4. Biological Resources

This section describes the biological environment that occurs in the study area. The "study area" encompasses the general area from Pisgah Crater west along the I-40/old Route 66 corridor to the Daggett area, and south through the Stoddard, North Lucerne, Lucerne, and Apple valleys to Hesperia (see Figure 1-1). This section also provides the results of background research and biological surveys along the previously proposed Coolwater-Lugo Transmission Project (CLTP) corridors. Although this project proposal was withdrawn in 2015, several years' worth of data collection was completed; these data provide important information about the resources in the region. The previously proposed corridors supported a wide representation of the habitats, special-status species, and other biological resources in the study area and can be extrapolated to the wider region. The term "survey area" is used in this section to refer to the area surveyed for the former CLTP.

4.1 Data Collection Methodology

The following is a summary of the methodology used to assess biological resources present or potentially occurring within the study area. The approach for this process was to utilize all available data related to biological resources to the extent possible, and to independently review, verify, and supplement the data in order to compile a concise and accurate description of the baseline biological conditions in the study area.

The assessment of baseline biological conditions began with a comprehensive review of all available species and habitat data and relevant reports from sources including the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and other agencies. Biological resource data sources included, but were not limited to, the following:

- Aerial photographs; Geographic Information Systems (GIS) data; United States Geological Survey (USGS) topographic maps; the Consortium of California Herbaria (CCH) online database; the California Native Plant Society's (CNPS's) Inventory of Rare, Threatened, and Endangered Plants of California; and the California Natural Diversity Database (CNDDB);
- Previously prepared reports and regional planning documents (the BLM's West Mojave Plan [WEMO], general plan policies, Habitat Conservation Plans [HCPs], Environmental Impact Statements [EISs], and Environmental Impact Reports [EIRs]); and
- Information developed by Southern California Edison (SCE) for the previously proposed CLTP, including the Proponent's Environmental Assessment (PEA) and associated technical reports and data (vegetation mapping and special-status species locations and survey data).

Following the background review of existing information, all data were independently field verified, un-surveyed portions of the previously proposed CLTP corridors were inventoried, and the potential for biological resources were evaluated. Table 4-1 summarizes the biological surveys conducted for the previously proposed CLTP.

Table 4-1. Biological Resources Surveys for the Former CLTP	
Survey	**Dates**
Botanical – Focused Survey	• March to April, 2012 • May to June, 2013 • April, 2014 • May, 2014 • August, 2014
Habitat Assessments, Vegetation Mapping, and Reconnaissance Surveys	• March to April, 2012 • May to June, 2013 • April, 2014 • August, 2014 • October, 2014
Jurisdictional Delineation	• March to April, 2012 • July to August, 2012 • May to June, 2013 • December 2013 to February 2014 • May, 2014 • September, 2014
Focused American badger and desert kit fox surveys	• May to June, 2013 • April to May, 2014 (concurrent with desert tortoise survey) • September to October, 2014 (concurrent with desert tortoise survey)
Focused arroyo toad survey	• April to June, 2013
Focused avian surveys	• April to May, 2012 • September, 2012 • June, 2013 • April, 2014 • September to October, 2014 (concurrent with desert tortoise survey)
Focused botanical survey	• March to April, 2012 • May to June, 2013 • May, 2014
Focused burrowing owl survey	• May to July, 2012 • May to June, 2013 • April to May, 2014 (concurrent with desert tortoise survey) • September to October, 2014 (concurrent with desert tortoise)
Focused desert tortoise herpetological survey	• May to July, 2012 • May to June, 2013 • April to May, 2014 • September, 2014 (protocol survey) • September to October, 2014 (reconnaissance surveys)
Habitat assessments & reconnaissance surveys	• March to April, 2012 • May, 2013 • May to June, 2013 • January, 2014 • April, 2014
Jurisdictional delineation	• March to April, 2012 • July to August, 2012 • May to June, 2013 • July, 2014
Mohave ground squirrel habitat assessment	• May, 2012 • July, 2012 • May, 2013

Table 4-1. Biological Resources Surveys for the Former CLTP	
Survey	**Dates**
Special-status species habitat assessment and surveys (entire survey area)	• April, 2014 • August, 2014
Vegetation mapping	• March to April, 2012 • May to June, 2013 • April, 2014 • October, 2014
Weed Mapping	• April, 2014

Source: SCE, 2013; SCE, 2014 and surveys conducted by Aspen in 2013 and 2014

4.2 Regional Setting

The study area is located in the southwestern Mojave Desert and southern ecoregional transition zone of the San Bernardino Mountains. The California portion of the Mojave Desert occupies the northern two-thirds of the California Desert floristic province (Baldwin et al., 2002). Region-wide the area is characterized by hot, dry summers and warm, dry winters; and exhibits greater temperature ranges and elevational relief than the Sonoran Desert region of California in eastern Riverside and Imperial counties. Elevations range from a low of approximately 1,900 feet above mean sea level (amsl) near Newberry Springs, to a high of approximately 4,900 feet amsl in the foothills of the San Bernardino Mountains. Annual precipitation ranges from three to six inches in the study area and mainly occurs in the winter and spring months. Unique years can generate increased rainfall, when subtropical air from the south moves into the area and creates monsoonal thunderstorms. Alternatively, years of drought can yield average rainfall of less than one inch for the entire year (WRCC, 2009). The region also receives periodic snowfall during cold winter storms.

The topography in the study area is diverse and includes steep mountain ranges, dry lakes (playas), relatively flat plains, bajadas (alluvial fans or debris flows), intermittent drainages, sand fields, and volcanic landforms. Active dune formations, sandy hummocks, seasonally inundated alkaline lake beds, and a series of ephemeral desert washes are also present. Daggett Ridge, Stoddard Valley, Sawtooth Mountains, North Lucerne Valley, Granite Mountains, Pisgah Crater, Lucerne Dry Lake, and the Mojave River are several of the landforms present in the study area. The variety of topography, soil conditions, surface hydrology, and subsurface conditions support a variety of plant communities, which in turn support several rare plants and a variety of wildlife. Creosote bush shrublands occupy vast areas and are characteristic of the Mojave Desert. Other communities include saltbush scrub, Joshua tree woodlands, basin sagebrush, and western juniper on the southern foothills of the San Bernardino Mountains. Features such as sand dunes, caliche caves, and steep rocky outcrops provide niche habitat for both common and rare wildlife, and riparian oases in the region concentrate wildlife in the otherwise arid region. Numerous invertebrates, reptiles, amphibians, birds, and large mammals inhabit the study area.

The floristic history of the Mojave Desert is complex, and a total of 1,836 vascular plant species in 116 families are known from the area (BLM, 2005). Portions of this subregion, including the study area, have been recognized as an important region of evolutionary potential in California and is known to support large numbers of endemic plants (i.e., species that occur nowhere else in the world) (Baldwin et al., 2012; Kraft et al., 2010). During favorable years, the region supports more endemic plants per square meter than any location in the United States; most of these occur as winter annuals (WWF, 2014).

Over 635 species of vertebrate animals are known from the Mojave Desert alone (BLM, 1990) and a wide variety of desert and mountain species overlap in the foothills of the San Bernardino Mountains. Investigations of invertebrates, such as insects, mollusks, and fairy shrimp have been completed for only a few groups, but show widespread endemism and specialization to unique substrates, host plants, and water sources; it is likely that thousands of invertebrate species are present across the Mojave Desert (*Ibid*.).

The distribution of plants and wildlife across the study area is a function of the level of disturbance (both historic and ongoing), soil type, and existing vegetative cover. Areas characterized by more intact native plant communities, such as the Ord-Rodman Desert Wildlife Management Area (DWMA), appear to support higher native species diversity including special-status species such as desert tortoise (*Gopherus agassizii*) and burrowing owl (*Athene cunicularia*). Important topographical features such as Daggett Ridge, Sawtooth Mountains, and the Granite Mountains provide nesting substrate for golden eagles (*Aguila chrysaetos*) and many other species of vertebrates. The Pisgah crater and large sand fields near the Pisgah Substation support a variety of habitat for sensitive wildlife, including the Mojave fringe-toed lizard (*Uma scoparia*).

The Ord Mountains and Lucerne Valley have been identified as an evolutionary hotspot, with high genetic diversity among several different wildlife species studied (Vandergast et al., 2013). Evolutionary hotspots protect future evolutionary potential for a variety of species, providing genetic diversity that may allow for adaptation to changing conditions including those associated with climate change. Where genetic diversity is low, populations are more susceptible to local extirpation. The Ord Mountains-Lucerne Valley region may reflect such a high level of genetic diversity and divergence among and across species due to the historic barrier formed by the Mojave River, and its location at the desert-mountain transition zone (Vandergast et al., 2013).

More disturbed locations including the Stoddard Valley off-highway vehicle (OHV) area, graded roads, highway edges, developed lands, and areas heavily colonized by weedy annuals provide lower habitat value and tend to support lower species diversity than otherwise intact native plant communities in the study area. In Apple Valley and Hesperia, native wildlife continues to persist; however, only remnant native plant communities exist in many areas. Wildlife usage is restricted in these areas, or is limited to more disturbance-tolerant species. The Mojave River, which once supported intact riparian communities in the study area, has been managed for flood control activities and is now subject to extensive OHV use which degrades habitat value for most species. The floodplain in the study area is dominated by sandy wash communities supporting thickets of emerging willows (*Salix* sp.), mule fat (*Baccharis salicifolia*), and salt cedar (*Tamarisk* sp.). Remnant Joshua tree woodland and wildflower fields dominated by thick carpets of California coreopsis (*Leptosyne californica*), Veatch's blazingstart (*Mentzelia veatchiana*), western nicolletia (*Nicolletia occidentalis*), pincushions (*Chaenactis* sp.), bush lupine (*Lupinus excubitus* var. *austromontanus*), and giant eriastrum (*Eriastrum densifolium* ssp. *densifolium*) are present along the east terrace of the Mojave River.

In more remote portions of the study area, the upper bajadas support intact native vegetation largely dominated by various alliances of creosote bush scrub, Joshua tree woodland, Mojave yucca scrub, catclaw acacia, and cheesebush scrub. During periods of adequate precipitation, these communities support a broad assemblage of native wildflowers. In lower elevations or where soil conditions are more saline, halophytic (salt-tolerant) communities are present and include allscale scrub, white bursage scrub, and saltbush scrub. Barren playa also occurs in some of these areas. In Apple Valley and Hesperia, vegetation ranges from remnant native plant communities to isolated patches of intact

desert scrub and Joshua tree woodland. Virgin River brittlebush and Mormon tea scrub dominate the steep sparsely vegetated hillsides near Chimney Rock and the Granite Mountains.

The study area includes private, State, military, and BLM-managed lands located within the WEMO. Several special management areas are located in the region, including the Ord-Rodman DWMA, the Mojave Monkey Flower Area of Critical Environmental Concern (ACEC), the Stoddard Valley OHV area, the Bendire's Thrasher Conservation Area, and the Juniper Flats ACEC (see Figure 4-1). See Section 3.1 (Land Use) for additional information on these special management areas.

4.3 Vegetation Communities and Landforms

Thirty-five types of vegetation and land cover were mapped in the survey area (see Table 4-2 below and Figure 4-2, located at the end of this section,). Vegetation was classified using names and descriptions in Sawyer et al. (2009). Non-native woodland and ruderal vegetation were mapped, but do not match vegetation descriptions in Sawyer et al. (2009). Six non-vegetated land cover types were mapped including basalt rock, carbonate outcrop, developed, dry lake bed (playa), open water, and sandy wash. Vegetation mapped in the survey area is representative of plant communities and landforms that occur throughout the study area.

Table 4-2. Vegetation and Cover Types in the Survey Area

Vegetation and Other Cover Types	Total Acres in Survey Area
Vegetation Types	
Allscale Scrub	1226.4
Arroyo Willow Scrub [2]	3.0
Big Sagebrush Scrub	83.8
Bitterbrush Scrub [1]	4.8
Black-stem Rabbitbrush Scrub [1]	4.9
California Buckwheat Scrub	746.1
California Juniper Woodland	600.1
Catclaw Acacia Thorn Scrub	54.2
Chamise Chaparral	149.0
Cheesebush Scrub	131.8
Cooper's Goldenbush Scrub	130.5
Creosote Bush - White Bursage Scrub	3671.7
Creosote Bush Scrub	6470.0
Desert Almond Scrub [1]	60.3
Desert Olive Patches [1]	0.7
Fourwing Saltbush Scrub	13.1
Holly Leaf Cherry Chaparral	23.3
Joshua Tree Woodland [1]	1624.4
Mesquite Thicket [1]	10.8
Mojave Yucca Scrub [1]	1176.7
Mormon Tea Scrub	149.2

Table 4-2. Vegetation and Cover Types in the Survey Area	
Vegetation and Other Cover Types	**Total Acres in Survey Area**
Mulefat Scrub [2]	2.9
Rubber Rabbitbrush Scrub	262.4
Ruderal	544.3
Sandbar Willow Thickets [2]	0.2
Scalebroom Scrub [1]	28.6
Tamarisk Thickets	50.7
Virgin River Brittle Brush Scrub [1]	47.3
White Bursage Scrub	110.4
Other Cover Types	
Basalt Rock	29.6
Carbonate Outcrop	14.1
Developed	3142.5
Dry Lake Bed	438.1
Open Water	5.0
Sandy Wash	95.4
Total	21,106

Note(s):

1. Sensitive vegetation community (CDFG, 2010)
2. Although not identified as a sensitive community by CDFW (CDFG, 2010), this vegetation is riparian and is typically considered sensitive.

4.3.1 Vegetation Types

Allscale Scrub. This community is dominated by allscale (*Atriplex polycarpa*) and is found on alkaline soils near playas and along the margins of dry lake beds. Other species of saltbush (*Atriplex* spp.), hop sage (*Grayia spinosa*), and creosote bush (*Larrea tridentata*) may also occur, but at very low densities. The canopy cover is relatively open with a lack of herbaceous understory species and very low plant diversity. This community occurs throughout much of the study area, but is most abundant in the vicinity of Rabbit Dry Lake and Troy Dry Lake (see Figure 4-2).

Arroyo Willow Scrub. This community is dominated by arroyo willow (*Salix lasiolepis*), with other willows (*Salix* spp.), mulefat (*Baccharis salicifolia*), and desert baccharis (*B. sergiloides*) also present. Arroyo willow scrub tends to establish in recently scoured areas that have exposed soil and access to ground water. Arroyo willow scrub occurs in the vicinity of Rock Springs (see Figure 4-2). It matches the description of riparian willow scrub, a sensitive natural community (CDFG, 2010).

Big Sagebrush Scrub. This community is dominated by big sagebrush (*Artemisia tridentata*) and is typically found growing in sandy soils on gradually sloping plains, alluvial fans, and bajadas. Other shrubs including Cooper's goldenbush (*Ericameria cooperi*), narrowleaf goldenbush (*E. linearifolia*), rubber rabbitbrush (*E. nauseosa*), and scattered California juniper (*Juniperus californica*) are also present, but in lower densities. The canopy is typically closed with a dense cover of shrubs, perennial herbs, and annuals. This community primarily occurs in the western portion of the study area.

Bitterbrush Scrub. This community is dominated by desert bitterbrush (*Purshia tridentata* var. *glandulosa*). Other species including Nevada ephedra (*Ephedra nevadensis*), desert almond (*Prunus fasciculata*), and California buckwheat (*Eriogonum fasciculatum*) are also present but in lower densities. This community is most common in the foothills of the San Bernardino Mountains.

Black-Stem Rabbitbrush Scrub. This community is dominated by Mojave rabbitbrush (*E. paniculata*), also known as black-stem rabbitbrush, and is found in desert washes. Other plants identified in this community include burrobrush (*Ambrosia salsola*), and an assortment of annuals and perennials.

California Buckwheat Scrub. This community consists of low, mostly soft-woody shrubs and is dominated by California buckwheat. Other species such as Cooper's goldenbush, narrowleaf goldenbush, rubber rabbitbrush, and Nevada joint fir are also present. In some areas, there is a low density component of emergent trees present, including California juniper and Joshua tree (*Yucca brevifolia*). This community primarily occurs on upland slopes, gradually rolling hills, and washes in the southwestern portion of the study area.

California Juniper Woodland. This community consists of an open vegetation type dominated by California juniper. While this community type is described as woodland, California juniper can be considered either a shrub or a low tree with a maximum height of about 13 feet (Hickman, 1993). The shrub understory varies across the study area and is either very sparse dominated by annual grasses and forbs or consists of various scrub communities that matches the descriptions of California buckwheat scrub or Cooper's goldenbush scrub. This community is found in the western portion of the study area.

Catclaw Acacia Thorn Scrub. This community is dominated by catclaw (*Senegalia greggii*) and grows in rocky canyons and larger washes where the plants have better access to seasonal rainfall and ground water. Other shrubs present in the community include creosote bush, white bursage, burrobrush, and wooly brickellia (*Brickellia incana*).

Chamise Chaparral. This community is dominated by chamise (*Adenostoma fasciculatum*). It is a fire-adapted community that consists of dense evergreen shrubs. Other shrub species present, but much less common include hollyleaf cherry (*Prunus ilicifolia*), mountain mahogany (*Cercocarpus betuloides*), chaparral yucca (*Hesperoyucca whipplei*), sages (*Salvia* spp.), and Mojave ceanothus (*Ceanothus vestitus*). This community is found in the southwestern portion of the study area.

Cheesebush Scrub. This community is dominated by burrobrush, also known as cheesebush, and is found in sandy washes and intermittent channels. Cheesebush scrub is often found in association with other shrubs such as creosote bush, wooly brickellia, and desert senna (*Senna armata*).

Cooper's Goldenbush Scrub. This community is dominated by Cooper's goldenbush. Other shrubs such as rubber rabbitbrush, Nevada ephedra, interior goldenbush and California buckwheat are also present but at lower densities. This community occurs on rolling hills in the western portion of the study area.

Creosote Bush Scrub. This community is the most characteristic vegetation of the California desert and is found on alluvial fans, bajadas, upland slopes, and washes. Creosote bush scrub is dominated by creosote bush with an intermittent to open canopy and an herbaceous layer of seasonal annuals and perennials. White bursage (*Ambrosia dumosa*), allscale, fourwing saltbush (*Atriplex canescens*), and desert senna may also occur. This community is found throughout the study area. In the vicinity of the Pisgah lava field and associated dunes habitats, big galleta (*Hilaria rigida*) is much more common in the creosote bush scrub than in other portions of the study area.

Creosote Bush – White Bursage Scrub. This community is widespread in the Mojave Desert and is characterized by a co-dominance of creosote bush and white bursage. The herbaceous layer is dominated by seasonal annuals and the shrub cover is relatively open. Other species within this community include those listed above for creosote bush scrub and additional species such as beavertail cactus desert (*Opuntia basilaris* var. *basilaris*), desert straw (*Stephanomeria pauciflora*), and desert trumpet (*E. inflatum*). This vegetation typically occurs on alluvial fans, bajadas, and rocky slopes in areas with a rockier soil gradation, and was mapped throughout the survey area.

Desert Almond Scrub. This community is found in association with small drainages and mesic areas and is dominated by desert almond (*Prunus fasciculata*). This vegetation is similar in plant composition and structure to bitterbush scrub described above. This community is present in the southern portion of the study area where it is found throughout the rolling hills and among large granitic boulders in the foothills of the San Bernardino Mountains.

Desert Olive Patches. This community is dominated by desert olive (*Forestiera pubescens*) and grows in more mesic locations along the north-facing slope of the San Bernardino Mountains. Desert olive was also observed as sub-dominant species growing in association with arroyo willow in a sandy wash.

Fourwing Saltbush Scrub. This community occurs on fine-textured, poorly drained soils with higher salinity and alkalinity than surrounding areas, and is dominated by fourwing saltbush. Other shrubs, such as allscale and creosote bush, are present but at lower densities. The canopy is open with a lack of herbaceous species. This vegetation occurs at scattered locations within the study area.

Joshua Tree Woodland. This community is dominated by Joshua trees with an intermittent shrub layer of creosote brush, white bursage, beavertail cactus, cholla (*O. echinocarpa*), Nevada joint fir, and burro brush. Depending on the location of this community in the study area, it also includes Mojave yucca, California juniper, and chaparral yucca. The herbaceous layer includes cheat grass and many species of perennials and annual wildflowers. This vegetation type often intergrades with creosote bush scrub, which may contain widely scattered Joshua trees. However, only areas with high densities of Joshua trees were mapped as this community type. This community is scattered throughout the study area, on rocky soils in association with ridges and moderate slopes.

Joshua tree woodlands support unique assemblages of plant and wildlife species and vast acreages of these habitats have been lost over the last several decades due to urbanization and agricultural activities. Most desert plant communities lack vertical structure and shade. However, Joshua tree woodlands provide important structural characteristics for mammals and birds, and Joshua trees are used extensively by nesting birds. Additionally, unlike herbaceous or shrub-dominated habitats, arid woodlands are extremely slow developing, and can take decades or more to fully recover from disturbance. Due to the unique floristic composition and structure of this vegetation type, and the historic and on-going losses, the CDFW and several local plans, ordinances, and policies have designated Joshua tree woodlands as sensitive.

Mojave Yucca Scrub. This community is characterized by the presence of Mojave yucca (*Y. schidigera*). Stands of this vegetation type are often similar to surrounding vegetation types such as Joshua tree woodland, creosote bush-white bursage scrub, or Nevada joint fir scrub, but these communities lack Mojave Yucca as a dominant emergent shrub. This vegetation occurs on alluvial fans, rocky slopes, and upper bajadas across most of the study area.

Mojave yucca scrub is similar in structure and diversity to Joshua tree woodlands but is shorter and less articulated. Due to similar reasons as Joshua tree woodland, the CDFW has designated Mojave yucca scrub as sensitive.

Nevada Joint Fir Scrub. This community occurs on well-drained gravelly and rocky substrates and is dominated by Nevada joint fir. Other species present in this community include Virgin River brittlebush (*Encelia virginiensis*), desert needle grass (*Stipa speciosa*), Mexican bladder sage (*Scutellaria mexicana*) and desert straw. This community is widespread in the Mojave Desert on dry, open rocky slopes and canyons. This community is found at several locations in the study area, predominantly on rocky slopes.

Mulefat Scrub. This community consists of a tall woody, riparian scrub dominated by mulefat. Common associates in the shrub layer include willows (*Salix* spp.) and salt cedar. In the study area, this community is relatively open with areas of bare sand between the shrubs. Over time, mulefat may become denser in the absence of excessive scour. Mulefat scrub is found in the more mesic portions of the Mojave River.

Rubber Rabbitbrush Scrub. This disturbance-associated vegetation (Holland, 1986) occurs along roadsides and in areas that have been disturbed by fire, grading, soil disturbance, or heavy grazing. Rubber rabbitbrush scrub often occurs as nearly pure stands of dominated by rubber rabbitbrush and may integrade with other vegetation types such as Cooper's goldenbush scrub, California juniper woodland, big sagebush scrub, and California buckwheat scrub. This community is most common in the southwestern portion of the study area.

Sandbar Willow Thickets. This community is dominated by sandbar willow (*Salix exigua*) and grows in mesic locations along the north-facing slope of the San Bernardino Mountains.

