burrow Use of the Desert Tortoise in the West Mojave Desert. *Copeia* 2009:378–389.
- Harris, J. H., and P. Leitner. 2004. Home Range and Use of Space in Mohave Ground Squirrels (*Spermophilus mohavensis*). *Journal of Mammalogy* 85:517–523.
- Holland, R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Game, Nongame-Heritage Program. Updated: 1992. Sacramento, CA.
- Jager, H. I., E. A. Carr, and R. A. Efrogmson. 2006. Simulated Effects of Habitat Loss and Fragmentation on a Solitary Mustelid Predator. *Ecological Modeling* 191:416–430.
- Leitner, P. and B. Leitner. 1996. A comparison of the diets of the Mohave ground squirrel and cattle: Results of a long-term study in the Coso Region of Inyo County. Unpublished report prepared on behalf of CalEnergy Company, Inc. Orinda, CA. As cited in Bureau of Land Management 2005.
- Leitner, P. 2008. Current Status of the Mohave Ground Squirrel. *Transactions of the Western Section of the Wildlife Society* 44:11-29.
- Long, C. A. 1973. *Taxidea taxus*. *Mammalian Species* 26. 4 pp.
- Mayhew, W. W. 1964. Taxonomic Status of California Populations of the Lizard Genus *Uma*. *Herpetologica* 20(3):170–183.

- Messick, J. P., and M. G. Hornocker. 1981. Ecology of the Badger in Southwestern Idaho. *Wildlife Monograph* 76. 53 pp.
- Miller, A. H., and R. C. Stebbins. 1964. The Lives of Desert Animals in Joshua Tree National Monument. University of California Press. Berkeley, CA.
- Norris, K. S. 1958. The Evolution and Systematics of the Iguanid Genus *Uma* and its Relation to the Evolution of other North American Desert Reptiles. *Bulletin of the American Museum of Natural History* 114(3):251–317.
- Pandolfino, E. R., M. P. Herzog, S. L. Hooper, and Z. Smith. 2011. Winter Habitat Associations of Diurnal Raptors in California's Central Valley. *Western Birds* 42(2):62–84.
- Sawyer, J. O., T. Keeler-Wolf, J. Evens. 2007. *A Manual of California Vegetation*. Second Edition. California Native Plant Society. Sacramento, CA.
- Shuford, W. D., and T. Gardali, eds. 2008. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. *Studies of Western Birds* 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.
- Smallwood, K. S. 1995. Scaling Swainson's Hawk Population Density for Assessing Habitat Use Across an Agricultural Landscape. *Journal of Raptor Research* 29:172–178.
- Smith, H. M. 1946. *Handbook of Lizards: Lizards of the United State and Canada*. Comstock Publishing Company, Ithaca, NY.
- Stebbins, R. C. 1944. Some Aspects of the Ecology of the Iguanid Genus *Uma*. *Ecology Monographs* 14(3):311–332.
- _____. 1985. *Western Reptiles and Amphibians*. Houghton Mifflin Company, Boston, MA.
- _____. 2003. *A Field Guide to Western Reptiles and Amphibians*. Third Edition. Houghton Mifflin Co. Boston, MA.
- U.S. Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan, A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Volume 1. January. California Desert District. Moreno Valley, CA.
- _____. 2006. Record of Decision, West Mojave Plan, Amendment to the California Desert Conservation Area Plan. March. Available: <http://www.blm.gov/pgdata/etc/medialib//blm/ca/pdf/pdfs/cdd_pdfs/wemo_pdfs.Par.4dfb777f.File.pdf/wemo_rod_3-06.pdf>. Accessed: April 2012.
- U.S. Department of Agriculture, Natural Resources Conservation Service. 2011. *Web Soil Survey*. Available: <<http://websoilsurvey.nrcs.usda.gov/app/>>. Accessed: December 2011.
- U.S. Fish and Wildlife Service. 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Mojave Population of the Desert Tortoise. *Federal Register* 55:12178–12191.
- _____. 2010a. Preparing for any Action That May Occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*).