Scalebroom Scrub. This vegetation is dominated by scalebroom (*Lepitospartum squamatum*) and occurs primarily on elevated alluvial benches, protected by topography from regular flooding. These sites may be subjected to some infrequent low-intensity flooding or inundation, which would tend to eliminate annual plants. Other shrubs including bush senecio (*Senecio flaccidus*), giant eriastrum (*Eriastrum densifolium* ssp. *densifolium*), and California buckwheat are present, but at lower densities. It is found in intermittently or rarely flooded, low-gradient alluvial deposits along washes, streams, and fans (Sawyer et al., 2009).

Tamarisk Thickets. This community is dominated by tamarisk (*Tamarix parviflora*) or saltcedar (*T. ramosissima*). Tamarisk is a type of woody shrub or small tree that invades desert washes and arid riparian areas throughout the western U.S. This vegetation grows in developed areas where the trees were likely planted to reduce wind erosion and also in low-lying areas, such as playas, where the water table is shallow, allowing the deep-rooted trees to persist. In the study area, this community largely consists of monotypic stands along the I-40/old Route 66 corridor. Native mesquites are also present in a few locations. Emerging tamarisk was observed in the Mojave River and in the vicinity of Newberry Springs and Troy Dry Lake.

Tamarisk mesquite thickets provide functional values similar to communities traditionally considered riparian because, although dry most of the time, these areas provide a slightly more mesic environment in the arid landscape. They are found in portions of the study area that experience seasonally ponded water or have access to shallow ground water, such as in the vicinities of the Mojave River and Troy Dry Lake.

Virgin River Brittle Brush Scrub. This community is found primarily on rocky hills and upland slopes and is dominated by Virgin River brittlebush. This vegetation type has similar structure and composition to Nevada joint fir scrub described above, except Virgin River brittlebush is the dominate species. It also has additional species present such as desert needlegrass and matchweed (*Gutierrezia sarothrae*). The canopy cover is generally open to intermittent with an herbaceous layer supporting seasonal annuals. Virgin River brittle brush scrub is most common in the granitic hills to the north of Rabbit Dry Lake.

White Bursage Scrub. This community is found primarily on rocky hills and upland slopes and is dominated by white bursage (*Ambrosia dumosa*). White bursage scrub supports many of the same species associated with creosote bush-white bursage scrub, although creosote bush is largely absent from the shrub canopy. The canopy cover is generally open to intermittent with an herbaceous layer supporting seasonal annuals. This community occurs intermittently across the study area and is most common in the granitic hills to the north of Rabbit Dry Lake, where it has extensive cover of chaparral yucca that is not present in other portions of the study area.

4.3.2 Other Cover Types

Basalt Rock. Basalt Rock lacks a dominance of vegetation and is characterized by volcanic rock outcrops and old lava flows. Vegetation, if present, is sparse and composed of annuals, perennials, and scattered creosote bush and desert tea. Basalt outcrops are common near the near the Pisgah Crater and along the I-40/old Route 66 corridor.

Carbonate Outcrops. Carbonate outcrops are associated with limestone deposits and are known to support a unique assemblage of plants, many of which are specialized and able to live on the substrate. Vegetation is often sparse and may include green ephedra (*E. viridis*), desert needle grass, chalk live forever's (*Dudleya* sps.), scarlet milkvetch (*Astragalus coccineus*), and a variety of annual flowers. Carbonate outcrops are limited to exposed areas in the San Bernardino Mountains.

Developed. Developed is a cover type used to describe areas that either have existing structures (i.e., houses and roads), railroads, or areas that are primarily devoid of vegetation due to continual disturbance by horses, vehicles, or other human causes. These areas typically lack vegetation, but may support weedy annuals or ornamental species that were intentionally planted. Developed lands occur throughout the study area.

Desert Pavement. This cover type is a distinctive feature widespread across arid lands in the Mojave Desert, and plays a role in important geomorphic, hydrologic, and ecologic processes. Where desert pavement predominates, infiltration is limited and rainfall is delivered as runoff to nearby bare ground areas where shrubs clusters (Wood et al., 2005). Desert pavement was not mapped, but occurs in a variety of locations across the study area.

Dry Lake Bed. This cover types is used to map portions of the survey area that cross unvegetated lake beds. They lack vegetation from the high saline levels and periodic inundation. Dry lake beds include Lake Lucerne and Rabbit Dry Lake. Dry lakes and degraded playas are also present along the I-40/old Route 66 corridor.

Open Water. This cover type is used to map portions of the survey area that cross permanent open water. Open water is present at the California aqueduct and at a large manmade pond near a private residence along the I-40/old Route 66 corridor.

Ruderal. Ruderal vegetation communities are dominated by herbaceous, introduced, pioneering plant species that readily colonize open disturbed soil and thrive as a result of human impacts. Ruderal species identified in the study area include Saharan mustard, summer mustard (*Hirshfeldia incana*), cheat grass, Mediterranean grass (*Schismus barbatus*), and Russian thistle. This community is common near existing pipeline routes, vacant lots near residential areas, and other areas with past disturbance.

Sandy Wash. This cover type is found in dry stream channels that have recently been scoured by floods. This cover type typically supports low densities of plant cover; however, in the absence of scouring flows or inundation these areas may develop more complex vegetation communities. Vegetation, when present, is composed primarily of annuals and perennials. Sandy wash is most common along portions of the Mojave River in the study area.

Soil Crusts. In arid and semi-arid lands, the cover of vegetation is often sparse or absent. The soil surface in open spaces between the higher plants is generally not bare of life, but covered by a community of highly specialized organisms. These communities are referred to as biological soil crusts, or cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts (Harper and Marble, 1988; West, 1990). They may constitute up to 70 percent of the living cover in some plant communities (Belnap, 1994). Biological soil crusts consist of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. Cyanobacterial and microfungal filaments weave throughout the top few millimeters of soil, "gluing" loose soil particles together and forming a matrix which stabilizes and protects soil surfaces from erosive forces (Cameron, 1966; Friedmann and Ocampo-Paus, 1976; Belnap and Gardner, 1993). Biological soil crusts conduct many important functions in arid and semi-arid lands. They protect soils from both wind and water erosion by binding the soil particles. Cyanobacteria and cyanolichens can be an important source of fixed nitrogen for plants and soils in desert ecosystems (Evans and Ehleringer, 1993). Soil crusts are common throughout the study area, particularly in undisturbed plant communities in the Barstow-Daggett area and Stoddard Valley.

4.4 Common Wildlife

4.4.1 Invertebrates

Desert ecosystems are known to support a broad group of invertebrate life. As in all ecosystems, invertebrates play a crucial role in a number of biological processes. Insects serve as the primary or secondary food source for a variety of bird, reptile, and mammal predators; they provide important pollination vectors for plant species; they act as efficient components in controlling pest populations; and they support the naturally occurring maintenance of an area by consuming detritus and contributing to necessary soil nutrients. The study area likely supports a wide variety of native and non-native invertebrates.

Desert fairy shrimp are known from saline lakes in the region and various species of gastropods (snails and slugs) can be associated with desert seeps and springs. In arid climates, such as that found in the Mojave Desert, fairy shrimp inhabit pools that may last from as little as three days to as long as four months, with much more variable levels of dissolved salts than found in pools in more humid climates (Brown and Carpelan, 1971). It is possible that during periods of heavy or prolonged rainfall, small depressions, road ruts, or gullies may support conditions that allow for the presence of common fairy shrimp. Rabbit Dry Lake and other nearby areas are known to support common fairy shrimp and other macroscopic invertebrates in wet years (Brown and Carpelan, 1971). These include giant fairy shrimp (*Branchinecta gigas*), alkali fairy shrimp (*B. mackini*), versatile fairy shrimp (*B. lindahli*), beavertail fairy

shrimp (*Thamnocephalusp latyurus*), and the longtail tadpole shrimp (*Triops longicaudatus*). None of these species have California or federal special status designations.

Native harvester ants (*Pogonomyrmex* spp.) occur throughout the region, and the proximity to rural residents in the Apple Valley may support non-native Argentine ants (*Linepithema humile,* formerly *Iridomyrmex humile*). The introduced Argentine ant is abundant in urban and agricultural lands throughout much of California, and invades into relatively mesic natural habitat such as along river courses and in some coastal lowlands (Ward, 2005). Desert areas are likely more resilient to invasion due to the low levels of soil moisture.

Insects known from the region include the common white (*Pontia protodice*), painted lady (*Vanessa cardui*), west coast lady (*V. annabella*), dainty sulphur (*Nathalis iole Boisduval*), desert marble (*Euchloe lotta Beutenmüller*), Lorquin's admiral *(Limenitis lorquini*), white-lined sphinx moth (*Hyles lineata*), and tarantula hawk (*Pepsis grossa*). Ford's swallowtail butterfly (*Papilio indra fordi*) has been recorded in the Granite Mountains.

4.4.2 Reptiles and Amphibians

The southwestern Mojave Desert supports a wide variety of reptiles and several amphibians. Most of the common snakes and lizards are widespread throughout the region, inhabiting desert scrubs, grasslands, and the scrub communities associated with the transition zones of the northern San Bernardino Mountains. Some reptiles, such as Mojave fringe-toed lizard and sidewinder (*Crotalus cerastes*), are more restricted to sand dunes or other specialized habitats, some of which are found along the I-40/old Route 66 corridor. Desert tortoise occurs in a variety of desert scrub and woodland habitats across the study area.

A variety of snakes and lizards were observed in the survey area. Great Basin whiptail (*Aspidoscelis tigris tigris*), western zebra-tailed lizard (*Callisaurus draconoides rhodostictus*), northern desert iguana (*Dipsosaurus dorsalis dorsalis*), southern desert horned lizard (*Phrynosoma platyrhinos calidiarum*), were found across the survey area. Desert spiny lizard (*Sceloporus magister*), western side-blotched lizard (*Uta stansburiana elegans*), Great Basin fence lizard (*Sceloporus occidentalis longipes*), collared lizard (*Crotaphytus bicintores*), and long-nosed leopard lizard (*Gambelia wislizenii*) were also detected. Chuckwalla (*Sauromalus ater*) was detected near rock outcrops, and desert night lizard (*Xantusia vigilis*) was found in association with Joshua trees and other yuccas.

Three species of rattlesnake were observed during surveys including sidewinder, speckled rattlesnake (*C. mitchellii*), and northern Mojave rattlesnake (C*. scutulatus scutulatus*). Other common desert snakes included Great Basin gopher snake (*Pituophis catenifer* ssp*. deserticola*), red racer (*Coluber flagellum piceus*), Mohave patch-nosed snake (*Salvadora hexalepis mojavensis*), Mohave shovel-nosed snake (*Chionactis occipitalis occipitalis*), and glossy snake (*Arizona elegans*). Although not widespread, riparian habitats at the Mojave River support common amphibians such as western toad (*Anaxyrus boreas*) and Pacific tree frog (*Pseudacris regilla*).

4.4.3 Fish

There are a number of sensitive fish in the Mojave Desert. Many of these are associated with seeps, springs, or other perennial water sources. Perennial water sources are limited in the study area and include Rabbit Springs and portions of the Mojave River north of Hesperia near the narrows and in the foothills of the San Bernardino Mountains. Arroyo chub (*Gila orcuttii*), a California species of special

concern, was introduced to the Mojave River but this occurrence is outside its known natural range. Mojave tui chub (*Siphateles bicolor mohavensis*) was historically known from the Mojave River; however, all natural occurrences are considered extirpated.

4.4.4 Birds

The southwestern Mojave Desert supports a wide range of both resident and migratory bird species. The study area is located within the Pacific Flyway, a very broad corridor stretching along the Pacific Coast from Mexico north to Alaska and into Siberia, Russia. The states of California and Nevada lie entirely within this large corridor (USFWS, 2014). Birds in the region include resident breeding birds, periodic migrants, and wintering species. The study area's location at the transition between the Mojave Desert and the San Bernardino Mountains, as well as the proximity to the Mojave River and desert mountain ranges with seeps and springs, results is a wide variety of habitats for both seasonal and year-round use. Over 200 bird species have been reported from the vicinity of the study area (eBird, 2014).

There are a number of factors that affect the type and the distribution of birds that occur in any given area. Some of these include the type and composition of habitat, the time of year, existing levels of anthropogenic disturbance, and proximity to areas that support high quality or important habitat types including areas mapped as important bird areas (IBAs). IBAs are areas that provide critical habitat to birds at some stage of their annual cycle, be it breeding, migration, or winter, and are identified through an international effort overseen by Birdlife International and coordinated by the National Audubon Society. The closest IBA to the study area is located on the middle stretch of the Mojave River, from Victorville to Helendale. This stretch supports the majority of riparian habitat associated with the Mojave River, and a wide bottomland of Fremont cottonwood-willow riparian woodland stretches for 15 miles in the otherwise arid region.

A variety of resident and migratory birds were detected in the study area. Some of these include burrowing owl (*Athene cunicularia*), verdin (*Auriparus flaviceps*), horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), and sage sparrow (*Amphispiza belli*). Possible migrant or wintering birds observed include Brewer's (*Spizella breweri*), chipping (*S. passerina*), and white-crowned sparrows (*Zonotrichia leucophrys*). Other species identified in the study area included LeConte's thrasher (*Toxostoma lecontei*), black-throated sparrow (*Amphispiza bilineata*), California quail (*Callipepla californica*), cactus wren (*Campylorhynchus brunneicapillus*), northern mockingbird (*Mimus polyglottos*), northern flicker (*Colaptes auratus*), and ladder-backed woodpecker (*Picoides scalaris*). Raptors were well represented and routinely observed. Common raptors included red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), and turkey vulture (*Cathartes aura*). Golden eagles were observed in flight above the study area.

4.4.5 Mammals

Desert mammals are widespread throughout the region and occur in a variety of different vegetation types. Creosote bush scrub and other desert scrub communities provide foraging and breeding habitat for many species including pocket mouse (*Perognathus* spp.), white-tailed antelope squirrel (*Ammospermophilus leucurus*), California ground squirrel, desert kangaroo rat (*Dipodomys deserti*), Merriam's kangaroo rat (*D. merriami*), desert cottontail (*Sylvilagus audubonii*), desert woodrat (*Neotoma lepida*), desert kit fox (*Vulpes macrotis*), and coyote (*Canis latrans*). California vole (*Microtus californicus*) and Botta's pocket gopher (*Thomomys bottae*) are also expected to occur in some areas,

such as the upper stream terraces of the Mojave River. American badger (*Taxidea taxus*) were detected in a number of locations, and appear to be more restricted to rural locations although they also likely persist in habitat along the margins of the San Gabriel Mountains. Wide-ranging carnivores such as bobcat mountain lion (*Puma concolor*) are also expected to occur. Nelson's big horn sheep (*Ovis canadensis nelsoni*) are known from the adjacent mountain ranges and likely cross the study area during periodic intermountain movements.

Juniper woodlands provide breeding and foraging habitat for many mammals such as gray fox (*Urocyon cinereoargenteus*), California ground squirrel (*Spermophilus beecheyi*), desert kangaroo rat, long-tail pocket mouse, pinyon mouse (*Peromyscus truei*), and possibly mule deer (*Odocoileus hemionus*). Joshua trees support a variety of similar wildlife and provide foraging and breeding habitat for cactus mouse (*P. eremicus*).

Several species of bats may forage over desert scrub and Joshua tree woodlands such as pallid bats (*Antrozous pallidus*), western pipistrelles (*Pipistrellus hesperus*), big free-tailed bat (*Nyctinomops macrotis*), western mastiff bat (*Eumops perotis*), Mexican free-tailed bat (*Tadarida brasiliensis*), and spotted bat (*Euderma maculatum*). A number of these species are likely associated with the Mojave River and large rock outcrops of the Granite and Ord mountains. The presence of mines, large trees, abandoned structures and outbuildings, and other structures on lands in the study area may provide potential roost sites for bats. Although bats and roosts were not identified during surveys, several species may forage in desert scrub and roost in the region.

Portions of the study area in proximity to urban development are frequented by domestic animals including house cat (*Felis catus*) and domestic dog (*Canis familiaris*). Ranches scattered within the study area support various livestock including cattle (*Bos taurus*), horses (*Equus ferus caballus*), and sheep (*Ovis aries*). Evidence of sheep grazing was noted in several locations in the West Lucerne Valley and Southern Apple Valley.

4.5 Special-Status Plants

Plant taxa are considered special-status species if they are classified as one or more of the following:

- Listed endangered or threatened, a candidate for listing, or proposed for listing under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA)
- Plants listed as rare under the California Native Plant Protection Act (NPPA)
- California Rare Plant Rank (CRPR) 1, 2, 3, and 4 species
- Plants covered under the BLM's WEMO
- Plants identified as Sensitive by the BLM

Rare plants are widely distributed in this portion of the Mojave Desert, and the study area includes several unique features known to support sensitive plants including sand fields near the Pisgah Crater, the Mojave Monkey Flower ACEC, carbonate soils within the foothills of the San Bernardino Mountains, and the floodplains of the Mojave River. A total of nine special-status plants were detected in the survey area during botanical surveys conducted from 2010 to 2014 (see Figure 4-3 for locations; Figure 4-3 is located at the end of this section), including:

- White-margined beardtongue (*Penstemon albomarginatus*), BLM Sensitive and CRPR 1B.1
- Small-flowered androstephium (*Androstephium breviflorum*), CRPR 2B.2

- Short-joint beavertail (*Opuntia basilaris* var. *brachyclada*), BLM Sensitive and CRPR 1B.2
- Booth's evening-primrose (*Eremothera* [*Camissonia] boothii* ssp*. boothii*), CRPR 2B.3
- Mojave menodora (*Menodora spinescens* var*. mohavensis*), BLM Sensitive and CRPR 1B.2
- Creamy blazing star (*Mentzelia tridentata*), BLM Sensitive and CRPR 1B.3
- Mojave Indian paintbrush (*Castilleja plagiotoma*), CRPR 4.3
- Utah vine milkweed (*Funastrum utahense* [*=Cynanchum utahense*]), CRPC 4.3
- Lemmon's syntrichopappus (*Syntrichopappus lemmonii*) CRPR 4.3

Several federally listed plants including Cushenbury oxytheca (*Acanthoscyphus parishii* var*. goodmaniana*), Cushenbury milk-vetch (*Astragalus albens*), San Bernardino Mountains bladderpod (*Lesquerella kingii* ssp. *bernardina*), Cushenbury buckwheat (*Eriogonum ovalifolium* var*. vineum*), and Parish's daisy (*Erigeron parishii*), are endemic to limestone substrates in the San Bernardino Mountains and northern foothills. Suitable limestone substrate is present in the extreme southern portion of the study area. No other State or federally listed plants are expected to occur in the study area.

Table 4-3 presents the special-status plants known from the region and summarizes their natural history and agency status.

Table 4-3. Special-Status Plants Known from the Study Area

Species	Status	Habitat and Distribution	Blooming Period
Abronia villosa var. aurita Chaparral sand-verbena	Federal – None State – None BLM – Sensitive CRPR – 1B.1	Annual or perennial herb; sand, about 250-5300 ft. elev; San Jacinto Mtns, Inland Empire, adjacent Colorado Desert, Orange & San Diego Counties; mostly alluvial fans and benches in W Riverside Co; dunes in deserts; not rare in the deserts	Feb–Jul
Acanthoscyphus parishii var*. goodmaniana* Cushenbury oxytheca	Federal – End State – None BLM – Sensitive CRPR – 1B.1	Annual; talus slopes with carbonate or sandy soils in pinyon/juniper woodlands; San Bernardino Mtns.	May–Oct
Androsace elongata ssp. acuta California androsace	Federal – None State – None BLM – None CRPR– 4.2	Annual; chaparral, coastal scrub, meadows, pinyon/juniper woodland, and grasslands; about 50-4000 ft. elev.; scattered locations throughout S Calif.	Mar–Jun
Androstephium breviflorum Pink funnel-lily, small-flowered androstephium	Federal – None State – None BLM – None CRPR – 2B.2	Bulb; Mojave Desert shrublands; stabilized dunes or sandfields, about 700-5300 ft. elev; scattered in Calif., N Arizona, S Nevada, to W Colorado	Mar –Apr
Astragalus albens Cushenbury milk-vetch	Federal – End State – None BLM – Sensitive CRPR – 1B.1	Perennial herb; usu. carbonate (rarely granitic) soils in Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland; about 3500-6600 ft elev. Endemic to San Bernardino Mtns and northern foothills.	Mar-Jun
Boechera dispar Pinyon rockcress	Federal – None State – None BLM – None CRPR – 2B.3	Perennial herb; coarse granitic soil, Joshua tree or pinyon-juniper woodland, desert shrubland; about 3900-8000 ft. elev.; Mojave Desert & adj Mtns.	Mar–Jun

Table 4-3. Special-Status Plants Known from the Study Area

Species	Status	Habitat and Distribution	Blooming Period
Boechera shockleyi Shockley's rockcress	Federal – None State – None BLM – WEMO CRPR – 2B.2	Perennial herb; carbonate or quartzite soil, pinyon-juniper woodland; about 2700-7300 ft. elev.; N slope of San Bernardino Mtns and disjunct to Inyo Co., Nevada, and Utah.	May–Jun
Calochortus palmeri var. palmeri Palmer's mariposa-lily	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Perennial bulb; meadows and seeps in chaparral and coniferous forest; about 3280-7840 ft. elev.in S. Calif. Mtns.	Apr-Jun
Calochortus striatus Alkali mariposa-lily	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.2	Bulb; alkaline meadows, seeps, saltbush scrub; about 200 - 5300 ft. elev.; Mojave Desert and adjacent margins of Transverse Ranges.	Apr–Jun
Canbya candida White pygmy-poppy	Federal – None State – None BLM – None CRPR – 4.2	Annual herb; sandy soils, about 1900-4000 ft. elev.; Joshua tree woodland, Mojave Desert shrubland, W Mojave Desert and surrounding mtn. foothills.	Mar –Jun
Castela emoryi Crucifixion thorn	Federal – None State – None BLM – WEMO CRPR – 2.3	Shrub; fine sand or silt, washes, plains, non-saline bottomlands, about 350-2100 ft. elev.; widespread but rare, Calif. deserts to Arizona, Baja, and Sonora; Mexico.	Jun–Jul
Castilleja plagiotoma Mojave Indian paintbrush	Federal – None State – None BLM – None CRPR– 4.3	Parasitic perennial herb; Joshua tree woodland, coniferous forest, and pinyon/juniper woodland; about 980-8200 ft. elev.; scattered locations in the mountains of S Calif.	Apr–Jun
Chorizanthe spinosa Mojave spineflower	Federal – None State – None BLM – None CRPR – 4.2	Annual; desert scrub, saltbush scrub, playas, and Joshua tree woodland; about 20-4300 ft. elev.; scattered locations throughout the W Mojave Desert.	Mar–Jul
Chorizanthe xanti var. leucotheca White-bracted spineflower	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Annual; sandy and gravelly soils in coastal scrub, desert scrub, and pinyon/juniper woodland; about 1000-3940 ft. elev.; coastal S Calif. and desert slope of the San Bernardino Mtns.	Apr–Jun
Cryptantha clokeyi Clokey's cryptantha	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Annual; desert scrub; from about 2400-4480 ft. elev.; Scattered locations throughout the Mojave Desert.	Apr
Cryptantha costata Ribbed cryptantha	Federal – None State – None BLM – None CRPR – 4.3	Annual; windblown and stabilized sand, desert shrublands; E Mojave and Sonoran Deserts , to Arizona & Baja; below sea level to about 1650 ft. elev.	Feb-May
Cymopterus deserticola Desert cymopterus	Federal – None State – None BLM –Sensitive, WEMO CRPR – 1B.2	Perennial herb; sandy soils in Joshua tree woodland and Mojave desert scrub; about 2070-4920 ft. elev.; known from Kern, Los Angeles, and San Bernardino Counties.	Mar–May
Cymopterus multinervatus Purple-nerve cymopterus	Federal – None State – None BLM – None CRPR – 2B.2	Perennial herb; desert shrubland, pinyon-juniper woodland; sandy or gravelly sites; about 2600-5900 ft. elev; San Bern Mtns, N and E to New York and Clark Mtns, to Utah and Texas	Mar–Apr

Table 4-3. Special-Status Plants Known from the Study Area

Species	Status	Habitat and Distribution	Blooming Period
Dudleya abramsii ssp. *affinis* San Bernardino Mountains dudleya	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Perennial herb, pebble plains & rock outcrops (often carbonate); about 5200-8500 ft. elev.; pinyon woodland, open pine forests in the San Bernardino Mtns.	Apr–Jun
Eremothera [Camissonia] boothii ssp. *boothii* Booth's evening-primrose	Federal – None State – None BLM – None CRPR – 2B.3	Annual; sandy washes in Joshua tree woodland and pinyon/juniper woodland; From about 2950-7880 ft. elev.; scattered locations in the Mojave Desert and the Owen's Valley.	Apr–Sep
Eriastrum harwoodii Harwood's woollystar	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Annual; partially stabilized desert dunes; about 900-1700 ft. elev.; San Bernardino, Riverside, and San Diego Counties.	Mar–Jun
Erigeron parishii Parish's daisy	Federal – THR State – None BLM – Sensitive, WEMO CRPR – 1B.1	Low perennial, mountain slopes, upper bajadas, washes; carbonate soils; about 2600-6600 ft. elev.; San Bernardino Mtns. and Joshua Tree Nat Park.	May–Aug
Eriogonum ovalifolium var. *vineum* Cushenbury buckwheat	Federal – END State – None BLM – Sensitive, WEMO CRPR – 1B.1	Matting woody perennial; carbonate soils, outcrops, and talus; about 4600-8000 ft. elev.; San Bernardino Mtns. endemic	May–Jun
Eriophyllum mohavense Barstow woolly sunflower	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.2	Annual; desert dunes, great basin scrub, and desert scrub; from about 1640-3150 ft. elev.; restricted to the W Mojave Desert of Calif.	Mar–May
Funastrum utahense (=Cynanchum utahense) Utah vine milkweed	Federal – None State – None BLM – None CRPR – 4.2	Climbing perennial herb; sandy or gravelly soils, about 500-4700 ft. elev.; E and S Mojave Des through JTNP and Anza-Borrego regions, to S Nevada, NW Arizona, and SW Utah.	Apr –Jun
Lesquerella (=Physaria) kingii ssp. *bernardina* San Bernardino Mountains bladderpod	Federal – END State – None BLM – Sensitive CRPR – 1B.1	Perennial herb; carbonate soils in lower montane coniferous forest, pinyon and juniper woodland, and subalpine coniferous forest. About 6,000-8,900 ft elev. Endemic to San Bernardino Mtns; known from approx. 5 occurrences in the Big Bear area.	May-Jun
Lupinus elatus Silky lupine	Federal – None State – None BLM – None CRPR – 4.3	Perennial herb; montane coniferous forest, about 4920-9840 ft. elev.; scattered occurrences in S Calif. Mtns.	Jun–Aug
Lupinus excubitus var. johnstonii Interior bush lupine	Federal – None State – None BLM – None CRPR – 4.3	Perennial herb; decomposed granite substrates in chaparral and coniferous forest; about 4920-8200 ft. elev.; restricted to the San Gabriel and San Bernardino Mtns.	May–Jul
Menodora spinescens var. mohavensis Mojave menodora	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Shrub; grows on Andesite gravel, rocky hillsides, and canyons in desert scrub; from about 2260-6560 ft. elev.; known from scattered occurences in San Bernardino and Riverside Counties.	Apr–May

Table 4-3. Special-Status Plants Known from the Study Area

Species	Status	Habitat and Distribution	Blooming Period
Mentzelia puberula Darlington's blazing star	Federal – None State – None BLM – None CRPR – 2B.2	Perennial herb; sandy and rocky substrates in Mojavean desert scrub and Sonoran desert scrub; from about 300-4200 ft. elev.; scattered locations in the deserts of San Bernardino and Riverside Cos.	Mar–May
Mentzelia tricuspis Spiny-hair blazing star	Federal – None State – None BLM – None CRPR – 2B.1	Annual; sandy and gravelly slopes and washes in Mojavean desert scrub; from about 500-4200 ft. elev.; known from widely scattered locations in S Calif. deserts.	Mar–May
Mentzelia tridentata Creamy blazing star	Federal – None State – None BLM – Sensitive CRPR – 1B.3	Annual; rocky, gravelly, and sandy areas in Mojavean desert scrub; from about 2300-3800 ft. elev.; widely scattered locations throughout S Calif.	Mar–May
Mimulus mohavensis Mojave monkeyflower	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.2	Annual; sandy or gravelly soils, often in washes, in Joshua tree woodland, and Mojavean desert scrub; from about 2000-4000 ft. elev.; Mojave Desert, primarily around Barstow and other surrounfing areas of San Bernardino County.	Apr–Jun
Monardella boydii Boyds monardella	Federal – None State – None BLM – Sensitive CRPR– 1B.2	Annual; Cracks in bedrock and in washes in Mojavean desert scrub, pinyon/juniper woodland, and riparian scrub; from about 4600-5400 ft. elev.; known only from Ord Mtn. in the Mojave Desert.	Aug–Oct
Muilla coronata Crowned muilla	Federal – None State – None BLM – None CRPR – 4.2	Perennial bulb; chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon/juniper woodland; from about 2200-6500 ft. elev.; scattered locations throughout the Mojave Desert and E into Nevada.	Mar–May
Opuntia basilaris var. brachyclada Short-joint beavertail	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.2	Succulent shrub; chaparral, Joshua tree woodland, pinyon/juniper woodland, and Mojavean desert scrub habitats; from about 4020-7500 ft. elev.; north side of the San Gabriel and San Bernardino Mtns.	Apr–Aug
Pediomelum castoreum Beaver Dam breadroot	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Perennial; sandy soils of washes and road cuts in Joshua tree woodland and desert scrub; from about 2000-5000 ft. elev.; Mojave Desert from the vicinity of Barstow E to the Nevada border.	Apr–May
Penstemon albomarginatus White-margined beardtongue	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.1	Perennial herb; desert dunes and Mojavean desert scrub habitats with sandy soils; from about 2100-3500 ft. elev.	Mar–May
Perideridia parishii ssp. *parishii* Parish's yampah	Federal – None State – None BLM – None CRPR – 2B.2	Perennial herb; meadows and seeps in coniferous forests on the San Bernardino Mtns.; from about 4800-9800 ft. elev.	Jun–Aug
Phacelia mohavensis Mojave phacelia	Federal – None State – None BLM – None CRPR – 4.3	Annual; sandy or gravelly soil; dry meadows and streambeds gen. Within pine forest, about 4500-8100 ft. elev.; San Gabriel & San Bernardino Mtns.	Apr–Aug

Table 4-3. Special-Status Plants Known from the Study Area

Species	Status	Habitat and Distribution	Blooming Period
Phacelia parishii Parish's phacelia	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.1	Annual; clay or alkali soils of playas in desert scrub of the Mojave Desert; from about 1800-4000 ft. elev.	Apr–Jul
Plagiobothrys parishii Parish's popcornflower	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.1	Annual; mesic alkali soils in Great Basin scrub and Joshua tree woodland of the Owens Valley and Mojave Desert; from about 2500-4600 ft. elev.	Mar–Nov
Puccinellia parishii Parish's alkali grass	Federal – None State – None BLM – Sensitive, WEMO CRPR – 1B.1	Annual; seeps and springs with alkali soils in the Mojave Desert. Known from very few locations in Calif., E to Colorado; from about 2300-3300 ft. elev.	Apr–May
Schoenus nigricans Black bog-rush	Federal – None State – None BLM – None CRPR – 2B.2	Perennial herb; alkali soils in marshes and swamps; scattered locations throughout S Calif.; from about 500-6500 ft. elev.	Aug–Sep
Scutellaria bolanderi ssp. austromontana Southern mountains skullcap	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Perennial herb; mesic habitats in chaparral, coniferous forests, and cismontane woodland; about 1400-6500 ft. elev.; S. Calif. Mtns	Jun–Aug
Sidalcea neomexicana Salt Spring checkerbloom	Federal – None State – None BLM – None CRPR – 2B.2	Perennial herb; mesic areas with alkali soils in chaparral, coniferous forest, coastal scrub, and desert scrub; scattered locations throughout S Calif.; from about 50-5000 ft. elev.	May–Jun
Symphyotrichum defoliatum San Bernardino aster	Federal – None State – None BLM – Sensitive CRPR – 1B.2	Perennial herb; meadows, seeps, springs, and other wet areas in coastal scrub, grasslands, chaparral and woodlands throughout S. Calif., about 5-6600 ft. elev.	Jul–Nov
Syntrichopappus lemmonii Lemmon's syntrichopappus	Federal – None State – None BLM – None CRPR – 4.3	Annual; chaparral, Joshua tree woodland, and pinyon/juniper woodland on the desert slopes of the transverse and peninsular ranges; from about 1600-6000 ft. elev.	Apr–Jun
Tripterocalyx micranthus Small-Flowered Sand-Verbena	Federal – None State – None BLM – Sensitive CRPR – 2B.3	Perennial herb; sandy soils in desert dunes and desert scrub in the Mojave Desert; from about 1800-2800 ft. elev.	Apr–May

Federal designations: (federal ESA, USFWS).

END: Federally listed, endangered.

THR: Federally listed, threatened.

State designations**:** (CESA, CDFW)

END: State listed, endangered.

THR: State listed, threatened.

California Rare Plant Rank (CRPR):

1A.– Presumed extinct in California

1B.– Rare or endangered in California and elsewhere

2A. – Presumed extinct in California, more common elsewhere

2B.– Rare or endangered in California, more common elsewhere

3.– Plants for which more information is needed (Review list)

4.– Plants of limited distribution (Watch List)

Threat Rank Extension:

0.1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

0.2 = Fairly endangered in California (20-80% occurrences threatened)

0.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)

BLM Sensitive = Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM Sensitive species also include all federal Candidate species and federal Delisted species which were so designated within the last 5 years, and CRPR 1B plant species that occur on BLM lands.

WEMO = Special-status species that were addressed in the Western Mojave Plan EIR/EIS due to management concerns within the WEMO Planning Area.

4.5.1 Listed Plants

Four federally listed plants have the potential to occur in the study area. These include Cushenbury oxytheca, Cushenbury milk-vetch, Parish's daisy, and Cushenbury buckwheat. These species are endemic to carbonate substrates in the San Bernardino Mountains. The only potential habitat for carbonate-endemic listed plants in the study area is located in the extreme southern portion on carbonate soils within the northern foothills of the San Bernardino Mountains. San Bernardino Mountains bladderpod, also a carbonate endemic listed plant, is only known from the Big Bear area outside of the study area. Federal listing actions have considered these plants as a group because they are restricted to carbonate soils in the San Bernardino Mountains and adjacent foothills and have extremely limited distributions. Designated critical habitat for each of these federally listed plants occurs within the San Bernardino National Forest, outside of the study area (see Figure 4-4).

Cushenbury Oxytheca. This variety is a small annual plant in the buckwheat family (Polygonaceae). It blooms from May to October. Cushenbury oxytheca occurs in scattered locations along the "carbonate belt" of the San Bernardino Mountains, from White Mountain in the west to Terrace Springs in the east; a known range of approximately 15 miles. (USFWS, 2009a)

Cushenbury oxytheca is typically found on carbonate soils in singleleaf pinyon-Utah juniper, singleleaf pinyon-mountain juniper, singleleaf pinyon, and canyon live oak woodlands. It occurs at elevations between approximately 4,700 to 7,800 feet amsl, and is typically associated with gently sloping terrain (USFWS, 2002). At the time of listing and critical habitat designation, Cushenbury oxytheca was known as *Oxytheca parishii* var. *goodmaniana*. The nomenclature was revised to *Acanthoscyphus parishii* var. *goodmaniana* in 2004 (USFWS, 2009a).

Cushenbury Milk-Vetch. This species is a small flowering plant in the pea family (Fabaceae). It is an annual (rarely perennial) that blooms from March to May. Cushenbury milk-vetch occurs in scattered locations along the carbonate belt of the San Bernardino Mountains, from Dry Canyon in the west southeast to Lone Valley. This species' known range encompasses approximately 15 miles. (USFWS, 2002)

Cushenbury milk-vetch is typically found on carbonate soils in singleleaf pinyon-Utah juniper, blackbush scrub, singleleaf pinyon, pinyon woodland, pinyon-juniper woodland, and Joshua tree woodland. It occurs on dry flats and slopes, and occasionally in rocky washes and disturbed sites. It is generally associated with gentle to moderate slopes between approximately 3,800 and 6,600 feet amsl. (USFWS, 2002)

Parish's Daisy. This species is a perennial herb in the aster family (Asteraceae). It blooms from May through June. Parish's daisy occurs in scattered locations along the carbonate belt of the San

Bernardino Mountains, from the northern flanks of White Mountain in the west to Pioneer Town in the east; a known range of approximately 35 miles. (USFWS, 2002)

Parish's daisy is typically found on carbonate soils in singleleaf pinyon-Utah juniper, blackbush scrub, singleleaf pinyon, pinyon-juniper woodland, and creosote bush-bursage scrub. It occurs on dry, rocky slopes, active washes, and outwash plains. Some occurrences are on granite-limestone interfaces. Parish's daisy occupies the lower elevations of the carbonate belt; between approximately 3,800 and 6,400 feet amsl, and is typically associated with flat or gently sloping terrain. (USFWS, 2002)

Cushenbury Buckwheat. This variety is a perennial plant in the buckwheat family (Polygonaceae). It blooms from May through August. Cushenbury buckwheat occurs in scattered locations along the carbonate belt of the San Bernardino Mountains, from White Mountain in the west to Rattlesnake Canyon in the east; a known range of approximately 25 miles. (USFWS, 2002)

Cushenbury buckwheat is typically found on carbonate soils in singleleaf pinyon-Utah juniper, singleleaf pinyon-mountain juniper, singleleaf pinyon, pinyon, pinyon-juniper, Joshua tree woodland, and blackbush scrub. It occurs on powdery soils with little canopy cover and organic material, in rocky areas. It is often associated with unstable talus, colluvium, or rock outcroppings. Cushenbury buckwheat has been found on gentle to steep slopes, usually with north or west aspects. It has been recorded between approximately 4,600 and 7,900 feet amsl. (USFWS, 2002)

4.5.2 BLM Sensitive and WEMO-Covered Plants

Alkali mariposa-lily (*Calochortus striatus*). Alkali mariposa-lily has a CRPR of 1B.2, is a BLM sensitive species, and is covered under the WEMO. It is a member of the lily family (Liliaceae) and typically blooms between April and June in years with adequate rainfall. Alkali mariposa-lily is known from Rabbit Springs (CDFW, 2014). Suitable dry lakebed habitat is present at several locations within the study area.

Crucifixion thorn (*Castela emoryi*). Crucifixion thorn has a CRPR of 2B.3 and is a covered species in the WEMO. It is a large conspicuous shrub in the quassia family (Simaroubaceae). It is known from several locations within the study area (CDFW, 2014).

Clokey's cryptantha (*Cryptantha clokeyi*). Clokey's cryptantha has a CRPR of 1B.2 and is a BLM sensitive species. It is a member of the borage family (Boraginaceae). It blooms in April, and is found in Mojavean desert scrub. It is known from rocky outcrop habitats in the Lucerne Valley.

San Bernardino Mountains dudleya (*Dudleya abramsii spp. affinis*). San Bernardino Mountains dudleya has a CRPR of 1B.2 and is a BLM sensitive species. It is a member of the stonecrop family (Crassulaceae). It blooms from April through July and is found on granitic, quartzite, or carbonate soils in pinyon-juniper woodland, montane coniferous forest, and pebble plain habitat. It has been reported from a limestone outcrop in the Ord Mountains near an old mine in the study area. Numerous dudleyas were observed in the foothills of the San Bernardino Mountains during surveys in 2014, including plants that appeared to key to desert dudleya (*Dudleya saxosa* ssp. *aloides*) and Southern California dudleya (*Dudleya lanceolata*). Although many of the dudleyas growing on the limestone outcrops were stunted and much smaller than those growing on different substrates, none of the dudleya observed keyed to San Bernardino Mountains dudleya. Comprehensive surveys were not conducted in 2014, and there is a high potential that it is present in this portion of the study area.

Harwood's woollystar (*Eriastrum harwoodii*). Harwood's woollystar has a CRPR of 1B.2 and is a BLM sensitive species. It is a member of the phlox family (Polemoniaceae). It blooms March through June,

and is found in desert dune habitat. It is known from sand dunes near the Pisgah Crater (CDFW, 2014). It has a high potential to occur in dune habitats in the northern and eastern portions of the study area.

Barstow woolly sunflower (*Eriophyllum mohavense*). Barstow woolly sunflower has a CRPR of 1B.2, is a BLM sensitive species, and is covered under the WEMO. It is a member of the sunflower family (Asteraceae). It blooms March through May, and is found in chenopod scrub, Mojavean desert scrub, and desert playas. It is known from several locations within the Barstow-Daggett area.

Mojave menodora (*Menodora spinescens* var*. mohavensis*). Mojave menodora has a CRPR of 1B.2 and is a BLM sensitive species. It is a member of the olive family (Oleaceae). It is a deciduous shrub that blooms April through May. It is found on volcanic gravel, rocky hillsides, and canyons in Mojavean desert scrub. This variety is known from several locations in the study area, including the Barstow-Daggett area (CDFW, 2014). It was found at eight locations in the survey area in Stoddard Valley, and many of these locations contained numerous individual plants. It was also observed on the rocky foothills of Daggett Ridge.

Creamy blazing star (*Mentzelia tridentata*). Creamy blazing star has a CRPR of 1B.3 and is a BLM sensitive species. It is a member of the stick-leaf family (Loasaceae). It blooms from March through May, and is found on rocky, gravelly, or sandy soils in Mojavean desert scrub. It is known from several locations in the Barstow-Daggett area, including one identified during surveys in 2014.

Mojave monkeyflower (*Mimulus mohavensis*). Mojave monkeyflower has a CRPR of 1B.2, is a BLM sensitive species, and is covered under the WEMO. It is a member of the lopseed family (Phrymaceae). It is endemic to the Mojave Desert in California. It is most abundant around Barstow, and there are numerous smaller occurrences as far south as the Victorville area, east of the Mojave River (MacKay, no date). It generally occurs on the margins of desert washes, in sandy or gravelly soils above the active channels. Like many desert annuals, its numbers seem to fluctuate widely from one year to another. It is unlikely to come up in drought years, but even in years of average or higher rainfall, it sometimes cannot be found at known sites. Within the study area, it has been recorded in numerous locations in the Barstow-Daggett area.

Short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*). Short-joint beavertail has a CRPR of 1B.2, is a BLM sensitive species, and is covered under the WEMO. It is a member of the cactus family (Cactaceae). It is a low cactus with grayish green stems and no spines or tubercles. It is a variety of the common beavertail cactus, distinguished by the stem joints which are relatively short and conspicuously cylindrical rather than flattened. Short-jointed beavertail and common beavertail commonly intergrade in several areas, and the two varieties are “weakly differentiated” (Parfitt and Baker, 1993). Short-jointed beavertail generally flowers in May or June, but can be identified year-round by its stem shape. It is known from desert shrublands and pinyon and juniper woodlands in the southwestern portion of the study area (CDFW, 2014). During surveys in 2014, several short-joint beavertail cacti were observed just west of the California aqueduct. Numerous beavertail cacti were also observed in other locations of the southwestern survey area, but these plants appeared to be the common beavertail cactus. It may be interspersed with common beavertail cactus at many locations.

Beaver Dam breadroot (*Pediomelum castoreum*). Beaver Dam breadroot has a CRPR of 1B.2 and is a BLM sensitive species. It is a member of the pea family (Fabaceae). It blooms April through May, and is found in sandy soil in washes and roadcuts in Joshua tree woodland and Mojavean desert scrub. It is known from several historic locations in the Barstow-Daggett area.

White-margined beardtongue (*Penstemon albomarginatus*). White-margined beardtongue has a CRPR of 1B.1, is a BLM sensitive species, and is covered under the WEMO. It is a member of the plantain family (Plantaginaceae). It blooms from March through May, and is found on stabilized desert dunes and sandy soils in Mojavean desert scrub. White-margined beardtongue is typically found in open sandy soils that are not regularly disturbed. It is known from numerous locations in the sand dunes to the north of Pisgah Crater and along the I-40/old Route 66 corridor.

Small-Flowered sand-verbena (*Tripterocalyx micranthus*). Small-flowered sand-verbena has a CRPR of 2B.3 and is a BLM sensitive species. It is a member of the four o'clock family (Nyctaginaceae). It has been reported from sandy soils near the Pisgah Crater and along the I-40/old Route 66 corridor.

4.5.3 Other Special-Status Plants

Small-flowered androstephium (*Androstephium breviflorum*). Small-flowered androstephium has a CRPR of 2B.2 and is a member of the brodiaea family (Themidaceae). It is relatively rare in California, but is found throughout the western United States. It blooms from March through April. Small-flowered androstephium is found in sandy soils on desert dunes and bajadas in Mojavean desert scrub and is often in association with the more common desert lily (*Hesperocallis undulata*). It is known from numerous locations on sandy soils north of the Pisgah Crater Lava Field. Approximately eight small-flowered androstephium were found in the survey area along the I-40/old Route 66 corridor. More plants are likely to be present in the same area, as several additional dried stems from previous years' growth were observed.

Pinyon rockcress (*Boechera dispar*). Pinyon rockcress has a CRPR of 2B.3 and is a member of the mustard family (Brassicaceae). It blooms from March through June, and is found on granitic, gravelly soils in Joshua tree woodland, Mojavean desert scrub, and pinyon-juniper woodland. It has been reported from numerous locations in the southern portion of the study area, most recently in 2011 on a limestone outcrop in the Ord Mountains.

Purple-nerve cymopterus (*Cymopterus multinervatus*). Purple-nerve cymopterus has a CRPR of 2B.2 and is a member of the celery family (Apiaceae). It blooms from March through April, and is found on sandy or gravelly soils in Mojavean desert scrub and pinyon-juniper woodland. Several occurrences are recorded in the West Lucerne Valley and along the I-40/old Route 66 corridor (CDFW, 2014).

Booth's evening-primrose (*Eremothera* [*Camissonia*] *boothii* spp. *boothii*). Booth's evening-primrose has a CRPR of 2B.3 and is an annual herb within the evening-primrose (Onagraceae) family. It blooms April through September, and is found in creosote scrub, Joshua tree woodland, and pinyon-juniper woodland. It is known from numerous locations along the Mojave River. It was observed during botanical surveys in 2013, where the survey area crosses the Mojave River.

4.5.4 CRPR 3 and 4 Plants

Several other special-status plants with a CRPR of 3 or 4 also occur in the study area or have a high potential to occur. These species have a limited distribution in California but are not considered rare; the CRPR 3 and 4 designations indicate that the plant is on a "watch list" and more information is needed.