- _____. 2010b. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to List the Mohave Ground Squirrel as Endangered with Critical Habitat. *Federal Register* 75(80): 22063–22070.
- _____. 2011a. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, CA. 222 pp.
- _____. 2011b. Critical Habitat Portal. Department of the Interior. Available: <<http://criticalhabitat.fws.gov/crithab/>> Accessed: December, 2011.
- U.S. Geological Society. 1988. *Water Valley, California* [7.5-minute topographic map]. Reston, VA: U.S. Geological Survey. Color, scale 1:24,000.
- _____. 1971a. *Barstow, California*. 7.5-Minute Topographical Map. Scale 1:24,000. Updated 1993. Reston, VA.
- _____. 1971b. *Hinkley, California*. 7.5-Minute Topographical Map. Scale 1:24,000. Updated 1993. Reston, VA.
- Williams, D. F. 1986. Mammalian Species of Special Concern in California. Wildlife Management Division Administrative Report 86-1. Department of Fish and Game; http://www.dfg.ca.gov/wildlife/nongame/publications/bm_research/docs/86_27.pdf.
- Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*). In: A. Poole and F. Gill (eds.), *The Birds of North America*, No. 231. The Academy of Natural Sciences, Philadelphia, PA, and the American Ornithologists' Union, Washington, D.C.

4.2 Personal Communications

- Knutson, Robert. 2011. Former Pacific Gas and Electric biologist. Email to Robert Knutson of 2008 log of desert tortoise recorded in the study area.

Attachment A
Site Photographs



Photograph: 1

Photo Date: December 20, 2011

Location: Northwestern edge of project area

Direction: View facing south

Comment: Photo depicts allscale scrub vegetation north of Halstead Road and west of Hinkley Road



Photograph: 2

Photo Date: December 20, 2011

Location: Southwest corner of project area

Direction: View facing northeast

Comment: Photo depicts creosote bush scrub community located north of Riverview Road



Photograph: 3

Photo Date: December 20, 2011

Location: Near northeast corner of project area

Direction: View facing east

Comment: Photo depicts playa with sparse allscale scrub community located south of Halsted Road



Photograph: 4

Photo Date: December 20, 2011

Location: Near center of project area

Direction: View facing north

Comment: Photo depicts red brome or Mediterranean grass grassland north of Santa Fe Avenue



Photograph: 5

Photo Date: December 20, 2011

Location: Near southwestern portion of project area

Direction: View facing east

Comment: View of desert wash from top of berm north of the Mojave River



Photograph: 6

Photo Date: December 20, 2011

Location: Near center of property on the west side

Direction: View facing east

Comment: Photo depicts typical topography and scrub cover of the project area in the center area of the project north of Halstead Road

Attachment B
Plant Species Observed

Attachment B - Observed Flora of Hinkley Project Site

Scientific Name	Common Name	Special Status
CONIFERS		
Pinaceae - Pine Family		
<i>Pinus sp.</i>	Pine	
GNETALES		
Ephedraceae - Ephedra Family		
<i>Ephedra sp.</i>	Ephedra	
MONOCOTS		
Agavaceae - Agave Family		
<i>Yucca brevifolia</i>	Joshua Tree	
Arecaceae - Palm Family		
* <i>Phoenix canariensis</i>	Canary Island Date Palm	
* <i>Washingtonia robusta</i>	Mexican Fan Palm	
Poaceae - Grass Family		
* <i>Bromus madritensis ssp. rubens</i>	Red Brome	
* <i>Bromus tectorum</i>	Cheat Grass	
<i>Pleuraphis rigida</i>	Galleta Grass	
* <i>Schismus barbatus</i>	Common Mediterranean Grass	
<i>Stipa hymenoides</i>	Indian Ricegrass	
<i>Stipa speciosum</i>	Desert Needlegrass	
EUDICOTS		
Asteraceae - Sunflower Family		
<i>Ambrosia dumosa</i>	White Bur-Sage	
<i>Ambrosia salsola</i>	Burrobush	
<i>Baileya pauciradiata</i>	Desert Marigold	
<i>Gutierrezia microcephala</i>	Sticky Snakeweed	
<i>Malacothrix glabrata</i>	Desert Dandelion	
<i>Xylorhiza tortifolia var. tortifolia</i>	Mojave Woody Aster	
Boraginaceae - Borage Family		
<i>Amsinckia sp.</i>	Fiddleneck	
<i>Cryptantha sp.</i>	Common Cryptantha	
Brassicaceae - Mustard Family		
* <i>Sisymbrium irio</i>	London Rocket	