Lemmon's syntrichopappus (*Syntrichopappus lemmonii*). Lemmon's syntrichopappus is a CRPR 4.3 species that occurs in Kern, Los Angeles, Monterey, Riverside, and San Bernardino counties within an elevation range of 1,640 to 6,000 ft. It is an annual that blooms in April and May and can be found in

chaparral, Joshua tree woodland, and pinyon and juniper woodlands within sandy or gravelly soils. This species was observed in the southern portion of the study area at a single location along an access road on an exposed ridgeline with sandy soils, mapped as California buckwheat scrub. It is known from numerous locations in the foothills of the San Bernardino Mountains and in the Hesperia area (CCH, 2014).

Mojave Indian paintbrush (*Castilleja plagiotoma*). Mojave Indian paintbrush is a CRPR 4.3 species that occurs in Kern, Los Angeles, San Bernardino, and possibly San Luis Obispo counties between roughly 980 and 8,200 feet. It is a hemi-parasitic perennial herb that grows in Great Basin scrub, Joshua tree woodland, lower montane coniferous forest, and pinyon and juniper woodland habitats. It was observed during surveys at several locations mapped as California buckwheat scrub in the southern portion of the study area. It is known from numerous locations in the southern portion of the study area (CCH, 2014).

Utah vine milkweed (*Funastrum utahense*). Utah vine milkweed is a CRPR List 4.2 species. It is a perennial herb found in the Mojave Desert in San Bernardino County and in the Colorado Desert in Riverside, Imperial, and San Diego Counties. This species also occurs in Arizona, Nevada, and Utah (CNPS, 2014). In California, its habitat is sandy and gravelly soils, often in washes climbing up through shrubs. It was observed during surveys in Stoddard Valley, and along the I-40/old Route 66 corridor.

Silky lupine (*Lupinus elatus*). Silky lupine is a CRPR 4.3 species that occurs in the lower and upper montane coniferous forests of Ventura, Los Angeles, and San Bernardino counties. It is a perennial herb that blooms from June to August. In the study area, it is known from one location in the foothills of the San Bernardino Mountains (CCH, 2014).

Interior bush lupine (*Lupinus excubitus* var*. johnstonii*). Interior bush lupine is a CRPR 4.3 species that grows on decomposed granite in chaparral and lower montane coniferous forests of Los Angeles and San Bernardino counties. It is a perennial herb that blooms from May to July. It is known from several locations in the foothills of the San Bernardino Mountains (CCH, 2014). Although this variety was not observed during surveys, the more common bush lupine (*L. e.* var. *austromontanus*) was observed at several locations in the foothills and in the Ord Mountains. It is possible that some individuals of the more common variety may exhibit traits of the sensitive variety and thus could be treated as the sensitive species.

Crowned muilla (*Muilla coronata*). Crowned muilla is a CNPS List 4.2 species that occurs in the deserts of Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties east into Nevada. It can be found in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodlands at elevations of 2,510 to 6,430 feet. It is a bulbiferous herb that blooms from March to April (CNPS, 2014). Suitable habitat is present throughout the study area.

White pygmy poppy (*Canbya candida*). White pygmy poppy is a CRPR 4.2 species that occurs in Joshua tree woodlands, desert scrub, and juniper woodlands from Inyo County south to Imperial County. It is found at elevations of roughly 1,900 to 5,000 feet. It is an annual species thats germination is strongly related to rainfall, and it usually blooms early in the season from March to June. It may not be found on a site for several years when rainfall in low, but in average or high rainfall years it may be plentiful at the same site. It is known from several locations in the study area. (CCH, 2014).

California androsace (*Androsace elongata* ssp. *acuta*). California androsace is a CRPR 4.2 species that is known from scattered locations throughout much of California. It is an annual that grows in a variety of habitat including grasslands and meadows, cismontane and juniper woodlands, and chaparral from

approximately 490 to 4,000 feet. It blooms between March and June, and is known from several locations in the study area.

Mojave spineflower (*Chorizanthe spinosa*). Mojave spineflower is a CRPR 4.2 species known from Kern, Los Angeles, and San Bernardino Counties. It is an annual that grows in chenopod scrub, Joshua tree woodland, desert scrub, and playas. It blooms from March through July. In the study area, it is known from one location near Hesperia (CCH, 2014).

4.5.5 Cacti, Yucca, and Native Trees

Seven species of cacti were observed in the survey area. Beavertail cactus, silver cholla (*Cylindropuntia echinocarpa*), and pencil cholla (*C. ramosissima*) were common. Engelmann hedgehog cactus (*Echinocereus engelmannii*), California barrel cactus (*Ferocactus cylindraceus*), fishhook cactus (*Mammillaria tetrancistra*), and clustered barrel cactus (*Echinocactus polycephalus* var. *polycephalus*) were found in rocky soils and desert pavement.

Native trees and yucca are widely distributed in the study area. Honey mesquite (*Prosopis glandulosa* var. *torreyana*), screwbean mesquite (*P. pubescens*), and catclaw acacia were observed in wash areas. Other riparian species, including willows, were limited to mesic soils in the foothills of the San Bernardino Mountains and near the Mojave River. Joshua trees occur in many locations, and in some areas form the dominant vegetation community (see Figure 4-2).

4.6 Special-Status Wildlife

Special-status taxa (*Taxon* [plural, *taxa*] refers to a specific taxonomic entity, such as a species or subspecies) include those listed as threatened or endangered under the ESA or CESA, taxa proposed for listing, Species of Special Concern, and other taxa which have been identified by the USFWS, and CDFW, and BLM as sensitive species. Figure 4-3 illustrates the known locations of special-status wildlife occurring within the study area. Table 4-4 presents the special-status wildlife known from the region and summarizes their natural history and agency status.

Table 4-4. Special-Status Wildlife Known from the Study Area

Species	Status	Habitat
Invertebrates		
Euchloe hyantis andrewsi Andrew's marble butterfly	Federal: None BLM: None State: S1	Rocky canyons, cliffs, moraines, gravelly flats of lower montane coniferous forest. Host plant is endangered slender pedaled mustard (*Thelypodium stenopetalum)*. Endemic to San Bernardino Mtns at elev. of 5,000-7,000 feet.
Helminthoglypta mohaveana Victorville shoulderband snail	Federal: None BLM: None State: S1	Among granite boulders and at the base of rocky cliffs; known only from along the Mojave River in San Bernardino County.
Helminthoglypta taylori Westfork shoulderband	Federal: None BLM: None State: S1	Under logs and leaves in the vicinity of the Mojave River.
Hydroporus simplex Simple hydroporus diving beetle	Federal: None BLM: None State: S1?	Aquatic habitats in Tuolumne and San Bernardino counties.

Table 4-4. Special-Status Wildlife Known from the Study Area		
Species	**Status**	**Habitat**
Plebulina emigdionis San Emigdio blue butterfly	Federal: None BLM: None State: S1S2	Montane desert regions of southern Calif. from Inyo County southwest through the Mojave Desert and Southern Sierra Nevada to Los Angeles County. Host plant is fourwing saltbush (*Atriplex canescens*).
Psychomastax deserticola Desert monkey grasshopper	Federal: None BLM: None State: S1S2	Chaparral dominated communities; esp. chamise (*Adenostoma fasciculatum*). Arid environments in the vicinity of the San Bernardino Mtns.
Fish		
Gila orcuttii Arroyo chub	Federal: None BLM: None State: S2, SSC	Primarily in warm streams of the Los Angeles Plain. Inhabits sandy and muddy bottoms in flowing pools and runs of head-waters creeks and small to medium rivers generally deeper than 40 cm. Often found in intermittent streams. Introduced population in Mojave River apparently hybridized with Mojave tui chub (Moyle, 1995).
Siphateles bicolor mohavensis Mohave tui chub	Federal: END BLM: WEMO State: S1, END, FP	Lakes, isolated springs, sloughs, sluggish rivers, and backwaters of swift streams. Require quiet water with estab-lished aquatic vegetation and substrates containing sand or other fine materials. Historically occurred in the Mojave River from the confluence of the east and west forks at the base of the San Bernardino Mtns downstream to Soda Dry Lake. The only surviving natural population is found in Soda Springs at Zzyzx near Baker, Calif. Currently, two additional introduced populations exist in the Lark Seep at the China Lake Naval Air Weapons Center and Camp Cady.
Amphibians		
Anaxyrus californicus (=*Bufo californicus*) Arroyo toad	Federal: END BLM: None State: S2S3, SSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash; rivers with sandy banks, willows, cottonwoods, or sycamores. Coastal and desert drainages in central and southern Calif., and Baja Calif., México.
Batrachoseps gabrieli San Gabriel slender salamander	Federal: None BLM: None State: S2	Talus slopes surrounded by a variety of conifer and montane hardwood species, including big cone spruce, pine, white fir, incense cedar, canyon live oak, black oak, and Calif. laurel; often near a stream. At elevations from 2,800-7,800 feet (850-2,380 meters) Found in at least 13 locations, from San Gabriel Cyn in the E San Gabriel Mtns to Kimbark and Waterman Cyn in the extreme W San Bernardino Mtns.
Ensatina klauberi Large-blotched salamander	Federal: None BLM: None State: S2S3, SSC	Moist areas of forested habitats in the San Bernardino, San Gabriel, San Jacinto and Transverse Mtns of So. Calif.
Spea hammondii Western spadefoot	Fed: None BLM: Sensitive State: S3; SSC	Primarily grasslands but can be found in valley-foothill hard-wood woodlands, sage scrubs, and chaparral where pooled or ponded water remains through early spring (April/May). Vernal pools, stock ponds, and road pools are essential for breeding, egg-laying, and larval development. Redding south through the Great Valley and assoc. foothills, South Coast Ranges into coastal southern Calif. south of the Transverse Mtns. and west of the Peninsular Mtns., into northwest Baja Calif.

Table 4-4. Special-Status Wildlife Known from the Study Area		
Species	**Status**	**Habitat**
Taricha torosa torosa Coast Range newt	Fed: None BLM: None State: S4; SSC	Breeds in ponds, reservoirs, streams; terrestrial individuals occupy various adjacent upland habitats, including grasslands, woodlands, and forests. Coast and coast range Mtns. from Mendocino Co. south to San Diego Co., disjunct pop. in southern Sierra Nevada.
Reptiles		
Actinemys (*Emys*) *marmorata* Western pond turtle	Federal: None BLM: Sensitive, WEMO State: S3, SSC	Ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking. May enter brackish water and even seawater. From British Columbia south through Washington, W Calif., to N Baja Calif., and Mexico.
Anniella pulchra pulchra Silvery legless lizard	Federal: None BLM: None State: S3, SSC	Sandy or loose loamy soils under sparse vegetation; soil moisture is essential; prefer soils with high moisture content. Nearly endemic to Calif.; elevation range extends from near sea level on the Monterey Peninsula to approximately 1,800 meters above sea level in the Sierra Nevada foothills.
Aspidoscelis tigris stejnegeri Coastal whiptail	Federal: None BLM: None State: S2S3	Deserts and semi-arid areas with sparse vegetation and open areas; also found in woodland and riparian habitats; substrates may be firm soil, sandy, or rocky. Coastal So. Calif.
Charina trivirgata (=*Lichanura trivirgata*) Rosy boa	Federal: None BLM: None State: S3S4	Rocky chaparral and desert shrubland; generally below about 4,500 ft. elev; S. Calif. through Baja Calif., SW Arizona, and western Sonora
Diadophis punctatus modestus San Bernardino ringneck snake	Federal: None BLM: None State: S2?	Moist habitats, including wet meadows, rocky hillsides, gardens, farmland, grassland, chaparral, mixed coniferous forests, woodlands. So Calif. coast from Santa Barbara south along the coast to San Diego Co, and inland into the San Bernardino Mtns.
Gopherus agassizii Desert tortoise	Federal: THR BLM: Sensitive, WEMO State: S2, THR	Desert shrublands where soil suitable for burrows; Mojave and Sonoran deserts (E Calif., S Nevada, W Arizona, and Sonora, Mexico)
Heloderma suspectum cinctum Banded gila monster	Federal: None BLM: Sensitive State: S1, SSC	Rocky outcrops in desert shrubland; scarce in scattered eastern mountain ranges of Calif. deserts; to S Nevada, W Arizona, and mainland Mexico.
Lampropeltis zonata California mountain kingsnake	Federal: None BLM: Sensitive State: S2?, SSC	Diverse habitats including coniferous forest, oak-pine woodlands, riparian woodland, chaparral, manzanita, and coastal sage scrub. Wooded areas near a stream with rock outcrops, talus or rotting logs that are exposed to the sun. From near sea level along the south coast, to 9,000 ft. (2750 m) on Mt. San Jacinto. From northern Baja Calif., to southern Washington.
Phrynosoma blainvillii Coast horned lizard	Federal: None BLM: Sensitive, WEMO State: S3S4, SSC	Coastal sage scrub and chaparral in arid and semi-arid climate zones; prefers friable, rocky, or shallow sandy soils; requires native ant food source. Pacific coast and some inland locales from Shasta Reservoir south to Baja Calif., Mexico. Elev. from sea level to 8,000 ft. (2,438 m).

Table 4-4. Special-Status Wildlife Known from the Study Area		
Species	**Status**	**Habitat**
Thamnophis hammondii Two-striped garter snake	Federal: None BLM: Sensitive State: S2, SSC	Highly aquatic; found in or near permanent fresh water; often along streams with rocky beds and riparian growth. Monterey Co. south along coast to So. Calif. where it ranges east through the Transverse Ranges and south through the Peninsular Ranges into northern Baja Calif., Mexico; at elev. From sea level to approx. 7,000 ft.
Uma scoparia Mojave fringe-toed lizard	Federal: None BLM: Sensitive, WEMO State: S3S4, SSC	Sand, especially dunes, sandy hummocks, washes, stabilized sand flats; below sea level to about 3000 ft. elev; Death Valley, SW to Antelope Valley and SE to W Arizona
Birds		
Accipiter cooperii Cooper's hawk	Federal: None BLM: None State: S3, WL (nesting)	Nests and hunts in forest & woodland, also forages in open areas; most of U.S., Central and South America.
Accipiter gentilis Northern goshawk	Fed: None BLM: Sensitive State: S3; SSC (nesting)	Nests in old growth stands of conifer and conifer/hardwood forests. Breeds from mountains of N and W Washington south through Oregon and Calif., incl. Mtns. of Ventura Co.
Accipiter striatus Sharp-shinned hawk	Fed: None BLM: None State: S3; WL (nesting)	Prefers, but not restricted to riparian habitats; breeds in ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats; requires north-facing slopes with perches; also forages in open areas; regularly winters in S Calif.
Agelaius tricolor Tricolored blackbird	Fed: BCC BLM: Sensitive State: S1S2; SSC (nesting)	Highly colonial species; requires open water, protected nesting substrate, and foraging areas with insect prey within a few kilometers of colony. Breeds locally west of Cascade Range, Sierra Nevada, and SE deserts from Humboldt and Shasta counties south to extreme SW San Bernardino Co., W Riverside Co., and W and S San Diego Co.
Aquila chrysaetos Golden eagle	Fed: BCC; Eagle Protection Act BLM: Sensitive, WEMO State: S3, WL, FP (nesting & wintering)	Nests in remote trees and cliffs; forages over shrublands and grasslands; breeds throughout W N America, winters to east coast
Artemisiospiza belli Bell's sage sparrow	Fed: BCC BLM: None State: S2?; WL	Nests in dense stands of shrubs in chaparral, sagebrush, alkali desert scrub, desert scrub, and similar habitats. Year-round resident in S Calif.
Asio flammeus Short-eared owl	Fed: None BLM: None State: S3; SSC (nesting)	Breeds in marshes and densely vegetated wetlands, forages over open wetlands, ag fields, and grasslands; temperate N & S America, Eurasia
Asio otus Long-eared owl	Fed: None BLM: None State: S3?; SSC (nesting)	Breed in riparian woodlands; forage (nocturnally) over open land; sea level to about 6000 ft. elev.; through N America and Eurasia
Athene cunicularia (=*Speotyto cunicularia*) Burrowing owl	Federal: BCC BLM: Sensitive, WEMO State: S3; SSC (burrow sites and some wintering sites)	Nests mainly in rodent burrows, usually in open grassland or shrubland; forages in open habitat; increasingly uncommon in S Calif.; occurs through W U.S. and Mexico

Table 4-4. Special-Status Wildlife Known from the Study Area

Species	Status	Habitat
Buteo regalis Ferruginous hawk	Federal: BCC BLM: WEMO State: S3S4; WL (wintering)	Forages over grassland and shrubland; winters in W and SW N Amer (breeds in Great Basin and N plains)
Buteo swainsonii Swainson's hawk	Federal: BCC BLM: Sensitive State: S3, THR (nesting)	Breeds in trees in open habitats (e.g. grassland), Central Valley (Calif) and east to central U.S., S Canada, N Mexico; winters in S America. A few nesting records in W Mojave Desert (e.g., Lancaster area)
Chaetura vauxi Vaux's swift	Fed: None BLM: None State: S2S3; SSC (nesting)	Breeds central Calif. and northward, in coastal and montane forests; winters in Central and S America
Charadrius nivosus (*C. alexandrines*) Western snowy plover	Fed: BCC[1] BLM: WEMO State: S2; SSC (nesting)	Nests on the ground, mainly in the open on sandy coastal beaches, barrier islands, barren shores of inland saline lakes, and on river bars. Also now uses man-made, agricultural wastewater ponds and reservoir margins in the interior, dredge spoils on the coast, and salt evaporation ponds on the coast and in the interior.
Charadrius montanus Mountain plover	Federal: BCC BLM: Sensitive State: S2?, SSC (wintering)	Short sparse grasslands, plowed fields, open sagebrush and foothill valley floors; winter through west Calif. and south into Mexico, primarily in Sacramento, San Joaquin, and Imperial Valleys.
Circus cyaneus Northern harrier	Fed: None BLM: None State: S3; SSC (nesting)	Breeds colonially in grasslands and wetlands; forages over open terrain; N America and Eurasia
Coccyzus americanus occidentalis Western yellow-billed cuckoo	Fed: THR; BCC BLM: Sensitive, WEMO State: S1; END (nesting)	Nests along the broad, lower flood-bottoms of larger river systems; also nests in riparian forests and riparian jungles of willow often mixed with cottonwoods, with an understory of blackberry, nettles, or wild grape. Formerly widespread, breeding now restricted to isolated sites in Sacramento, Amaragosa, Kern, Santa Ana, and Colorado river valleys in Calif.
Elanus leucurus White-tailed kite	Fed: None BLM: Sensitive State: S3; FP (nesting)	Typically nests at lower elevations in riparian trees, including oaks, willows, and cottonwoods; forages over open country.
Empidonax traillii extimus Southwestern willow flycatcher	Fed: END BLM: Sensitive, WEMO State: S1; END (nesting)	Breeds in riparian woodlands in southern Calif. Critical habitat for this species is present at Deep Creek and at the Mojave Narrows.
Eremophila alpestris actia California horned lark	Federal: None BLM: None State: S3, WL	Variety of open habitats, usually where trees and large shrubs are absent. Found from grasslands along the coast and deserts near sea level to alpine dwarf-shrub habitat above tree line. Less common in mountain regions, on the N Coast, and in coniferous or chaparral habitats. In winter, flocks in desert lowlands.
Falco columbarius Merlin	Fed: None BLM: None State: S3; WL (wintering)	Uncommon in winter in S Calif. desert and valleys (breeds in northern N America and Eurasia)

Table 4-4. Special-Status Wildlife Known from the Study Area

Species	Status	Habitat
Falco mexicanus Prairie falcon	Fed: BCC BLM: WEMO State: S4; WL (nesting)	Nests on high cliffs, forages primarily over open lands; occurs throughout arid western U.S. and Mexico
Falco peregrinus American Peregrine falcon	Fed: BCC BLM: None State: S3S4; FP (nesting)	Nests on high cliffs, generally near water bodies; feed on birds (esp. shorebirds & waterfowl); widespread but rare worldwide
Gymnogyps californianus California condor	Fed: END State: END; FP	Nests in caves, crevices, behind rock slabs, or on large ledges on high sandstone cliffs; requires vast expanses of open savannah, grasslands, and foothill chaparral with cliffs, large trees and snags for roosting and nesting.
Haliaeetus leucocephalus Bald eagle	Federal: BCC, Eagle Protection Act BLM: Sensitive State: S2, END, FP (nesting & wintering)	Estuaries, large lakes, reservoirs, rivers, and some seacoasts. In winter, congregate near open water in tall trees.
Icteria virens Yellow-breasted chat	Fed: None BLM: WEMO State: S3; SSC (nesting)	Breeds in dense riparian habitat, gen. below about 4500 ft.; much of US; becoming rare in Calif. due to cowbirds and habitat loss; winters from tropical Mexico to Panama
Lanius ludovicianus Loggerhead shrike	Fed: BCC BLM: None State: S4; SSC (nesting)	Woodlands, shrublands, open areas with scattered perch sites; not dense forest; widespread in N America; valley floors to about 7000 ft. elev.
Myiarchus tyrannulus Brown-crested flycatcher	Fed: None BLM: WEMO State: S2S3; WL (nesting)	Arid lands in areas with cacti or large trees. Breeds in S Calif., S Nevada, central Arizona, and S Texas southward.
Oreothlypis luciae (=*Vermivora luciae*) Lucy's warbler	Federal: BCC BLM: Sensitive State: S2S3, SSC (nesting)	Cavity-nesting species; breeds in desert riparian woodlands through much of Arizona; winters on Pacific Coast of mainland Mexico
Pandion haliaetus Osprey	Fed: None BLM: None State: S3; WL (nesting)	Nests in northern N America and Mexican coastlines near large water bodies, preys primarily on fish; winters in central Calif to S America.
Pelecanus erythrohynchos American white pelican	Federal: None BLM: None State: S1, SSC (nesting colony)	In breeding season, found mostly inland, nesting on isolated islands in lakes and feeding on shallow lakes, rivers, and marshes, which may be far from nesting sites. Also breed locally on coastal islands. Winter mainly along coasts, in shallow, protected bays and estuaries, and on large lakes in warm climates. Migrating flocks rest on lakes and rivers along the way.
Piranga rubra Summer tanager	Federal: None BLM: WEMO State: S2, SSC (nesting)	Breeds in lowland forests and woodlands, S half of US; N Mexico; winters S Mexico to S America
Polioptila melanura Black-tailed gnatcatcher	Federal: None BLM: None State: S4	Desert shrublands, gen. nests in shrub thickets along washes; occas. in open scrub (esp. in winter); Calif. deserts, to W Texas, Baja, and central Mexico
Pyrocephalus rubinus Vermilion flycatcher	Federal: None BLM: WEMO State: S2S3, SSC (nesting)	Desert riparian woodlands and shrublands; SE Calif., east through S Texas, and S through Mexico; winters in Mexico

Table 4-4. Special-Status Wildlife Known from the Study Area		
Species	**Status**	**Habitat**
Riparia riparia Bank swallow	Federal: None BLM: Sensitive State: S2S3, THR (nesting)	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert; requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, or the ocean to dig a nesting hole. CDFW considers it extirpated as a breeder in S Calif.
Setophagia (*Dendroica*) *petechia* Yellow warbler	Fed: BCC BLM: WEMO State: S3S4; SSC (nesting)	Riparian plant associations; prefers willows, cottonwoods, aspens, sycamores, and alders for nesting and foraging. In Calif., primarily riparian woodland or forest dominated by cottonwoods and willows.
Toxostoma bendirei Bendire's thrasher	Federal: BCC BLM: Sensitive, WEMO State: S3, SSC	Joshua tree woodland, desert scrub; high cactus cover; mainly E Mojave Desert in Calif. (scarce in W Mojave); American SW and mainland Mexico; winters in S Arizona, New Mexico, and mainland Mexico
Toxostoma crissale Crissal thrasher	Federal: None BLM: None State: S3, SSC	Nests in dense, low, brushy thickets of mesquite or other desert riparian shrubs; Sonoran Desert, E Mojave Desert to Texas, W mainland Mexico
Toxostoma lecontei Le Conte's thrasher	Federal: BCC BLM: WEMO State: S3, SSC	Calif. deserts, SW Central Valley & Owens Valley, E to Utah, Arizona; open shrubland, often sandy or alkaline flats
Vireo bellii pusillus Least Bell's vireo	Fed: END BLM: Sensitive State: S2; END (nesting)	Summer resident of southern Calif. in low riparian habitats in vicinity of water or dry river bottoms; found below 2000 ft; nests placed along margins of bushes or on twigs projecting into pathways, usually willow, mesquite, or mulefat.
Vireo vicinior Gray vireo	Federal: BCC BLM: Sensitive, WEMO State: S2, SSC (nesting)	Found in arid pinyon-juniper, and juniper, woodlands and chaparral habitats from 600-2,000 meters.
Mammals		
Antrozous pallidus Pallid bat	Fed: None BLM: Sensitive State: S3; SSC	Desert, grassland, shrubland, woodland, forest; most common in open, dry habitats with rocky areas for roosting; mostly below about 6000 ft. elev. Calif., SW N America through interior Oregon and Washington; hibernates in winter.
Bassariscus astutus Ring-tail	Fed: None BLM: None State: FP	Chaparral, coastal sage scrub, riparian scrub, oak woodlands, and riparian woodlands in proximity to permanent water.
Chaetodipus fallax pallidus Pallid San Diego pocket mouse	Federal: None BLM: None State: S3S4, SSC	Coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland. Sandy herbaceous areas, usually in association with rocks or course gravel in southwestern California.
Corynorhinus townsendii (=*Plecotus townsendii*) Townsend's big-eared bat	Fed: None BLM: Sensitive State: S2S3; Candidate THR, SSC	Many habitats throughout Calif. and W N America, scattered populations in E; day roosts in caves, tunnels, mines; feed primarily on moths.
Euderma maculatum Spotted bat	Fed: None BLM: Sensitive State: S2S3; SSC	Desert (cool seasons) to pine forest (summer), much of SW N America but very rare; roosts in deep crevices in cliffs, feeds on moths captured over open water.
Eumops perotis californicus Western mastiff bat	Fed: None BLM: Sensitive State: S3?; SSC	Lowlands (with rare exceptions); central and S Calif., S Arizona, NM, SW Texas, N Mexico; roost in deep rock crevices, forage over wide area.

Table 4-4. Special-Status Wildlife Known from the Study Area		
Species	**Status**	**Habitat**
Lasionycteris noctivagans Silver-haired bat	Federal: None BLM: None State: S3S4	Coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. Range is generally below 9,000 ft (2,750 m). Roosts in hollow trees, snags, buildings, rock crevices, and caves, and under bark.
Macrotus californicus (=*M. waterhousii*) California leaf-nosed bat	Fed: None BLM: Sensitive State: S2S3; SSC	Arid lowlands, S Calif., S and W Arizona, Baja Calif. and Sonora, Mexico; roost in mineshafts, forage over open shrublands
Microtus californicus mohavensis Mohave river vole	Federal: None BLM: WEMO State: S1, SSC	Moist habitats including meadows, freshwater marshes, pond edges, along irrigation canals, and irrigated pastures in the vicinity of the Mojave River.
Myotis ciliolabrum Western small-footed myotis	Federal: None BLM: Sensitive State: S2S3	Wide variety of habitats, primarily in relatively arid wooded and brushy uplands near water.
Myotis evotis Long-eared myotis	Federal: None BLM: Sensitive State: S4?	Semiarid shrublands, sage, chaparral, and agricultural areas, but usually associated with coniferous forests. Individuals roost under exfoliating tree bark, and in hollow trees, caves, mines, cliff crevices, sinkholes, and rocky outcrops on the ground. They also sometimes roost in buildings and under bridges.
Myotis thysanodes Fringed myotis	Federal: None BLM: Sensitive State: S4	Most common in drier woodlands (oak, pinyon-juniper, ponderosa pine) but is found in a wide variety of habitats including desert scrub, mesic coniferous forest, grassland, and sage-grass steppe.
Myotis velifer Cave myotis	Federal: None BLM: Sensitive State: S1, SSC	Primarily at lower elevations (the Sonoran and Transition life zones) of the arid southwest, in areas dominated by creosote bush, palo verde, brittlebush, and cactus. In Calif., only occurs along the Colorado River.
Myotis volans Long-legged myotis	Federal: None BLM: None State: S4?	Primarily coniferous forests, but also occurs seasonally in riparian and desert habitats. Uses abandoned buildings, cracks in the ground, cliff crevices, exfoliating tree bark, and hollows within snags as summer day roosts; caves and mine tunnels as hibernacula.
Myotis yumanensis Yuma myotis	Federal: None BLM: Sensitive State: S4?	Usually associated with permanent sources of water, typically rivers and streams, but also use tinajas in the arid West. Occurs in a variety of habitats including riparian, arid scrublands and deserts, and forests. Roosts in bridges, buildings, cliff crevices, caves, mines, and trees.
Nyctinomops femorosaccus (=*Tadarida femorosaccus*) Pocketed free-tailed bat	Federal: None BLM: None State: S2S3, SSC	Deserts and arid lowlands, SW U.S., Baja Calif., mainland Mexico; Roost mainly in crevices of high cliffs; forage over water and open shrubland.
Nyctinomops macrotis (=*Tadarida molossa*) Big free-tailed bat	Federal: None BLM: None State: S2, SSC	Roosts in crevices of rocky cliffs, scattered localities in W N America through Central America; ranges widely from roost sites; often forages over water. Variety of habitats incl. desert scrub, woodlands, and evergreen forests. Rare in Calif.
Ovis canadensis nelsoni Nelson's bighorn sheep	Federal: None BLM: Sensitive, WEMO State: S3, FP	Open, rocky, steep areas with access to water and herbaceous vegetation.
Taxidea taxus American badger	Fed: None BLM: None State: S4; SSC	Mountains, deserts, interior valleys where burrowing animals are avail as prey and soil permits digging; throughout cent and W N America.

Table 4-4. Special-Status Wildlife Known from the Study Area		
Species	**Status**	**Habitat**
Vulpes macrotis arsipus Desert kit fox	Federal: None BLM: None State: None	Widespread, open desert lands; constructs below-ground dens; requires soil suitable for burrowing; primarily nocturnal; preys on small mammals.
Xerospermophilus mohavensis Mohave ground squirrel	Federal: None BLM: Sensitive, WEMO State: S2S3, THR	Mojave desert scrub, alkali scrub, and Joshua tree woodland between 1,800-5,000 ft. Sandy to gravelly soils.
Xerospermophilus tereticaudus chlorus Palm Springs round-tailed ground squirrel	Federal: None BLM: Sensitive State: S1S2, SSC	Widespread in Calif. deserts, Coachella Valley to Death Valley; formerly considered endemic to mesquite and sandy habitats in Coachella Valley.

Note(s):

1. The Pacific coast population of the western snowy plover is federally listed as threatened. The Pacific coast population is defined as those individuals that nest adjacent to or near tidal waters, and includes all nesting colonies on the mainland coast, peninsulas, offshore islands, adjacent bays, and estuaries (USFWS, 1993). The western snowy plovers in the study area are of the interior population, and are not listed under the ESA or CESA.

4.6.1 Invertebrates

Special-status invertebrates were not detected during surveys; however, portions of the study area have the potential to support shoulderband snails. Shoulderband snails are a group of pulmonate (air-breathing) snails that can occur in areas with suitable micro-habitat such as rock or debris piles, dead vegetation, or small drainages where soil moisture persists. Victorville shoulderband snail (*Helminthoglypta mohaveana*) and westfork shoulderband (*H. taylori*) are known from the vicinity of the Mojave River. Although not formally listed under the CESA or ESA or designated as California Species of Special Concern, these species are rare and worthy of consideration and are tracked by the CNDDB as Special Animals.

San Emigdio blue butterfly (*Plebulina emigdionis*) is also tracked by the CNDDB as a Special Animal and is known from the region, the nearest records being from the Mojave River in Victorville. Its host plant, fourwing saltbush (*Atriplex canescens*), occurs in scattered locations throughout the study area. The Ford's swallowtail butterfly (*Papilio indra fordi*) has no special status and is not tracked in the CNDDB; however, it is a rare butterfly known from the Granite Mountains. Its primary host plant is Panamint spring parsley (*Cymopterus panamintensis acutifolius*).

4.6.2 Amphibians

Arroyo Toad (*Anaxyrus californicus*)

The arroyo toad is federally listed as endangered and a California Species of Special Concern. Its distribution extends from the upper Salinas River system in San Luis Obispo County south into coastal Baja California, and eastward to several desert locations (Jennings and Hayes, 1994). Adults are primarily nocturnal and usually active from the first major rains in January and February until early August (Cunningham, 1962).

Arroyo toads require overflow pools adjacent to the inflow channel of streams that are relatively free of predators. Shallow pools with sandy or gravely bottoms surrounded by little woody vegetation are preferred. Regular disturbance in the form of flooding is required to maintain areas of sparsely

vegetated, sandy stream channels and terraces, which are used by adults and subadults for foraging and burrowing (USFWS, 2001). Outside the breeding season, arroyo toads use a wide range of habitats in both upland (to a distance of at least 3,740 feet from the upland-riparian ecotone) and riparian areas (Holland and Sisk, 2001). Upland habitats used by arroyo toads include alluvial scrub, coastal sage scrub, chaparral, oak woodland, grassland, riparian, and agricultural land (Griffin, 1999; USFWS, 2011a).

The arroyo toad is endemic to California, and has been extirpated from approximately 75 percent of its historic range (USFWS, 2009b). Significant factors in the decline of the arroyo toad are loss of habitat to agriculture and urbanization, changes in the hydrological regime of streams and rivers, and predation from introduced aquatic species. Other threats to remaining populations are disturbances in and near aquatic habitats (e.g., campgrounds, OHV use), placer mining, and cattle grazing. Fire and drought have also produced severe declines in populations that were already stressed (Jennings and Hayes, 1994).

Potential habitat for arroyo toad in the study area includes the Mojave River and associated riparian habitats. Designated critical habitat is located upstream of the study area (see Figure 4-4). Arroyo toads were not detected during protocol surveys conducted in 2013 within the study area, although a population is known to occur approximately one mile south of the survey area. Focused surveys in this location identified one adult arroyo toad. Tadpoles and egg strings were not detected, although suitable breeding habitat was identified (SCE, 2013).

4.6.3 Reptiles

Agassiz's Desert Tortoise (*Gopherus agassizii*)

The Agassiz's desert tortoise is a State-listed threatened species and the Mojave population (west of the Colorado River) is federally listed as threatened. Critical habitat for this species was established February 8, 1994.

The desert tortoise is a large slow growing herbivorous reptile that is well adapted to a variable and often harsh desert environment (USFWS, 2011b). In the U.S., the desert tortoise's range includes portions of the Mojave and Sonoran desert regions of southern California, southern Nevada, southwestern Utah, and western Arizona. In Mexico, the species is found throughout most of Sonora and into portions Sinaloa. Based on genetic differences, there are two recognized populations of desert tortoise in the U.S.; these include the Mojave and Sonoran populations (USFWS, 2011b). Although the species often look similar, the differentiation between the Mojave and Sonoran assemblages of the desert tortoise are supported via multiple forms of evidence, including morphology, ecology, and genetics (Weinstein and Berry, 1987; Lamb et al., 1989; Lamb and Lydehard, 1994; Berry et al., 2002; Van Devender, 2002a; 2002b; Murphy et al., 2007). The Mojave population includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California (a division of the Sonoran Desert).

The Mojave population is further classified by recovery units. The USFWS 2011 *Revised Recovery Plan for the Mojave Population of the Desert Tortoise* (USFWS, 2011b) identifies five recovery units for the Mojave population of desert tortoise. These include the Upper Virgin River; Northeastern Mojave; Eastern Mojave; Western Mojave; and Colorado Desert. Although the recovery unit designation does not provide special legal protection, the USFWS defines recovery units as special units that are geographically identifiable and are essential to the recovery of the entire listed population (i.e.,

recovery units are individually necessary to conserve the genetic, behavioral, morphological, and ecological diversity necessary for long-term sustainability of the entire listed population) (USFWS, 2011b). The study area is located in the Western Mojave Recovery Unit. Within this recovery unit, there are three designated critical habitat units: Superior-Cronese, Fremont-Kramer, and Ord-Rodman. The Ord-Rodman critical habitat unit is also a designated DWMA. Portions of the study area are located in the Ord-Rodman critical habitat unit/DWMA (see Figure 4-4).

During inactive periods, tortoises hibernate, aestivate, or rest in subterranean burrows or caliche caves, spending as much as 98 percent of their time underground (Marlow, 1979; Nagy and Medica, 1986). During active periods, they usually spend nights and the hotter portion of the day in their burrow. However, desert tortoise activity is seasonally variable and peak adult and juvenile activity typically coincides with the greatest annual forage availability during the early spring and summer. Studies conducted at Fort Erwin in 2010-2011 detected that desert tortoises can be active during winter months. In this study, 9.8 percent (37 of 377) of desert tortoises displayed some winter activity, and 11 were active on more than one occasion. Desert tortoise were identified above ground in small numbers equally between December and January, and between January and February; these are typically the coldest months of the year (USGS, 2011).

Desert tortoise is a long-lived species that requires 13 to 20 years to reach sexual maturity. It has low reproductive rates during a long period of reproductive potential, and individuals experience relatively high mortality early in life (USFWS, 2011b). Mating often begins in late March or early April but can occur during the spring, summer, or fall (Black, 1976; Rostal et al., 1994). Eggs are laid in late May to July and hatch after approximately three to four months (Stebbins, 2003; Zeiner et al., 1988). Multiple clutches (two or rarely three) occur in favorable years (Stebbins, 2003). Low rainfall and consequent scarcity of plants may result in reproductive failure for desert tortoise (Zeiner et al., 1988).

Tortoise activities are primarily concentrated in core areas within home ranges. Although adult males may be aggressive toward each other during the breeding season, there can be a great deal of overlap in individual home ranges. Annual home range sizes have been estimated between 10 and 450 acres. Home range size depends on tortoise age and sex, the season, and the density of resources in the area. More than 1.5 square miles of habitat may be required to meet the life history needs of a single tortoise. Individuals have been known to travel seven miles or more at a time in search of resources (BLM, 2002). During drought years, the availability of drinking water, in the form of surface water following rain storms, may be crucial for tortoise survival. During droughts, tortoises may be required to forage over larger areas, increasing the likelihood of encounters with sources of injury or mortality, including humans and predators.

Desert tortoise habitat includes many landforms and vegetation types of the Mojave and Sonoran Deserts, except the most precipitous slopes. Alluvial fans and upper bajadas are often considered important habitat areas. Friable soils, such as sand and fine gravel, are important for burrow excavation and nesting, and the availability of suitable soils is a limiting factor to desert tortoise distribution. Another important functional component that characterizes desert tortoise habitat is the availability of preferred forage, particularly annual forbs, native grasses, and cacti. While many species of plants are taken, forbs are preferred over grasses and green vegetation is preferred over dry (Zeiner et al., 1988). Some of the preferred forage species for desert tortoises in the Mojave Desert are various species of milk-vetch (*Astragalus* spp.), primrose (*Camissonia* spp.), spurges (*Euphorbia* spp.), lotus (*Lotus* spp.), and wishbone bush (*Mirabilis* spp.) (Jennings, 1993).

Desert tortoise population trends have been difficult to discern. The USFWS (2011b) reviews population monitoring efforts dating back to the 1980s, and concludes that available data provide qualitative (not quantitative) insight to range-wide trends, and show appreciable declines at the local level in some areas. A more formal and consistent range-wide monitoring study was initiated in 2001, but no range-wide trend has been identified over that period.

Desert tortoise have several natural predators including common ravens, desert kit fox, American badgers, roadrunners (*Geococcyx californianus*), and coyotes. Bobcats and mountain lions are also known to prey on tortoises. A variety of birds prey on desert tortoise including red-tailed hawks, golden eagles, loggerhead shrikes (*Lanius ludovicianus*), American kestrels (*Falco sparvarius*), and burrowing owls (Boarman, 1993). Birds typically prey upon two to three-inch long juveniles, which have a thin, delicate shell (USFWS, 1994). In addition, non-native species, including dogs, are a known source of mortality for desert tortoise (USFWS, 2011b).

Desert tortoise populations are threatened by several factors, each of which tends to be exacerbated by the others and most of which are associated with human land uses and other human activities. Most threats identified in the 1980s as the basis for state and federal listing continue to affect tortoise populations today. Habitat degradation and loss due to land use conversion, grazing, mining, energy development, and transportation projects have all contributed to declining tortoise numbers and fragmented populations. OHV use degrades habitat and causes direct mortality from vehicle collision or crushed burrows. Desert tortoises are also vulnerable to vehicle collisions on roads and highways. Drought, habitat degradation, and associated weed invasion lead to reduced nutrient quality of food plants; this increases desert tortoise susceptibility to upper respiratory tract disease, and possibly other diseases, which can be fatal and transmittable among populations. Juvenile tortoises are vulnerable to predation by ravens, and both juvenile and adult tortoises are preyed upon by coyotes and domestic and feral dogs.

Infrastructure development and urbanization creates perch sites and food and water sources for ravens, and typically increases the numbers of dogs and coyotes in a given area, which tend to elevate predation pressure on tortoises. Other factors affecting tortoises and their habitat include illegal collecting, vandalism, livestock grazing, feral burros, invasive non-native plants, changes to natural fire regimes, and environmental contaminants. Habitat fragmentation and development can isolate tortoise populations, further increasing risk of disease and reducing genetic diversity. This range of threats can kill or indirectly affect desert tortoises and their habitat, but little is known about the relative contribution each threat makes to tortoise demography. Current recovery planning focuses on expanding the knowledge of individual threats and places emphasis on understanding their multiple and combined effects on tortoise populations.

Protocol surveys for desert tortoise were conducted in most of the biological survey area in May to July of 2012, May to June of 2013, and from April to May of 2014. Surveys were conducted within suitable habitat, and included the general survey corridor plus a 1,000-foot buffer zone (SCE, 2013; SCE, 2014). Surveys were not conducted in the urbanized Hesperia area or several other areas where habitat quality was considered poor.

Desert tortoise or their sign (e.g., live tortoise, active and inactive burrows, tracks, scat, and carcasses) were detected throughout the surveyed area. Habitat modeling conducted for the Desert Renewable Energy Conservation Plan (DRECP) indicate relatively high quality habitat in most of the study area, except for developed areas around Hesperia and along the foothills of the San Bernardino Mountains (see Figure 4-5). The highest concentrations of desert tortoises detected during the survey effort for

the formerly proposed CLTP were located between Camp Rock Road and SR 247. Abundant sign was also found in Stoddard Valley, along SR 247 outside of the OHV area (22 live desert tortoises, 39 carcasses, 206 potential tortoise burrows, and 39 tortoise scats). Other areas with plentiful sign included the I-40/old Route 66 corridor near the Pisgah Crater and in the Barstow-Daggett area (SCE, 2013).

Mojave Fringe-Toed Lizard (*Uma scoparia*)

Mojave fringe-toed lizard is a BLM sensitive species and a California Species of Special Concern. Mojave fringe-toed lizards are known almost exclusively from California, primarily in San Bernardino and eastern Riverside counties, but are also found to the north in southeastern Inyo County and historically to the west in eastern Los Angeles County (Jennings and Hayes, 1994). Murphy et al. (2006) identified two genetic lineages of this species; the northern lineage is associated with the Amargosa River drainage system, and the southern with the Mojave River drainage system, Bristol Trough, Clark's Pass (including Palen Lake and Pinto Wash), and the Colorado River sand transport systems.

Mojave fringe-toed lizard is found in arid, sandy, sparsely vegetated habitats and is associated with creosote scrub throughout much of its range (Norris, 1958; Jennings and Hayes, 1994). This species is restricted to habitats containing fine, loose, aeolian (windblown) sand, typically with sand grains no larger than 0.375 mm in diameter (Turner et al., 1984; Jennings and Hayes, 1994; Stebbins, 1944). It burrows in the sand to avoid predators and to thermoregulate (Stebbins, 1944), and will also seek shelter in rodent burrows. Sand dunes are the primary habitat for this species, although it can also be found on the margins of dry lakebeds and washes and in isolated pockets against hillsides (BLM, 2005). The most important factor in this species' habitat is the presence of fine aeolian sands.

Mojave fringe-toed lizards are found across the Mojave and northern Colorado deserts, but its distribution is highly fragmented. Aeolian sand habitat is patchily distributed (Murphy et al., 2006); many local populations occur on modest patches of sand and are quite small. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from habitat disturbance and fragmentation as well as stochastic events (Murphy et al., 2006). Aeolian sand habitat is a fragile ecosystem requiring protection against both direct and indirect disturbances (Weaver, 1981; Beatley, 1994; Barrows, 1996). Environmental changes that stabilize sand, affect sand sources, or block sand movement corridors will also affect this species (Turner et al., 1984; Jennings and Hayes, 1994). Threats to this species include habitat loss or damage from urban development, OHV use, and agriculture as well as disruption of sand source, wind transport, or sand transport corridors. Development can also increase predator access to occupied habitat.

This species is known to occur near the Pisgah Crater and along the eastern portion of the I-40/old Route 66 corridor in the study area. The Mojave Fringe-Toed Lizard ACEC is located just north of the study area. Mojave fringe-toed lizards were not observed during surveys conducted for the former CLTP (SCE, 2013).

Coast (*Blainville's*) Horned Lizard (*Phrynosoma blainvillii*)

Coast horned lizard is a BLM sensitive species and a California Species of Special Concern. It ranges from Butte County to San Diego County and throughout the central and southern California coast. The coast horned lizard can live in a variety of habitats from the coast to the mountains, including woodland, valley-foothill riparian, grassland, and desert. Sufficient populations of native ants must be

present, as this is the main food source for coast horned lizards. This lizard is often associated with loose, sandy soils that it uses for refuge and thermoregulation (CDFG, 2000).

Potential habitat for this species occurs throughout the study area. Several historic occurrences exist in the southern portion of the study area, and one coast horned lizard was observed in this area during surveys (SCE, 2013).

Rosy Boa (*Charina [= Lichanura] trivirgata*)

The rosy boa is tracked by the CDFW as a special animal in the CNDDB. It occurs in rocky shrublands and desert shrubland from sea level to approximately 6,700 feet in elevation. In coastal regions, it is found south and west of the major mountain chains, in the interior valleys and mountains of Los Angeles, Riverside, San Bernardino, and Orange counties, southward to the coast in San Diego County and Baja California. In the deserts, rosy boas range throughout most of the Mojave Desert and much of the Colorado Desert, eastward into Arizona. This species is active during warm seasons, and is primarily nocturnal. Potential habitat occurs throughout the study area.