Scientific Name	Common Name	Special Status
Cactaceae - Cactus Family		
<i>Cylindropuntia echinocarpa</i>	Silver Cholla	
Chenopodiaceae - Goosefoot Family		
<i>Atriplex canescens</i>	Four-wing Saltbush	
<i>Atriplex polycarpa</i>	Allscale Saltbush	
<i>Atriplex spinifera</i>	Mojave Saltbush	
<i>Grayia spinosa</i>	Spiny Hopsage	
<i>Krascheninnikovia lanata</i>	Winterfat	
* <i>Salsola tragus</i>	Prickly Russian-Thistle	
<i>Suaeda nigra</i>	Bush Seepweed	
Euphorbiaceae - Spurge Family		
<i>Croton californicus</i>	California Croton	
Fabaceae - Legume Family		
<i>Lupinus bicolor</i>	Miniature Lupine	
* <i>Parkinsonia aculeata</i>	Mexican Palo Verde	
Geraniaceae - Geranium Family		
* <i>Erodium cicutarium</i>	Red-Stemmed Filaree	
Loasaceae - Loasa Family		
<i>Petalonyx thurberi ssp. thurberi</i>	Thurber's Sandpaper Plant	
Onagraceae - Evening Primrose Family		
<i>Camissonia sp.</i>	Evening Primrose	
Polemoniaceae - Phlox Family		
<i>Eriastrum sp.</i>	Eriastrum	
Polygonaceae - Buckwheat Family		
<i>Chorizanthe spinosa</i>	Mojave Spineflower	CRPR 4.2
<i>Eriogonum sp.</i>	Annual Buckwheat	
<i>Eriogonum inflatum</i>	Desert Trumpet	
Solanaceae - Nightshade Family		
<i>Lycium cooperi</i>	Peach Desert Thorn	
Tamaricaceae - Tamarisk Family		
* <i>Tamarix ramosissima</i>	Tamarisk	
Zygophyllaceae - Caltrop Family		
<i>Larrea tridentata</i>	Creosote Bush	

Scientific Name	Common Name	Special Status
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Legend

*= Non-native or invasive species

Special Status:

Federal:

FE = Endangered

FT = Threatened

State:

SE = Endangered

ST =Threatened

SR = Rare

CRPR – California Rare Plant Rank

1A. Presumed extinct in California

1B. Rare or Endangered in California and elsewhere

2. Rare or Endangered in California, more common elsewhere

3. Plants for which we need more information - Review list

4. Plants of limited distribution - Watch list

Threat Ranks

.1 - Seriously endangered in California

.2 – Fairly endangered in California

.3 – Not very endangered in California

Note that in March, 2010, CDFG changed the name of “CNPS List” or “CNPS Ranks” to “California Rare Plant Rank” (or CRPR). This was done to reduce confusion over the fact that CNPS and DFG jointly manage the Rare Plant Status Review groups that the rank assignments are the product of a collaborative effort and not solely a CNPS assignment.

Attachment C
Wildlife Species Observed

Attachment C. Wildlife Species Observed

Common Name	Scientific Name	Special Status
VERTEBRATES		
Birds		
Rock Pigeon	<i>*Columba livia</i>	
House Sparrow	<i>*Passer domesticus</i>	
Eurasian Collared-Dove	<i>*Streptopelia decaocto</i>	
European Starling	<i>*Sturnus vulgaris</i>	
Red-tailed Hawk	<i>Buteo jamaicensis</i>	
California Quail	<i>Callipepla californica</i>	
House Finch	<i>Carpodacus mexicanus</i>	
Northern Harrier	<i>Circus cyaneus</i>	CSC
American Crow	<i>Corvus brachyrhynchos</i>	
Common Raven	<i>Corvus corax</i>	
Yellow-rumped Warbler	<i>Dendroica coronata</i>	
California Horned Lark	<i>Eremophila alpestris actis</i>	
Prairie Falcon	<i>Falco mexicanus</i>	
American Kestrel	<i>Falco sparverius</i>	
Loggerhead Shrike	<i>Lanius ludovicianus</i>	CSC
Northern Mockingbird	<i>Mimus polyglottos</i>	
Savannah Sparrow	<i>Passerculus sandwichensis</i>	
Say's Phoebe	<i>Sayornis saya</i>	
Western Meadowlark	<i>Sturnella neglecta</i>	
Mourning Dove	<i>Zenaida macroura</i>	
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	
Mammals		
Antelope Ground Squirrel	<i>Ammospermophilus leucurus</i>	
Coyote	<i>Canis latrans</i>	
Black-tailed Jackrabbit	<i>Lepus californicus</i>	