California Mountain Kingsnake (*Lampropeltis zonata*)

California mountain kingsnake is a BLM sensitive species and a California Species of Special Concern. It ranges from southern Washington south to northern Baja California, and occupies a diverse assemblage of habitats including coniferous forests, oak-pine woodlands, riparian woodland, chaparral, manzanita, and coastal sage scrub. Portions of the study area in the foothills of the San Bernardino Mountains support habitat for this species.

4.6.4 Birds

Bendire's Thrasher (*Toxostoma bendirei*)

The Bendire's thrasher is a BLM sensitive species, a USFWS bird of conservation concern, and a California Species of Special Concern. In California, Bendire's thrashers are known from scattered locations in Kern, Inyo, San Bernardino, and Riverside counties, with one occurrence in San Diego County (Sterling, 2008). In the Mojave Desert, this species favors desert scrub habitat, primarily in areas that contain Joshua tree, Mojave yucca, and large cholla cacti or other succulents (Sterling, 2008).

Population status is not well understood. This species withdraws from the northern part of its range in the winter, and distribution during breeding is inconsistent. Bendire's thrasher forages mainly on the ground, feeding on arthropods, seeds, and berries. Threats to this species include loss of habitat due to urbanization and agricultural development, harvesting of yuccas and cacti, and OHV activity (Sterling, 2008). Bendire's thrasher is secretive and much remains to be learned about feeding, breeding, and migratory behavior, as well as the extent of its range (American Bird Conservancy, 2010).

Desert scrub and Joshua tree woodland within the study area provide suitable habitat for the Bendire's thrasher. The Bendire's Thrasher Conservation Area is also designated within the study area (see Figure 4-1). Focused surveys for special-status birds were conducted in April, May, and September of 2012, June of 2013, and April of 2014. Three Bendire's thrashers were observed along Camp Rock Road (SCE, 2013).

Burrowing Owl (*Athene cunicularia*)

The burrowing owl is a BLM sensitive species, a USFWS bird of conservation concern, and a California Species of Special Concern. It inhabits arid lands throughout much of the western U.S. and southern interior of western Canada (Poulin et al., 2011). In this portion of its range, some owls are migratory, while some are year-round residents. Burrowing owls prefer flat, open annual or perennial grassland or gentle slopes and spare shrub or tree cover. However, they are routinely found in desert shrub communities that are present in the study area.

Burrowing owls are unique among the North American owls in that they nest and roost in abandoned burrows, especially those created by ground squirrels, kit fox, desert tortoise, and other wildlife. Burrowing owls have a strong affinity for previously occupied nesting and wintering habitats. Burrowing owls often return to burrows used in previous years, especially if they were successful at reproducing there in previous years (Gervais et al., 2008). The breeding season in southern California generally occurs from February to August with peak breeding activity from April through July (Poulin et al., 2011).

In the Mojave Desert, this species has declined due to loss and fragmentation of habitat, diminished food supply, and predation of eggs and young. Burrowing owl habitat is found throughout the study area and numerous records exist in the region. Focused surveys for this species were conducted in 2012, 2013, and 2014, from May to July, May to June, and April to May, respectively. Surveys were conducted concurrently with desert tortoise surveys (SCE, 2013; SCE, 2014). Burrowing owls and burrows (with whitewash, pellets, or feathers) were detected in all areas surveyed (i.e., all survey corridors with the exception of the urbanized Hesperia and Apple Valley areas). In total, eight owls were observed and 97 burrows documented (SCE, 2013; SCE 2014). Burrowing owls and active burrows could be present across most of the study area in areas of suitable habitat that have not been surveyed. However, the probability of burrowing owl occurrence decreases in the urbanized areas of Apple Valley and Hesperia.

Golden Eagle (*Aquila chrysaetos*)

Golden eagle is a BLM sensitive species and a USFWS bird of conservation concern. It is federally protected under the Bald and Golden Eagle Protection Act (BGEPA) and considered a fully protected species by the State of California.

Golden eagles are year-round residents throughout most of their range in the western U.S., including the study area. In the southwest, they are more common during winter when eagles that nest in Canada migrate south into the region. They breed from late January through August, mainly during late winter and early spring in the California deserts. In the desert, they generally nest in steep, rugged terrain, often on sites with overhanging ledges, cliffs, or large trees that are used as cover. Eagles have also been documented nesting on T/L towers. Golden eagles are wide-ranging predators, especially outside of the nesting season, when they have no need to return daily to tend eggs or young at their nests. Foraging habitat consists of open terrain including grasslands, deserts, savanna, and early successional forest and shrubland habitats. They prey primarily on rabbits and rodents, but will take other mammals, birds, reptiles, and some carrion.

Golden eagle nesting territories generally comprise several nests within an area that can vary in size from about 8 to 13 square miles (DRECP, 2014). In any given year, eagles may initiate nesting behavior at one nest, without any activity at the other nests. Eagles may complete breeding by laying eggs and

raising chicks, or may abandon the nest without successfully raising young. In any given year, all or most nests in a territory may be inactive, but eagles may return in future years to nest at previously inactive sites.

BLM has identified "Key Raptor Areas" occupied by golden eagles in the study area, including the Granite and Newberry Mountains and Stoddard and Daggett Ridges (*Ibid*). BLM data indicate multiple nests in the Granite Mountains, Stoddard Ridge, Sidewinder Mountain, Daggett Ridge, Goat Mountains, Ord Mountains, and Elephant Mountains. Four golden eagles were observed near the Granite and Ord Mountains during surveys for the former CLTP, and a nest was documented on a transmission tower near Daggett Ridge. An active golden eagle nest was also observed in 2014 at White Horse Mountain (J. Trow, pers. comm.). There are 68 known golden eagle nests in 15 to 21 territories within the study area; 7 nests in 6 territories were occupied in 2012 and 1 was occupied in 2014 (SCE, 2014). BLM estimates nine occupied eagle territories are currently in the study area. Known nesting locations in the region were also investigated during surveys for the former CLTP. Of the 85 historic nesting sites identify by BLM, 10 sites were active, 27 were inactive, 32 sites had missing nests, and 16 nests could not be located (SCE, 2013). The majority of the study area, with the exception of the most urbanized areas to the south, provide foraging habitat for golden eagles.

Swainson's Hawk (*Buteo swainsoni*)

Swainson's hawk is listed as threatened under CESA, is considered a bird of conservation concern by USFWS, and is a BLM sensitive species. It is a migratory raptor that breeds in open plains and prairies in the Great Plains and relatively arid areas of western North America, including the Central Valley and the western Mojave Desert. It winters in South America, primarily in Argentina. During the spring and fall migration seasons, Swainson's hawks are observed regularly in southern California.

Suitable nesting habitat is present in the study area; however, this species is not known to currently nest in this region. Several historic nesting records exist in Victorville and Adelanto, but the nearest current breeding locations are over 50 miles to the west near Lancaster, and over 70 miles northeast in the Mojave National Preserve (DRECP, 2014). Two Swainson's hawks were observed flying over the study area in the Granite Mountains during surveys for the former CLTP.

Other Special-Status Raptors

Several other special-status birds of prey are found seasonally, especially during winter, in the region. These include ferruginous hawk, Cooper's hawk, sharp-shinned hawk, northern harrier, prairie falcon, merlin, short-eared owl, and long-eared owl. A Cooper's hawk was observed perched in trees in the Daggett area, and prairie falcon were observed foraging in the study area during surveys. Active prairie falcon nests were observed in the Granite and Fairview Mountains. Cooper's hawks nest in forests and smaller woodlots, including windrows, plantations, and trees in urban and suburban areas, and potential nesting habitat occurs in several locations throughout the study area. Long-eared owl breeds in riparian woodlands, and very limited potential breeding habitat occurs in and near the study area, primarily in the southernmost portion. Ferruginous hawk, sharp-shinned hawk, northern harrier, short-eared owl, and merlin are expected to winter in the region. Suitable foraging habitat for all of these raptors is widely available in the study area and throughout the region.

Special-Status Riparian Songbirds

Two federally and state-listed riparian songbirds, the least Bell's vireo and the southwestern willow flycatcher, are documented in the region. The yellow warbler, yellow-breasted chat, and vermillion flycatcher, all California Species of Special Concern, are also expected to occur in the region. All of these songbirds are covered species under the WEMO and the least Bell's vireo is a BLM sensitive species.

Least Bell's vireo and southwestern willow flycatcher are known from the Mojave Narrows near Victorville. Critical habitat for the southwestern willow flycatcher is designated at Deep Creek, in the San Bernardino Mountains just south of the study area. One yellow warbler was observed in willows at the Mojave River in the study area, and one yellow-breasted chat was observed during surveys in Stoddard Valley (SCE, 2013 and SCE, 2014). Riparian habitats are limited in and near the study area, and riparian songbirds would be expected to nest in only a few select locations in the foothills of the San Bernardino Mountains and portions of the Mojave River.

Other Special-Status Birds

Several other special-status birds are present or have the potential to occur in the study area. These include western snowy plover (federally listed threatened, California Species of Special Concern, WEMO-covered species); mountain plover (BLM sensitive species, California Species of Special Concern); tricolored blackbird (California Species of Special Concern, BLM sensitive species); loggerhead shrike (California Species of Special Concern); California horned lark (CDFW Watch List); American white pelican (California Species of Special Concern); Le Conte's thrasher (WEMO-covered species, California Species of Special Concern); gray vireo (California Species of Special Concern, WEMO-covered species, BLM sensitive species); bank swallow (state-listed threatened, BLM sensitive species); Bell's sparrow (CDFW Watch List); brown-crested flycatcher (WEMO-covered species, CDFW Watch List); and black-tailed gnatcatcher (no designated special status, but tracked as a Special Animal by the CDFW). The tricolored blackbird was given emergency endangered status under the CESA in December, 2014. This listing provided temporary (6 months) protection but was allowed to expire in June, 2015. As of November, 2015, the CDFW is considering permanent protection for the species under the CESA.

California horned lark, loggerhead shrikes, Bell's sparrow, loggerhead shrike, black-tailed gnatcatcher, and Le Conte's thrasher were observed during surveys in the study area. Tricolored blackbirds are known from Barstow and Newberry Springs, but were not detected during surveys. Western snowy plovers breed at Harper Dry Lake, approximately 20 miles northwest of the study area and are regularly observed at the Edison Solar I ponds near Daggett. This species may breed at this location. The study area is outside of the breeding range for mountain plover, but this species winters in the western Mojave Desert and is occasionally recorded during fall and winter in the Lucerne Valley. The American white pelican and bank swallow migrate through the region, but the study area is outside of the breeding range for both species.

Brown-crested flycatcher could breed in riparian habitats in and near the foothills of the San Bernardino Mountains and along the Mojave River. Gray vireo has been recorded in the study area, and could nest in pinyon-juniper woodland and chaparral habitats in the foothills.

4.6.5 Mammals

Special-Status Bats

A number of special-status bats have a high potential to occur in the study area. These include pallid bat, Townsend's big-eared bat, western mastiff bat, silver-haired bat, big free-tailed bat, and pocketed free-tailed bat. Special-status bats of the region roost in rock crevices, tunnels, mines, or caves. One species, the silver-haired bat, also roosts in trees and buildings. Roost sites may be used seasonally (e.g., inactive cool seasons) or daily (day roosts, used during inactive daylight hours). Bat life histories vary widely. Some species hibernate during winter, or migrate south. During the breeding season, bats generally roost during the day, either alone or in communal roost sites, depending on species. All special-status bats in the region are insectivorous, catching their prey either on the wing or on the ground. Some species feed mainly over open water where insect production is especially high, but others forage over open shrublands such as those found in most of the study area.

The majority of adverse impacts to bat populations in the region result from disturbance of roosting or hibernation sites, especially where large numbers of bats congregate; physical closures of old mine shafts, which eliminates roosting habitat; elimination of riparian or desert wash microphyll vegetation which is often productive foraging habitat; more general habitat loss or land use conversion; and agricultural pesticide use which may poison bats or eliminate their prey-base.

Mohave Ground Squirrel (*Xerospermophilus mohavensis*)

The Mohave ground squirrel (MGS) is state-listed as threatened and a BLM sensitive species. It is restricted to the western Mojave Desert, historically occurring from near Palmdale on the southwest, southeast to Lucerne Valley, northwest to Olancha, and northeast to the Avawatz Mountains (Gustafson, 1993). There is some uncertainty as to the extent of the historic range of the MGS, but the current range may be substantially smaller than historic distribution. The MGS is presumed extirpated in the western portion of the Antelope Valley, although suitable desert scrub habitat is present in much of the area. It has also been extirpated from much of the greater Victorville area, including some portions of the study area, due to agricultural and urban development; however, some recent records from the Adelanto area suggest a possible relict population (DRECP, 2014). A population was also historically documented in the Lucerne Valley, which may be the only known locality east of the Mojave River. This area has not been well-surveyed in recent years, and the MGS' status here is presently unknown (*Ibid*).

MGS prefer creosote bush scrub, various types of saltbush scrub, Mojave mixed woody scrub, desert greasewood scrub, shadscale scrub, and Joshua tree woodland (DRECP, 2014). Distribution throughout its range appears to be patchy, even within suitable habitats, although systematic, range-wide studies have not been conducted to verify. The MGS prefers flat to gently sloping terrain with deep, sandy to gravelly soils and open vegetative cover (*Ibid*). It is seasonally active, spending much of the year in a torpid state in underground burrows, emerging to feed following winter and spring rains. It feeds on the leaves and seeds of forbs and shrubs, with perennial shrubs forming a large part of the diet, especially when annual forbs are not available. The MGS is threatened by loss, fragmentation, and degradation of its habitat due to agriculture, military activities, development, livestock grazing, and off-road vehicle use (CDFG, 2005).

The DRECP presents a plan-wide analysis of MGS distribution and target conservation areas. The study area is outside of identified Mohave Ground Squirrel Core Areas and linkages; however, portions are

within modeled habitat (see Figure 4-6). The DRECP models and proposed survey areas are based on available data, and most of the study area has not been recently surveyed for this species. MGS habitat assessments were conducted for the previously proposed CLTP, and suitable habitat was identified along all preferred and alternative routes.

Nelson's bighorn sheep (*Ovis canadensis nelson*)

Nelson's bighorn sheep is a BLM sensitive species, a WEMO-covered species, and a fully protected species in California. It is known from the Transverse Ranges, California Desert Ranges, Nevada, portions of northern Arizona, and Utah. Its populations in the Peninsular Ranges (the Santa Rosa and San Jacinto Mountains, and southward into Baja California) are federally listed as a threatened distinct vertebrate population segment. However, populations in San Bernardino County have no CESA or ESA listing status.

Bighorn sheep are typically found on steep, rocky areas used for escape cover with available water and vegetation for forage. Bighorn sheep graze on grasses and forbs and browse shrubs; they obtain minerals from natural salt licks. Bighorn sheep feed on a large variety of plants, and diet composition varies seasonally and among locations. While diet quality in the Mojave Desert varies greatly among years, it is generally highest in late winter and spring (Wehausen, 1992), and this coincides with the peak of lambing. In the Mojave Desert, bighorn have a long lambing season that can begin in December and end in June. A small percentage of births may occur in summer as well (Wehausen, 1992).

Proximity to perennial water is the best predictor of bighorn sheep presence. Turner et al. (2004) found that 97 percent of sheep observations in the Santa Rosa Mountains were within three kilometers of perennial water sources. In the desert, there are few perennial water sources, and local sources are consequently more important. Interestingly, male and female bighorn sheep inhabiting desert ecosystems can survive without consuming surface water (Krausman et al., 1985), and males appear to drink infrequently in many situations (Jaeger et al., 1991; Bleich et al., 1997); however, there are no known large populations of bighorn sheep in the desert region that lack access to surface water.

Nelson's bighorn sheep vary seasonally in habitat use patterns, and intermountain seasonal migration may be common. Bighorn sheep use areas close to water during the summer, and are less tied to water sources during the cooler, wetter months. Slightly different ranges are used during rutting and lambing seasons, and home range size varies depending on availability of resources (water and foraging and lambing habitats), as well as forage abundance and quality, season, sex, and age. In general, males (rams) have larger home ranges than females (ewes) (DRECP, 2014).

Recent data indicate that intermountain movement is important to Nelson's bighorn sheep populations, and that recolonization of vacant areas from surrounding ranges is not rare. Current information suggests that recolonizations over the last 25 years have exceeded extinctions that occurred during the mid-20th century during a 30-year period of drought and adverse human impacts. These data illustrate the importance of intact intermountain linkages to bighorn sheep population dynamics. The intermountain habitat includes "stepping stones" that facilitate movement, but are not permanent habitat (*Ibid*).

Threats to Nelson's bighorn sheep include habitat loss or degradation, limited availability of water sources, barriers to local or regional movement (e.g., highways and aqueducts), disease spread by domestic live-stock, and natural predation by mountain lions in some populations.

Bighorn sheep are known from the region and likely use much of the study area for periodic intermountain movement (see Figure 4-7). Historic records of bighorn sheep occur in the Newberry Mountains and Cady Mountains.

American Badger (*Taxidea taxus*)

The American badger is a California Species of Special Concern. Badgers were once fairly widespread throughout open grassland habitats of California. They are now uncommon, permanent residents throughout most of the state, including the Mojave Desert. They are found in open shrubland, forest, and herbaceous habitats with friable soils. In the southwest, badgers are typically associated with creosote bush and sagebrush shrublands. Badgers are fossorial, digging large burrows in dry, friable soils and use multiple dens and cover burrows within their home range. Badgers move among burrows daily, although they can use a den for a few days at a time (Western et al., 2010).

Badger home range sizes are dependent upon prey availability and other habitat characteristics. In general, home ranges are several hundred acres in size, though they would likely be larger in the Mojave Desert due to low prey densities. They feed mainly on small mammals, especially ground squirrels, pocket gophers, rats, mice, and chipmunks. Badgers also prey on birds, eggs, reptiles, invertebrates, and carrion. The diet shifts seasonally and yearly depending upon prey availability.

Badger numbers have declined drastically in California in the 20th century due largely to agricultural and urban development, direct and secondary poisoning, and shooting and trapping for control (Bolster, 1998).

Potential habitat for American badger is found across most of the study area. Two badger dens were identified during field work for the former CLTP in Stoddard Valley and one in the North Lucerne Valley. Disturbed areas including the intensively utilized Stoddard Valley OHV area and urbanized portions of Apple Valley and Hesperia are generally unsuitable for this species.

Desert Kit Fox (*Vulpes macrotis arsipus*)

Desert kit fox is protected under Title 14, Section 460, California Code of Regulations, as well as the California Fish and Game Code (§§ 4000-4012), which defines kit fox as a protected furbearing mammal. Both of these regulations prohibit take of the species. Desert kit fox is an uncommon to rare permanent resident of arid regions of southern California. Kit fox occur in annual grasslands, or grassy open, arid stages of vegetation dominated by scattered herbaceous species. Kit fox prey on rabbits, ground squirrels, kangaroo rats, and various species of insects, lizards, and birds (Zeiner et al., 1990). Desert kit fox is primarily nocturnal, and inhabits open, flat areas with patchy shrubs. Friable soils are necessary for the construction of dens, which are used throughout the year for cover, thermoregulation, water conservation, and pup rearing. Desert kit fox is present throughout much of the study area with the exception of urbanized areas in Apple Valley and Hesperia. In 2011, an outbreak of canine distemper virus was identified in the Colorado Desert population of kit fox located approximately 125 miles east of CLTP (Clifford et al., 2013). To date, no canine distemper virus has been reported from the study area.

Palm Springs Round-Tailed Ground Squirrel (*Xerospermophilus tereticaudus chlorus*)

Palm Springs round-tailed ground squirrel is a California Species of Special Concern and a BLM sensitive species. This species was a candidate for federal listing as threatened or endangered prior to 2010,

when it was removed from the list of candidates (USFWS, 2010). Until recently, Palm Springs round-tailed ground squirrel was believed to be limited in range to the Coachella Valley region in Riverside County. In that area, its primary habitat is mesquite hummocks and associated sand dunes and, to a lesser extent, dunes and hummocks associated with creosote bush or other vegetation. The primary threats to its habitat are land use changes and groundwater pumping, both of which have eliminated much of the honey mesquite from the Coachella Valley area. Recent research indicates that its range is substantially larger than previously understood, extending at least 150 miles northward to Hinkley Valley and Death Valley. Based on this range extension, the existing protection on its habitat in Death Valley National Park, and ongoing conservation efforts in the Coachella Valley, the USFWS concludes that it no longer warrants candidate status.

This subspecies is known from the Barstow-Daggett area, and potential habitat exists throughout the study area.

4.7 Wildlife Movement

The extent, distribution, and accessibility of suitable habitat affect the long-term viability of regional wildlife populations. Fragmentation and isolation of natural habitat can ultimately result in the loss of vulnerable native species within those areas. Accessibility between habitat areas, i.e., "connectivity," is important to long-term genetic diversity and demography of wildlife populations. In the short term, connectivity may also be important to individual animals' ability to occupy their home ranges, if their ranges extend across a potential movement barrier. These considerations apply to greater or lesser extent to all plants and animals. Plant populations "move" over the course of generations via pollen and seed dispersal; most birds and insects travel and disperse via flight; terrestrial species including small mammals, reptiles, arid land amphibians, and non-flying invertebrates disperse across land. Therefore, landscape barriers and impediments are more important considerations for movement of these terrestrial species. These considerations are especially important for rare, threatened, or endangered species such as the desert tortoise and large mammals, which tend to be wide-ranging and exist in lower population densities. Therefore, this discussion of wildlife movement in the study area focuses on desert tortoise and Nelson's bighorn sheep, though it is also applicable to a wide variety of other species.

The potential for movement constraints is also relevant for other species, including corridor "passage" and corridor "dweller" species (Beier and Loe, 1992). Corridor passage species would traverse connectivity areas during ordinary daily or seasonal movement patterns, whereas corridor dweller species must persist as viable populations over multiple generations within a connectivity area in order to eventually migrate from one habitat block to another.

In landscapes where native habitats exist as partially isolated patches surrounded by other land uses, planning for wildlife movement generally focuses on "wildlife corridors" to provide animals with access routes among habitat patches. In largely undeveloped areas, including the Stoddard and North Lucerne valleys, wildlife habitat is available in extensive open space areas throughout much of the region, but specific barriers or land uses (such as extensive OHV use) may impede or prevent movement. In these landscapes, wildlife movement planning focuses on specific sites where animals can cross linear barriers (e.g., wash crossings beneath highways and railroad ROWs), and on broader linkage areas that may support stable, long-term populations of target species.

In the study area, the biologically important functions of large mammal movement are the long-term demographic and genetic effects of occasional animal movement among mountain ranges and other large habitat areas. Animals such as Nelson's bighorn sheep travel across the valleys infrequently as a part of dispersal among subpopulations. Animals may also use bajada habitat for seasonal foraging or as part of their regular home ranges. These large animals are examples of corridor passage species. In contrast to large animal movement, desert tortoises and other less-mobile animals often live out their entire lives within a linkage between larger habitat blocks. For these species, movement among regional valleys may take place over the course of several generations (Beier and Loe, 1992).

A state-wide evaluation of habitat connectivity and a focused study on desert linkages in California identify much of the study area as essential for wildlife habitat connectivity (Spencer et al., 2010; Penrod et al., 2012). The Mojave River provides a crucial riparian corridor for movement and sustenance, and the Ord Mountains and San Bernardino Mountains are identified as natural landscape blocks with the North Lucerne Valley as an essential connectivity area between these blocks (see Figure 4-8). Specific linkages within the region also include the Northern Lucerne Wildlife Linkage, an east-west linkage through the northern Lucerne Valley, and the Granite Mountain Wildlife Linkage, which provides north-south connectivity. Both of these linkages have been proposed as ACECs in the DRECP (DRECP, 2014). Desert tortoise, MGS, and bighorn sheep are some of the special-status species that depend on unobstructed movement.

The DRECP describes the proposed Northern Lucerne Wildlife Linkage ACEC. This proposed ACEC would connect the existing Ord-Rodman ACEC to the existing Bendire's Thrasher Conservation Area and Mojave Monkey Flower ACEC in the study area. It is identified as a critical area for bighorn sheep, desert tortoise, golden eagle, prairie falcon, and several other species. It is regionally significant because the area supports major populations of rare and sensitive plants. The proposed Northern Lucerne Wildlife Linkage ACEC provides critical linkages for wildlife populations to the north and south of the area, and designation of this ACEC would prevent urbanized areas of Lucerne Valley and Apple Valley from merging and creating a block to wildlife movement.

The other DRECP-proposed ACEC in the study area is the Granite Mountain Wildlife Linkage, which would link the San Bernardino National Forest with the existing Bendire's Thrasher Conservation Area. This linkage would be between Lucerne Valley and Apple Valley and includes Granite Mountain. This proposed ACEC has similar biological values as the proposed Northern Lucerne Wildlife Linkage ACEC and would maintain connectivity for wildlife that may otherwise be lost to expansion of urbanized areas in Lucerne Valley and Apple Valley (DRECP, 2014).

BLM management strategies for wildlife and habitat, including management to maintain connectivity among habitat areas, include special management of ACECs, Wilderness Areas, Wilderness Study Areas, Wildlife Habitat Management Areas (WHMAs), and DWMAs. Certain BLM lands within and near the study area are designated as ACECs, WHMAs, and DWMAs (see Figure 4-1). Extensive natural habitat important to regional wildlife habitat connectivity exists throughout the study area (excluding the more urbanized areas to the southwest). In some areas this habitat has been degraded by past and ongoing stressors, such as OHV use, nonnative weeds, illegal dumping, and highways.

4.8 Invasive Plant Species

Invasive plants are non-native species that, upon becoming established in a new area, displace native species, supplant food plants or other habitat elements (e.g., cover) that are important to native

wildlife species, alter natural habitat structure and ecological function, alter natural wildfire patterns, or displace special-status plant occurrences and habitat (Zouhar et al., 2008; Lovich and Bainbridge, 1999). These plants are considered "weeds" or "pest plants" when they invade natural landscapes (Bossard et al., 2000). Weeds and pest plants are defined here to include any species of non-native plants identified on the weed lists of the California Department of Food and Agriculture, the California Invasive Plant Council, or of special concern identified by BLM.

Numerous invasive weeds have already become widespread throughout the Mojave Desert, and for some invasive species the prevention of further spread is impracticable. Examples include red-stemmed filaree (*Erodium cicutarium*), Mediterranean splitgrass (*Schismus barbatus*), red brome (*Bromus madritensis* ssp. *rubens*), and wild oats (*Avena* spp). Others (e.g., saltcedar) are damaging to riparian habitat types, but pose little or no threat to widespread upland desert habitat.

Surveys for the former CLTP identified several weeds considered noxious weeds by the California Invasive Plant Council (Cal-IPC). Invasive plants that have been found in the survey corridors and in the surrounding areas include red brome, red-stemmed filaree, Sahara mustard, London rocket (*Sisymbrium irio*), and Russian thistle (*Salsola tragus*). These and other species with the potential to occur in the study area now or in the future are listed in Table 4-5.

Table 4-5. Weeds Known from the Study Area

Weed Species	Abundance	Location	Growth Form	Cal-IPC Rating
Amaranthus albus Tumbling pigweed	Uncommon	Throughout	Annual/short-lived perennial forb	None
Avena barbata Slender wild oat	Uncommon	Throughout	Annual grass	Moderate
Brassica nigra Black mustard	Scarce	Foothills of the San Bernardino Mtns.	Annual forb	Moderate
Brassica tournefortii Sahara mustard	Occasional	Throughout	Annual forb	High
Bromus diandrus (B. rigidus) Ripgut brome	Occasional	Throughout	Annual grass	Moderate
Bromus madritensis ssp. rubens (B. rubens) Red brome	Occasional	Throughout	Annual grass	High
Bromus tectorum Cheat grass	Occasional	Throughout	Annual grass	High
Chenopodium album Lamb's quarters	Uncommon	I-40/old Route 66 corridor	Annual forb	None
Chloris virgata Feather finger grass	Scarce	I-40/old Route 66 corridor	Annual grass	None
Cynodon dactylon Bermuda grass	Uncommon	Southern portion of study area	Creeping perennial grass	Moderate
Dactyloctenium aegyptium Egyptian grass	Scarce	I-40/old Route 66 corridor	Annual grass	None
Descurainia sophia Herb sophia	Uncommon	Foothills of the San Bernardino Mtns.	Annual forb	Limited
Erodium cicutarium Red-stemmed filaree	Common	Throughout	Annual/biennial forb	Limited

Table 4-5. Weeds Known from the Study Area

Weed Species	Abundance	Location	Growth Form	Cal-IPC Rating
Eruca vesicaria ssp. sativa Garden rocket	Uncommon	Barstow-Daggett area and Stoddard Valley	Annual forb	None
Festuca myuros (Vulpia myuros) Foxtail fescue	Occasional	Throughout	Annual grass	Moderate
*Halogeton glomeratus **(?)**** Saltlover	Unknown	Unknown	Annual forb	Moderate
Hirschfeldia incana (Brassica geniculata) Short-pod mustard	Uncommon	Throughout	Annual/biennial/ perennial forb	Moderate
Hordeum murinum Hare barley	Uncommon	Southern portion of study area and I-40/old Route 66 corridor	Annual grass	Moderate
Lamarckia aurea Goldentop grass	Uncommon	Throughout	Annual grass	None
Marrubium vulgare Horehound	Uncommon	Southern portion of study area	perennial subshrub/forb	Limited
Melilotus indicus Sourclover	Uncommon	Southern portion of study area	Annual forb	None
Nerium oleander Common oleander	Uncommon	Developed areas throughout	Shrub/small tree	None
Nicotiana glauca Tree tobacco	Uncommon	Southern portion of study area	Perennial tree/shrub	Moderate
Oenothera laciniata Cutleaf evening primrose	Scarce	Foothills of the San Bernardino Mtns.	Annual/short-lived perennial forb	None
Pinus sp. Unidentified ornamental	Uncommon	Developed areas throughout	Perennial tree	None
Robinia pseudoacacia Black locust	Uncommon	Southern portion of study area	Perennial tree	Limited
Salsola tragus Russian thistle	Common	Throughout	Bushy annual forb	Limited
Schinus molle Peruvian pepper tree	Scarce	Developed areas throughout	Evergreen shrub or tree	Limited
*Schinus terebinthifolius **(?)**** Brazilian pepper tree	Unknown	Unknown	Evergreen shrub or tree	Limited
Schismus barbatus Mediterranean schismus	Occasional	Throughout	Annual grass	Limited
Sisymbrium altissimum Tumbling mustard	Uncommon	Southern portion of study area	Annual/biennial forb	None
*Sisymbrium officinale **(?)**** Hedge-mustard	Unknown	Unknown	Annual forb	None
Sisymbrium irio London rocket	Occasional	Throughout	Annual forb	Moderate
Sonchus asper ssp. asper Prickly sow thistle	Uncommon	Foothills of the San Bernardino Mtns.	Annual forb	None
Tamarix aphylla Athel	Scarce	I-40/old Route 66 corridor	Shrub or tree	Limited

Table 4-5. Weeds Known from the Study Area

Weed Species	Abundance	Location	Growth Form	Cal-IPC Rating
Tamarix parviflora Tamarisk	Scarce	Throughout	Shrub or tree	High
Tamarix ramosissima Saltcedar	Occasional	Throughout	Shrub or tree	High
Tribulus terrestris Puncture vine	Scarce	I-40/old Route 66 corridor	Annual forb	None
Verbascum thapsus Woody muellin	Scarce	Southern portion of study area	Annual/biennial forb	Limited
Veronica anagallis-aquatica Water speedwell	Scarce	Foothills of the San Bernardino Mtns.	Perennial forb	None

Source: Cal-IPC, 2014; Jepson eFlora, 2014

*Species reported in the CLTP PEA (SCE, 2013) and not subsequently relocated are indicated with a bold question mark. Information on the abundance and location of these species was not provided; therefore location or abundance cannot be determined.

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed.

Moderate: These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, although establishment is generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited: These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Weed Species with Moderate or High Cal-IPC Rating

Slender wild oat (*Avena barbata*). Slender wild oat is an annual grass in the family Poaceae. It has a Cal-IPC rating of moderate, and is common and widespread throughout portions of Southern California up to about 4,000 feet elevation. Habitats include grassland, cropland, disturbed areas, and many native vegetation communities. It flowers mainly March through June. Control methods include hand pulling or mowing prior to seed set or herbicide application.

Black mustard (*Brassica nigra*). Black mustard is an annual forb in the mustard family (Brassicaceae). It has a Cal-PIC rating of moderate, and is common and widespread throughout portions of Southern California up to about 4,900 feet elevation. Habitats include grasslands, fields, roadsides, disturbed areas, and many native vegetation communities. It flowers from mid-spring to mid-summer. It grows profusely and produces allelopathic chemicals that inhibit germination of native plants. Stands of black mustard provide fine fuels that contribute to increased fire frequency in chaparral and coastal scrub and promote type conversion to annual grassland. Control methods include hand pulling or mowing prior to seed set or herbicide application. Yearly manual removal of plants before seeds mature can eventually deplete the seedbank.

Sahara mustard (*Brassica tournefortii*). Sahara mustard is an annual forb in the mustard family (Brassicaceae). It has a Cal-IPC rating of high, and is found in desert and semi-arid coastal areas of Southern California up to about 3,300 feet elevation. Habitats include grassland, coastal sage scrub, desert, disturbed areas, and many native vegetation communities. This species grows on sandy soil

where there is little competing vegetation. It readily spreads from roadsides and disturbed areas into washes, desert shrubland, and dune areas. It flowers from December through June. Stands of Sahara mustard provide fine fuels that can contribute to increased fire frequency in desert scrub and can promote type conversion to grassland. Control methods include hand pulling or grading prior to seed set or herbicide application.

Ripgut brome (*Bromus diandrus*). Ripgut brome is an annual grass in the family Poaceae. It has a Cal-IPC rating of moderate, and is found throughout Southern California up to about 6,600 feet elevation. Habitats include fields, rangelands, roadsides, disturbed areas, and many native vegetation communities. When dry, it provides fine fuels that contribute to increased frequency and spread of wildfires in natural communities and the resulting type conversion to annual grassland. It flowers in the spring. Control methods include hand pulling or repeated mowing prior to seed set or herbicide application.

Red brome (*Bromus madritensis* spp. *rubens*). Red brome is an annual grass in the family Poaceae. It has a Cal-IPC rating of high, and is found throughout Southern California up to about 7,200 feet elevation. Habitats include fields, rangelands, roadsides, disturbed areas, and many native vegetation communities. Red brome is spreading in desert shrubland, pinyon-juniper woodlands, and three-needle pine woodlands. When dry, it provides fine fuels that contribute to increased frequency and spread of wildfires in natural communities and the resulting type conversion to annual grassland. It flowers in the spring. Control methods include hand pulling or repeated mowing prior to seed set or herbicide application.

Cheat grass (*Bromus tectorum*). Cheat grass is an annual grass in the family Poaceae. It has a Cal-IPC rating of high, and is found throughout Southern California up to about 7,200 feet elevation. Habitats include fields, rangelands, roadsides, disturbed areas, and many native vegetation communities. Cheat grass is spreading in desert shrubland, pinyon-juniper woodlands, and three-needle pine woodlands. When dry, it provides fine fuels that contribute to increased frequency and spread of wildfires in natural communities and the resulting type conversion to annual grassland. It flowers in the spring. Control methods include hand pulling or repeated mowing prior to seed set or herbicide application.

Bermuda grass (*Cynodon dactylon*). Bermuda grass is a creeping perennial grass in the family Poaceae. It has a Cal-IPC rating of moderate, and is found throughout Southern California up to about 3,000 feet elevation. Bermuda grass tolerates acidic, alkaline, and saline conditions, and limited flooding. Habitats include disturbed areas, roadsides, turf, landscaped areas, and native vegetation communities that receive some warm-season moisture. It is a particular problem in riparian areas. It flowers from June through September. Control methods include persistent manual removal of rhizomes and stolons or herbicide application.

Foxtail fescue (*Festuca* [*Vulpia*] *myuros*). Foxtail fescue is an annual grass in the family Poaceae. It has a Cal-IPC rating of moderate, and is found throughout Southern California up to about 6,600 feet elevation. This species tolerates very poor sandy soil, acidic soil, and drought. Habitats include disturbed and undisturbed areas, fields, grassland, washes, and open areas in many native vegetation communities. It flowers from March through June or July. Control methods include hand pulling or mowing prior to seed set or herbicide application.

Saltlover (*Halogeton glomeratus*). Saltlover is an annual forb in the goosefoot family (Chenopodiaceae). It has a Cal-IPC rating of moderate. It is found throughout Southern California, particularly in the Mojave Desert, from about 2,500 feet to 7,000 feet elevation. It is found in disturbed

arid and semi-arid sites with alkaline to saline soils, especially where winters are cold. Habitats include disturbed open sites, dry lakebeds, roadsides, and native shrublands where vegetation is sparse. Abundance depends on annual precipitation and outbreaks may appear sporadically. Plants accumulate salts from lower soil horizons, increasing topsoil salinity. Ingestion of relatively small amounts of plant material is toxic to livestock. Saltlover flowers from June through September. Control methods include hand pulling prior to flowering and herbicide application.

Short-pod mustard (*Hirschfeldia incana*). Short-pod mustard is a biennial or short-lived perennial, occasionally an annual, in the mustard family (Brassicaceae). It has a Cal-IPC rating of moderate, and is found in much of Southern California up to about 5,300 feet elevation. Habitats include disturbed areas, fields, grasslands, and coastal scrub. It flowers from May through October and sometimes nearly year-round. Control methods include hand pulling or mowing prior to seed set or herbicide application. Persistent manual removal of plants before seeds mature can eventually deplete the seedbank.

Hare barley (*Hordeum murinum*). Hare barley is an annual grass in the in the family Poaceae. It has a Cal-IPC rating of moderate, and is found throughout Southern California up to about 3,300 feet elevation. Habitats include disturbed areas, roadsides, fields, grassland, savanna, and many native communities, often in moist areas. It flowers from April through June. Control methods include hand pulling and grubbing out the root prior to flowering or herbicide application.

Tree tobacco (*Nicotiana glauca*). Tree tobacco is a perennial shrub or small tree in the nightshade family (Solanaceae). It has a Cal-IPC rating of moderate, and is found throughout Southern California up to about 5,300 feet elevation. Habitats include disturbed areas, fields, washes, and many native communities including grasslands, woodlands, and riparian areas. All plant parts are highly toxic to humans and livestock if ingested. Tree tobacco flowers from March through November. It can be controlled by pulling young plants by hand and pulling larger plants with a weed wrench. The entire root must be removed or stump sprouting will occur. Other control methods are persistent cutting of plants and resprouts, herbicide application, or cutting combined with herbicide application.

London rocket (*Sisymbrium irio*). London rocket is an annual forb in the mustard family (Brassicaceae). It has a Cal-IPC rating of moderate, and is found throughout Southern California up to about 2,600 feet elevation. Habitats include disturbed areas, roadsides, desert, riparian areas, and many other native communities. It flowers from January through May. Control methods include hand pulling and mowing prior to seed set or herbicide application.

Tamarisk (*Tamarix parviflora*) and saltcedar (*Tamarix ramosissima*). Tamarisk and saltcedar are similar species, differing slightly in floral and leaf morphology. Both species are shrubs or trees in the tamarisk family (Tamaricaceae), and can grow up to 15 to 20 feet tall. They have a Cal-IPC rating of high and are found in much of Southern California, particularly the Mojave and Colorado deserts, up to about 4,300 feet (tamarisk) or 6,500 feet (saltcedar) elevation. These species are found where surface or subsurface water is available most of the year, and they are tolerant of alkaline, saline, and acidic soils. Habitats include riparian areas, canals, ditches, pond margins, springs, and some washes. Once introduced, these species often come to dominate riparian plant communities. Tamarisk and saltcedar infestations can dramatically alter habitat by stabilizing alluvial sediments, with resulting narrowing of stream channels and more frequent flooding; lowering water tables; increasing soil salinity; increasing fuel loading and fire frequency; and reducing wildlife diversity. These species do provide nesting habitat for riparian woodland birds, most notably the federally endangered southwestern willow flycatcher (*Empidonax traillii* ssp. *extimus*). Tamarisk flowers from March through April, and saltcedar from April through August. They also reproduce vegetatively by sprouting from

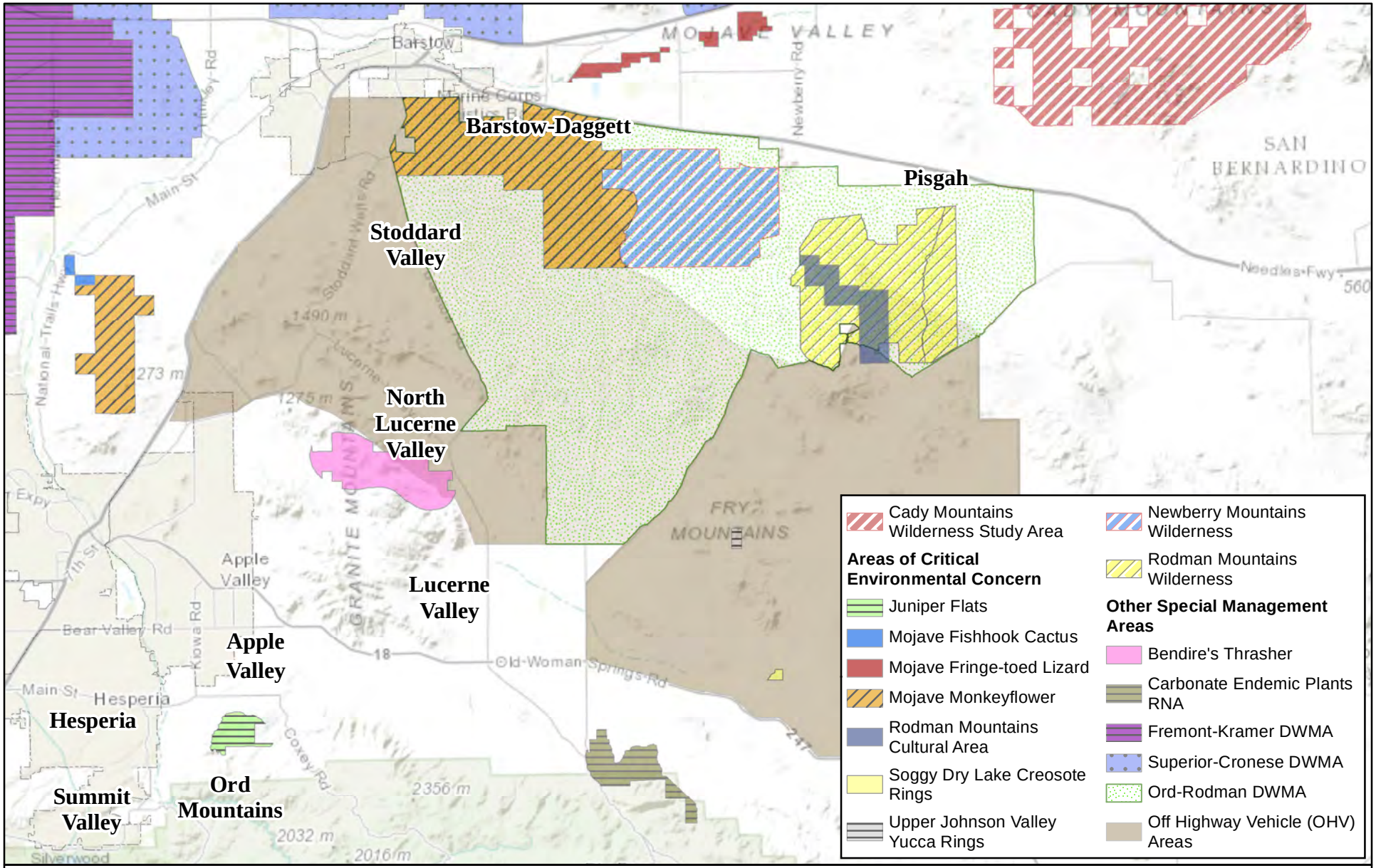
stem fragments that fall on moist soil. Successful control of these species generally requires multiple approaches. Hand pulling and grubbing can be used to control seedlings and young plants after larger growth has been cut and removed and the stumps treated with herbicide. Biological control with the non-native tamarisk beetle (*Diorhabda elongata*) has the potential to suppress, but not eradicate tamarisk and saltcedar infestations.

4.9 Jurisdictional Resources

The study area supports an extensive network of jurisdictional resources, including ephemeral drainages, swales, and large washes. These drainages are dry for most of the year and flow in direct response to seasonal rainfall. The Mojave River traverses the western portion of the study area. It is the largest drainage system in the Mojave Desert, though the flow is largely ephemeral in many locations, and only present in response to storms. Also present in the study area are large alluvial fans, Daggett Wash, the California Aqueduct, and dry lakes (playas).