Common Name	Scientific Name	Special Status
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Legend

*= Non-native or invasive species

Special Status:

Federal:

FE = Endangered

FT = Threatened

State:

SE = Endangered

ST =Threatened

CSC = California Species of Special Concern

CFP = California Fully Protected Species

Attachment D
Special-Status Species Tables

Table D-1. Special-Status Plant Species with Potential to Occur in the Project Area

Special-Status Plants	Life Form and Habitat	Flower Season	Status	Occurrence Probability ^a	Comments
chaparral sand-verbena <i>Abronia villosa</i> var. <i>aurita</i>	Annual herb. Coastal scrub and mostly broad alluvial fans and benches. Sandy soils. Elevations from 260 to 5,250 feet.	January–August	Federal: none State: none CRPR: 1B.1	Low	A single collection was made within the BSA on Lenwood Road in 1976 (Consortium of California Herbaria 2012, California Department of Fish and Game 2011a). However, this occurrence is thought to be misidentified, as the remaining collections for this species are from the coastal plain and low desert areas. As such, it was determined that chaparral sand-verbena has a low potential to occur within the BSA.
Lane Mountain milkvetch <i>Astragalus jaegerianus</i>	Perennial herb. Joshua Tree woodland and Mojavean desert scrub. Shallow sandy soils within areas of exposed or partially exposed granitic bedrock. Elevations from 2,952 to 3,936 feet.	April–June	Federal: endangered State: none CRPR: 1B.1	Low to moderate	Portions of the scrub on site contain some suitability for the species, however, the entire site is below the known elevational range of the species.
Lancaster milkvetch <i>Astragalus preussii</i> var. <i>laxiflorus</i>	Perennial herb. Chenopod scrub. Known from elevations around 2,296 feet.	March–May	Federal: none State: none CRPR: 1B.1	Low	The saltbush scrub provides suitable habitat for this species, however, historical records suggest that this plant does not occur in the vicinity/region of the project site.
Mohave spineflower <i>Chorizanthe spinosa</i>	Annual herb. Chenopod scrub, Joshua Tree woodland, playas and Mojavean desert scrub. From 20 to 4,265 feet.	March–July	Federal: none State: none CRPR: 4.2	Observed within playa habitat.	Confirmed present. High potential to be found on the edges of playas.
Clokey's cryptantha <i>Cryptantha clokeyi</i>	Annual herb. Mojavean desert scrub. Elevations from 2,378 to 4,477 feet.	April	Federal: none State: none CRPR: 1B.2	Moderate	The Mojavean scrub on the site provides suitable habitat for the species.
Desert cymopterus <i>Cymopterus deserticola</i>	Perennial herb. Joshua Tree woodland and Mojavean desert scrub with sandy substrates. From 2,066 to 4,920 feet.	March–May	Federal: none State: none CRPR: 1B.2	Moderate to high	The saltbush scrub, allscale scrub and playa habitats on site provide suitable habitat for this species.
Barstow woolly sunflower <i>Eriophyllum</i>	Annual herb. Saltbush scrub, Mojavean desert scrub and playas. From 1,650 to 3,148 feet.	March–May	Federal: none State: none CRPR: 1B.2	Moderate to high	The site contains suitable scrub and playa habitat for this species.

Special-Status Plants	Life Form and Habitat	Flower Season	Status	Occurrence Probability ^a	Comments
<i>mohavense</i>					
Mojave menodora <i>Menodora spinescens</i> var. <i>mohavensis</i>	Perennial deciduous shrub. Mojavean desert scrub, and in areas with Andesite gravel on rocky hillsides and in canyons. From 2,263 to 6,560 feet.	April–May	Federal: none State: none CRPR: 1B.2	Low to moderate	Portions of the site, particularly the eastern edges adjacent to hillslopes have the potential to support this species.
Creamy blazing star <i>Mentzelia tridentata</i>	Annual herb. Mojavean desert scrub in association with gravelly, rocky or sandy substrates. From 2,296 to 3,805 feet.	March–May	Federal: none State: none CRPR: 1B.3	Moderate	Portions of the site, particularly the rocky slopes on the eastern edges of the site have the potential to support this species.
Mojave monkeyflower <i>Mimulus mohavensis</i>	Annual herb. Joshua Tree woodland, Mojavean desert scrub and sandy or gravelly places such as washes. From 1,968 to 3,936 feet.	April–June	Federal: none State: none CRPR: 1B.2	Moderate to high	Historical records indicate the plants presence on site (CNDDB).
Beaver Dam breadroot <i>Pediomelum castoreum</i>	Perennial herb. Joshua Tree woodland and Mojavean desert scrub within sandy washes and road cuts. From 2,000 to 5,002 feet.	April–May	Federal: none State: none CRPR: 1B.2	Moderate	The scrub and wash habitats present on site, particularly on the eastern side of the site support suitable habitat for this species.
Parish's phacelia <i>Phacelia parishii</i>	Annual herb. Mojavean desert scrub and clay or alkaline playas. From 1,771 to 3,936 feet.	April–June	Federal: none State: none CRPR: 1B.1	Low to moderate	A single 1884 collection was made east of the project site near Barstow, however, the saltbush, all scale scrub and playa habitat on site support suitable habitat for this species.
Utah glasswort <i>Sarcocornia utahensis</i>	Perennial deciduous shrub. Chenopod scrub and alkaline playa. Known from around 1,094 feet.	August–September	Federal: none State: none CRPR: 2.2	Low	The saltbush scrub and playa habitats on site support suitable habitat for this species, however the site is above the known elevational range of the species.
Palmer's jackass clover <i>Wislizenia refracta</i> ssp. <i>palmeri</i>	Perennial deciduous shrub. Chenopod scrub, desert dunes, Sonoran desert scrub and Sonoran thorn woodland. From below 984 feet.	January–December	Federal: none State: none CRPR: 2.2	Low	The saltbush scrub and playa habitat have some potential to support this plant. However, this plant is known to be associated with the lower Sonoroan desert.
Special-Status Vegetation Communities			Conservation Status	Occurrence Probability	
Transmontane Alkali Marsh			CNDDB	Confirmed Absent	

Sources: Consortium of California Herbaria 2012; California Department of Fish and Game 2011a (See Chapter 4, *References*, of the BSR).

Notes:

BSA = biological survey area

CNDDDB = California Natural Diversity Database

CRPR = California Rare Plant Rank

California Rare Plant Rank (CRPR)

List 1A (Presumed extinct in California)

List 1B (Rare, threatened or endangered in California and elsewhere)

List 1B.1 (Seriously endangered in California)

List 1B.2 (Fairly endangered in California)

List 1B.3 (Not very endangered in California)

List 2 (Presumed extinct in California, but more common elsewhere)

List 3 (We need more information about this plant)

List 4 (Limited distribution (watch list))

^a Occurrence Codes

Confirmed Absent: Confirmed to be absent on the study area as a formal and/or practical matter. Typically based on results of focused surveys.

Less than Reasonable: Although occurrence might be remotely possible, the likelihood of occurrence is less than that required for any potentially applicable regulatory threshold. Furthermore, the likelihood of meaningful value of the site to any population(s) of this taxon is less than reasonable.

Low: Occurrence of the species is reasonable but unlikely because of some combination of facts, for example: (1) the study area was the subject of unsuccessful searches conducted under relevant and reasonable circumstances, (2) potential habitat present is marginal or minimal in extent, (3) the best available information suggests the species is absent from the study area, and/or (4) available information sheds no clear light on the species' likelihood in the study area, but it is known to be rare at best in the vicinity. Neither the species nor any indication of its presence was detected.

Moderate: The study area is within the range of the species, and contains potentially appropriate habitat. Neither individuals nor diagnostic signs were detected. It is nevertheless reasonable that some individuals may have been overlooked.

High: The study area is known to be within the range of the species, and contains potential habitat with a high likelihood of occupancy. Although no individuals or diagnostic signs were detected during current fieldwork by a qualified observer, it is likely that it is present to some degree given the best available information.

Confirmed Present: Confirmed present by a qualified biologist or other reliable source and there is no specific evidence that the species has subsequently become absent. Depending on the species and other information available, it may or may not be possible to determine what portions of the study area are currently in use without further studies.

Table D-2. Special-Status Wildlife Species with Potential to Occur in the Project Area

Species/Natural Communities	Special Status ^a	Requirements	Likelihood of Occurrence ^b	Comments
ANIMALS				
Burrowing owl <i>Athene cunicularia</i>	SSC	Inhabits open, dry, nearly or quite level, grassland; prairie; desert floor; shrubland should be considered potential habitat if shrub cover is below 30%. In coastal Southern California, a substantial fraction of birds are found in microhabitats highly altered by humans, including flood control and irrigation basins, dikes, and banks, abandoned fields surrounded by agriculture, and road cuts and margins. In the western United States burrowing owls are only rarely known to construct their own burrows; strong association between burrowing owls and burrowing mammals, especially ground squirrels (<i>Spermophilus</i> spp.); however burrowing owls will also occupy human-made niches such as banks and ditches, piles of broken concrete, and even abandoned structures.	Confirmed Present	Suitable vegetation communities/habitat for foraging and nesting is present.
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	FT, SSC	Found on sandy beaches, salt pond levees, and shores of large alkali lakes. Needs sandy, gravelly, or friable soils for nesting. Breeds primarily on coastal beaches above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely-vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries. Wintering snowy plovers are found on many of the beaches used for nesting as well as in human-made salt ponds, and on estuarine sand and mudflats.	Less than reasonable	No suitable habitat on or adjacent to the site. Species has not been documented within the site and the surrounding 8 quads since 1978 in which one individual was observed.
Northern harrier <i>Circus cyaneus</i>	SSC*	Breeds and forages in a variety of open (treeless) habitats that provide adequate vegetative cover, an abundance of suitable prey, and scattered perches such as shrubs or fence posts. In California, such habitats include freshwater marshes, brackish and saltwater marshes, wet meadows, weedy borders of lakes, rivers and streams, annual and perennial grasslands (including those with vernal pools), weed fields, ungrazed or lightly grazed pastures, some croplands (especially alfalfa, grain, sugar beets, tomatoes, and melons), sagebrush flats, and desert sinks. They nest on the ground, mostly within patches of dense, often tall, vegetation in undisturbed areas.	Foraging-Confirmed Present Nesting-Low	Closest known breeding location is at Harper Dry Lake, but has not been suspected there since the mid-1990s.

Species/Natural Communities	Special Status ^a	Requirements	Likelihood of Occurrence ^b	Comments
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	FC, SE	Inhabitant of extensive, mature, riparian forests; has declined from a fairly common, local breeder in much of California 60 years ago, to virtual extirpation with only a handful of tiny populations remaining in all of California today. Losses are tied to obvious loss of nearly all suitable habitat, but other factors may also be involved. Relatively broad, well-shaded riparian forests are utilized, although it tolerates some disturbance. A specialist to some degree on tent caterpillars, with remarkably fast development of young covering only 18–21 days from incubation to fledging.	Less than reasonable	No suitable habitat on or adjacent to the site. Species has not been documented within the site and the surrounding eight quads since 1986 in which one individual was observed.
Mohave tui chub <i>Gila bicolor mohavensis</i>	FE, SE	Endemic to the Mojave River basin. Prefers lake habitats, always associated with deep pools and slough-like areas, and do poorly in fast-flowing streams. Is adapted for harsh water qualities including alkaline waters and extreme temperatures.	Absent	Had once occurred on site as a result of transplanting individuals. Extirpated due to the closure of facility in 1992.
Desert tortoise <i>Gopherus agassizii</i>	FT, SE	Mojave and Sonoran deserts in southwestern Utah, southern Nevada, southeastern California, and western Arizona in the United States. Habitat includes creosote/cactus/shadscale scrub from sandy flats to rocky foothills, including alluvial fans, washes, and canyons where suitable soils for den construction might be found. It is found from near sea level to around 3,500 feet in elevation.	Confirmed Present	Suitable vegetation communities/habitat present. Individuals and sign observed during previous surveys.
Loggerhead shrike <i>Lanius ludovicianus</i>	SSC*	Forages in open country of many types (including non-intensive agricultural areas) and nests in small trees and large shrubs, often at the edges of such open areas. Like most birds of prey, generally occurs at low densities. The species is widely distributed in Southern California with some seasonal movements evident.	Confirmed Present	Suitable habitat occurs throughout the site. Several individuals were observed within the site during the December 2011 survey.
Mohave river vole <i>Microtus californicus mohavensis</i>	SSC	Occurs in moist habitats including meadows, freshwater marshes, and irrigated pastures in the vicinity of the Mojave River. Suitable habitat is associated with ponds and irrigation canals along with the Mojave River. Burrows into soft soils. Elevations of known localities range between 750–823 meters (2,325–2,700 feet).	Low-Moderate	Suitable habitat may occur on site within the agricultural areas.

Species/Natural Communities	Special Status ^a	Requirements	Likelihood of Occurrence ^b	Comments
Yuma clapper rail <i>Rallus longirostris yumanensis</i>	FE, ST	Found in freshwater and alkali marshes dominated by stands of emergent vegetation interspersed with areas of open water and drier, upland benches. Prefers mature marsh stands along margins of shallow ponds with stable water levels. Nest sites selected by near upland areas in shallow sites dominated by mature vegetation, often in the base of a shrub.	Less than reasonable	No suitable habitat on or adjacent to the site. Species has not been documented within the site and the surrounding eight quads since 1977 in which one individual was observed.
Mohave ground squirrel <i>Spermophilus mohavensis</i>	ST	Restricted to the Mojave Desert in San Bernardino, Los Angeles, Kern, and Inyo Counties. Optimal habitats are open desert scrub, alkali desert scrub, and Joshua tree woodland. Feeds in annual grasslands. Prefers sandy to gravelly soils, avoids rocky areas. Uses burrows at base of shrubs for cover	Confirmed Present	Suitable vegetation communities/habitat present. A CNDDDB occurrence is mapped within the BSA and an individual was observed during previous surveys.
American badger <i>Taxidea taxus</i>	SSC	Found in open, drier stages of many shrub, herbaceous, and woodland communities where soils are dry and suitable for burrowing. Sensitive to fragmentation of open spaces. Generally requires good diversity and abundance of rodent prey.	Moderate	Though there are no records for occurrence on site, suitable habitat is present. Records for this species occur approximately 3 miles from the site as recently as 2007.
Mojave fringe-toed lizard <i>Uma scoparia</i>	SSC	Restricted to areas with fine, loose, windblown sand including dunes, dry lakebeds, desert washes, riverbanks, sparse desert scrub habitats, and isolated pockets against hillsides.	High	Suitable habitat is present in the BSA and the CNDDDB has recorded occurrences within the BSA.

Notes:

BSA = biological survey area

CNDDDB = California Natural Diversity Database

^aStatus Definitions

FE Federally Endangered

FT Federally Threatened

FC Federal Candidate species

SE State Endangered

ST State Threatened

SSC State Species of Special Concern

SSC* State Species of Special Concern only when breeding

^bOccurrence Codes**Confirmed Absent:** Confirmed to be absent on the study area as a formal and/or practical matter. Typically based on results of focused surveys.**Less than Reasonable:** Although occurrence might be remotely possible, the likelihood of occurrence is less than that required for any potentially applicable regulatory threshold. Furthermore, the likelihood of meaningful value of the site to any population(s) of this taxon is less than reasonable.**Low:** Occurrence of the species is reasonable but unlikely because of some combination of facts, for example: (1) the study area was the subject of unsuccessful searches conducted under relevant and reasonable circumstances, (2) potential habitat present is marginal or minimal in extent, (3) the best available information suggests the species is absent from the study area, and/or (4) available information sheds no clear light on the species' likelihood in the study area, but it is known to be rare at best in the vicinity. Neither the species nor any indication of its presence was detected.**Moderate:** The study area is within the range of the species, and contains potentially appropriate habitat. Neither individuals nor diagnostic signs were detected. It is nevertheless reasonable that some individuals may have been overlooked.**High:** The study area is known to be within the range of the species, and contains potential habitat with a high likelihood of occupancy. Although no individuals or diagnostic signs were detected during current fieldwork by a qualified observer, it is likely that it is present to some degree given the best available information.**Confirmed Present:** Confirmed present by a qualified biologist or other reliable source and there is no specific evidence that the species has subsequently become absent. Depending on the species and other information available, it may or may not be possible to determine what portions of the study area are currently in use without further studies.