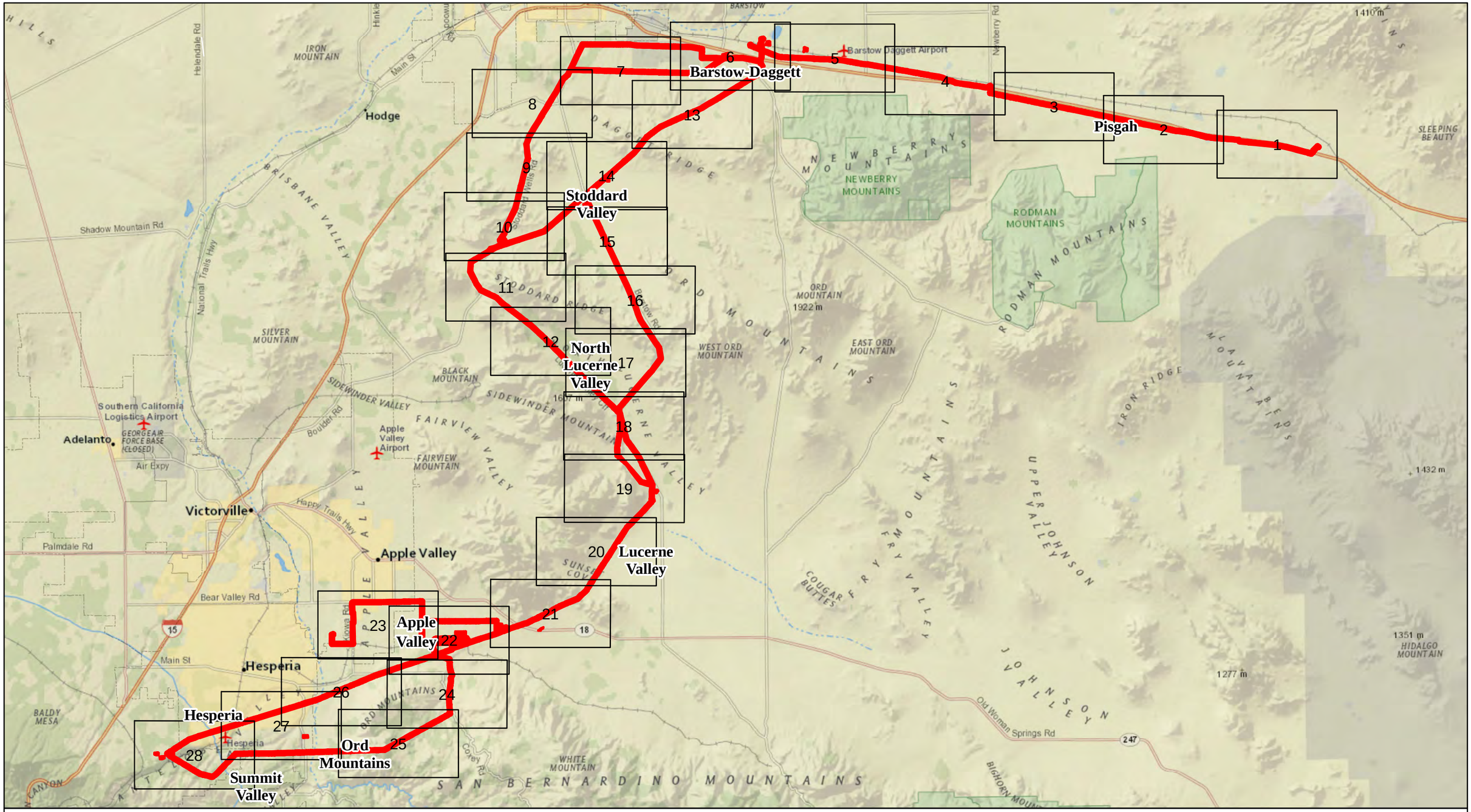
Ephemeral washes play an integral role in the ecology of the Mojave Desert and provide unique habitat that is distinct from the surrounding uplands. Ephemeral washes have higher moisture content, and wash-dependent and upland vegetation along desert washes drive food webs, provide seeds for regeneration, habitat for wildlife, access to water, and create cooler, more hospitable microclimatic conditions essential for a number of plant and animal species. Baxter (1988) noted that washes, because of their higher diversity of plant communities, are probably important foraging locations for desert tortoise. In smaller washes, there is greater cover and diversity of spring annuals, providing important food sources. Researchers have noted the high diversity of herpetofauna in desert washes, and many snakes and lizards preferentially use xeroriparian habitat because of its denser cover (*ibid*.). Kirkpatrick et al. (2007) noted that even dry, ephemeral washes have greater avian abundance and species richness than adjacent uplands. In a study of 66 plots on BLM lands in California, dry washes supported 1.5 times more breeding species and twice as many wintering species as the more common desert scrub (Kubik and Remsen, 1977; Tomoff, 1977; Daniels and Boyd, 1979).

During seasonal dry periods, plant species diversity levels along ephemeral stream channels are typically low. Following seasonal wet periods, however, diversity levels along some ephemeral stream channels can equal that along perennial stream channels with ephemeral desert annuals (Lichvar and McColley, 2008).



Special Management Areas

Figure 4-1



Map Page

Vegetation Survey Area

City Boundaries

0 2.5 5 Miles

Vegetation
Map Book Overview

Figure 4-2

See Page 2

Vegetation

Figure 4-2

See Page 3

See Page 1

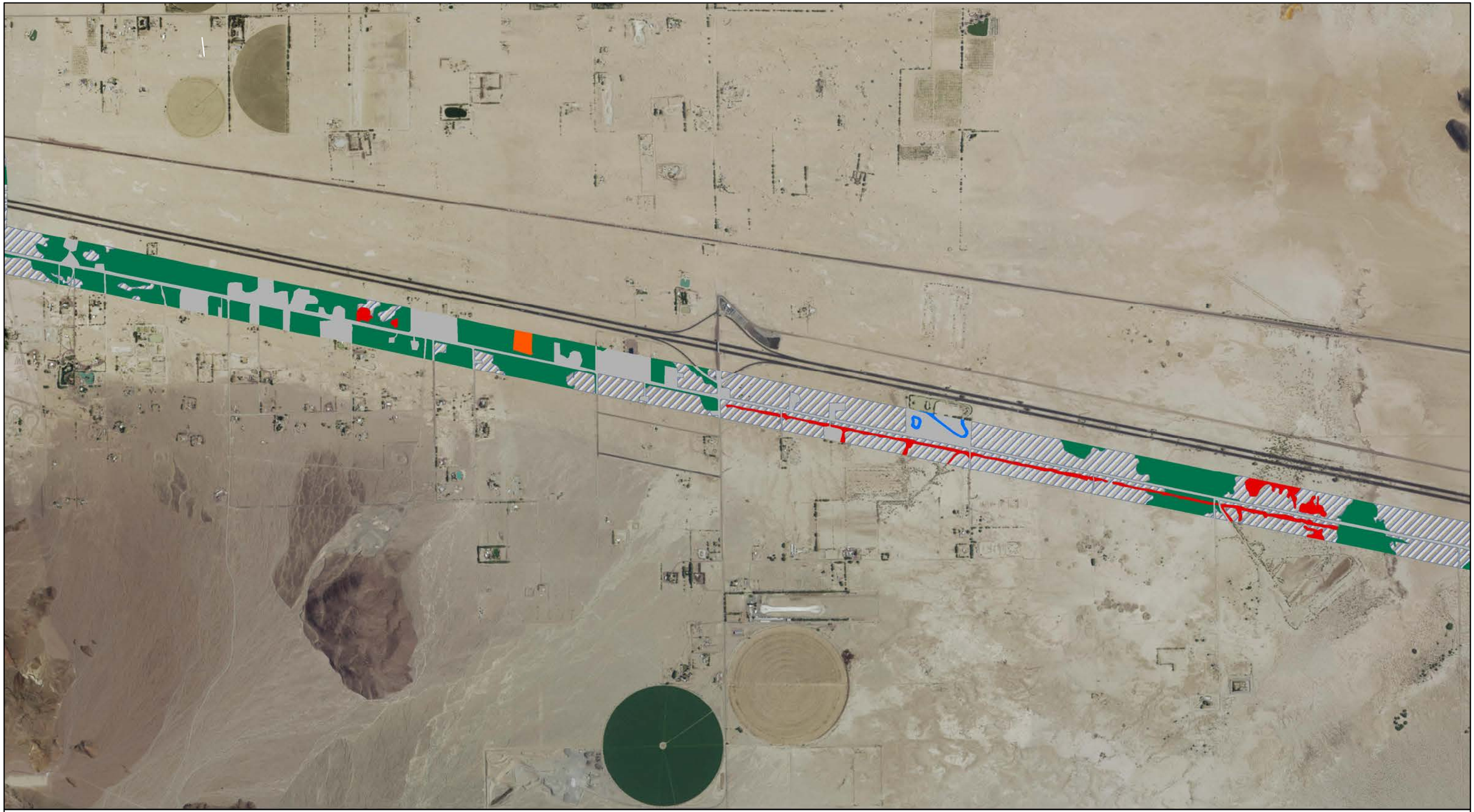
Vegetation

0 0.25 0.5 Miles

Figure 4-2

See Page 4

See Page 2



Vegetation

Figure 4-2

See Page 5

See Page 3

Vegetation

Figure 4-2

See Page 6

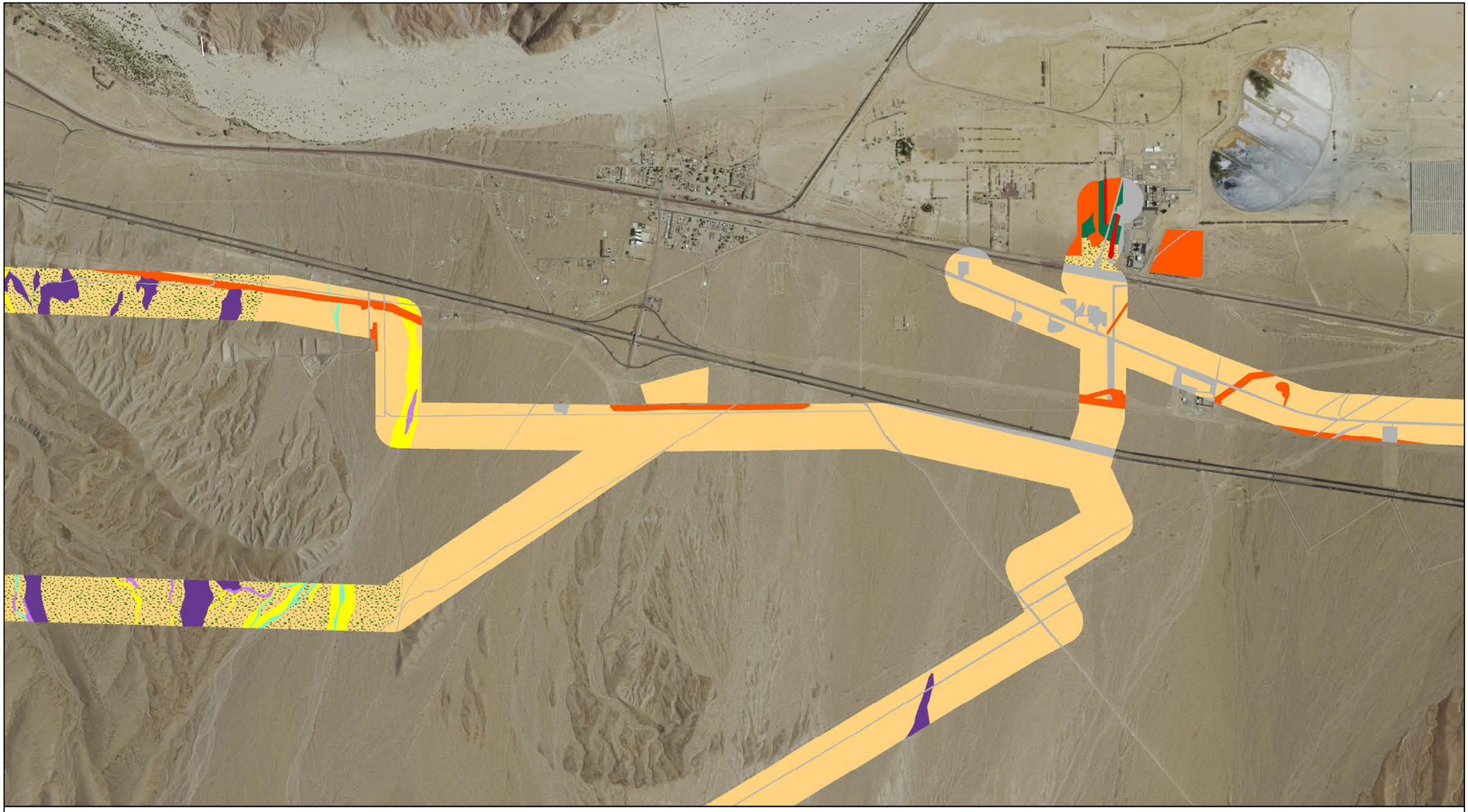
Vegetation

Figure 4-2

See Page 4

See Page 7

See Page 5



See Page 13

0 0.25 0.5 Miles

Vegetation/Cover Type

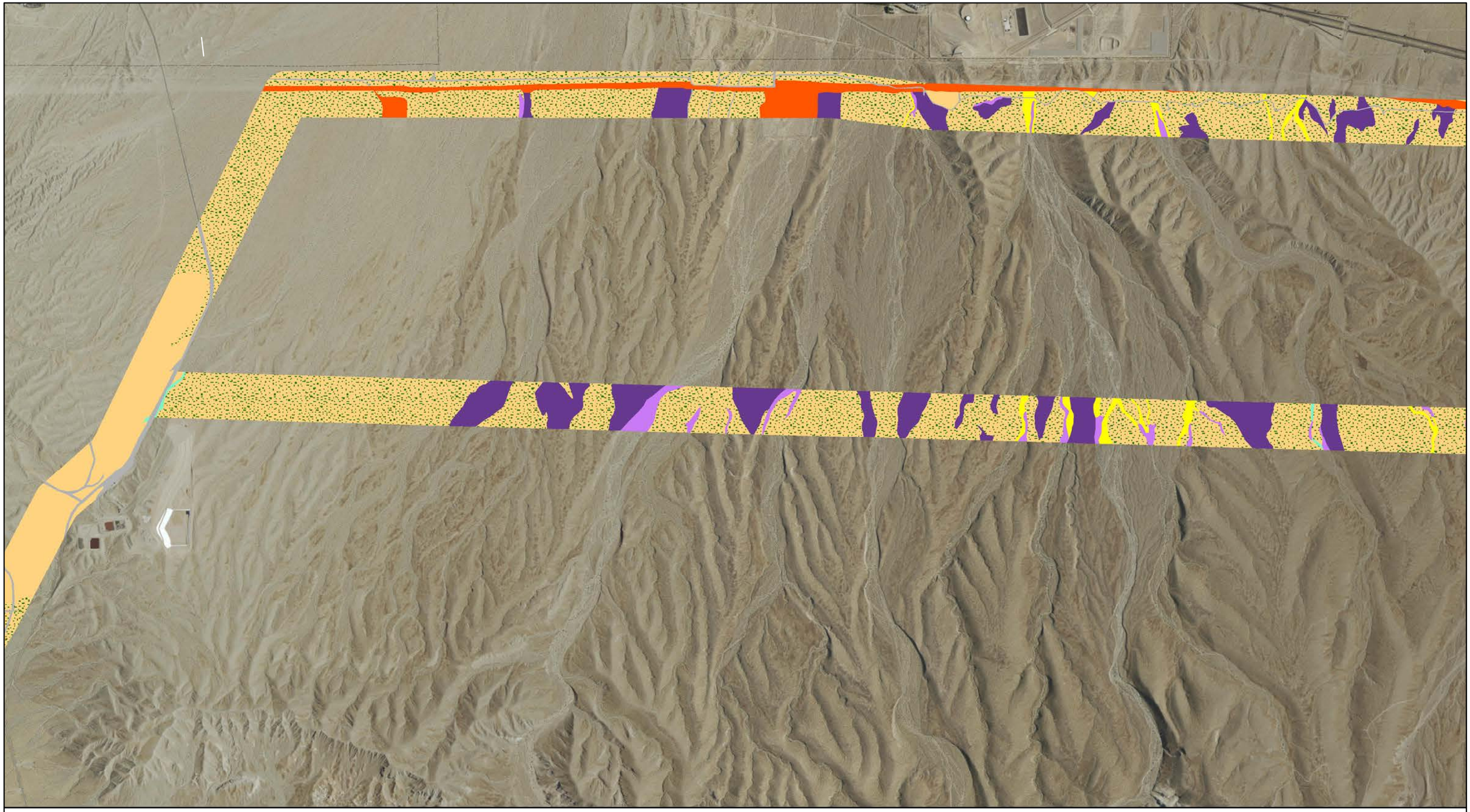
- Allscale Scrub
- Catclaw Acacia Thorn Scrub
- Cheesebush Scrub
- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed
- Mojave Yucca Scrub
- Ruderal
- Sandy Wash
- Tamarisk Thickets

Vegetation

Figure 4-2

See Page 8

See Page 6



See Page 13

0 0.25 0.5 Miles

Vegetation

Figure 4-2

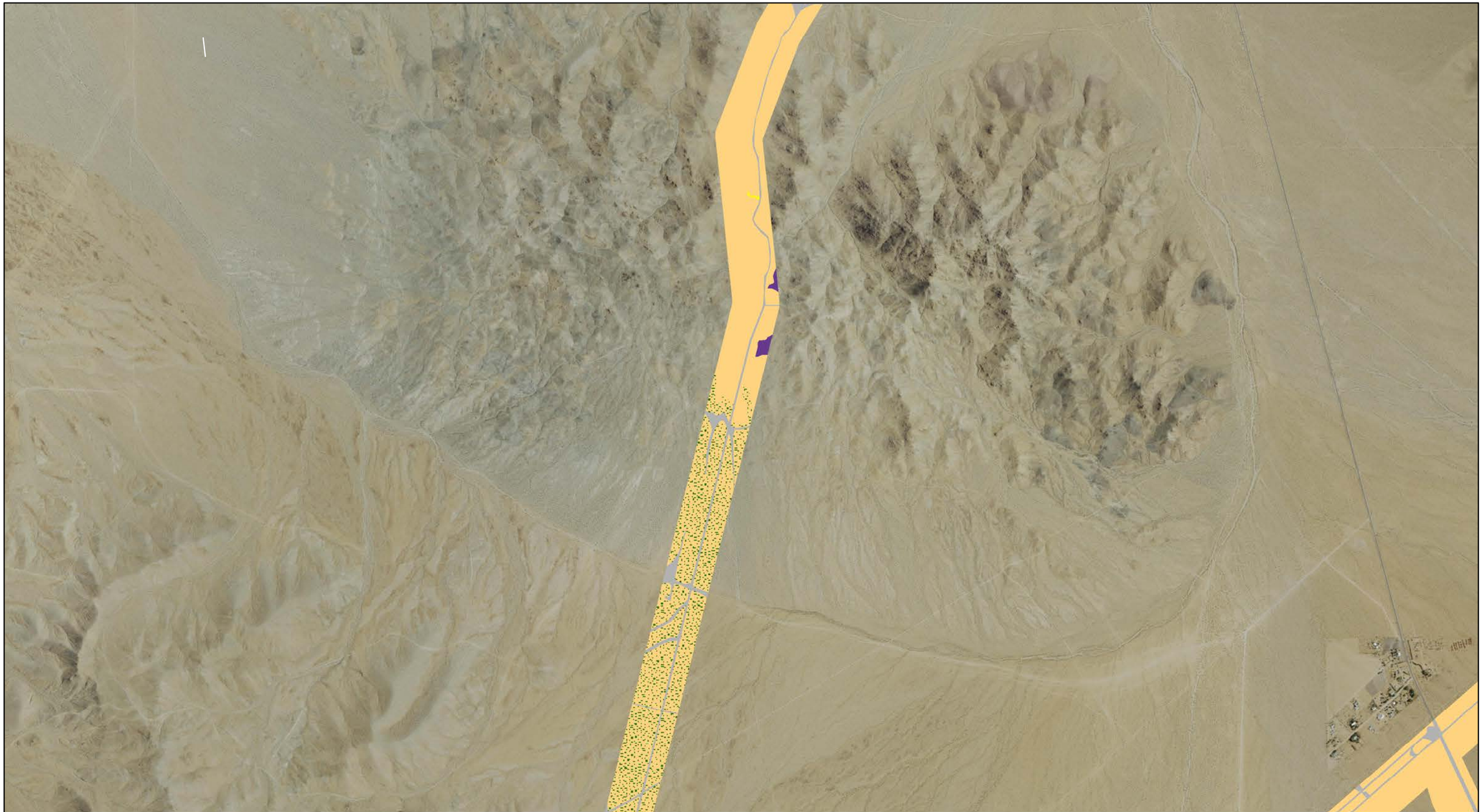
See Page 7

See Page 9

Vegetation

Figure 4-2

See Page 8

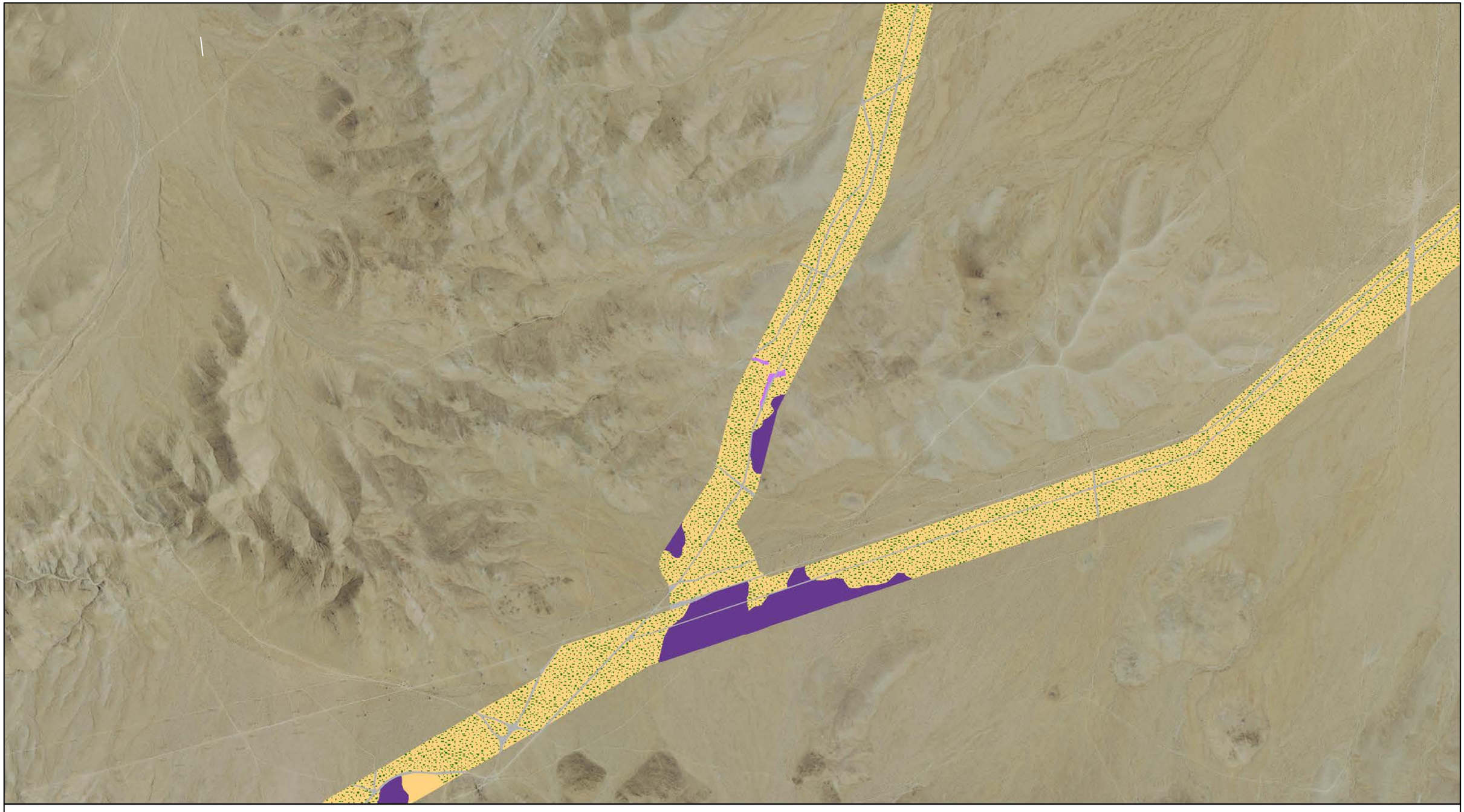


See Page 14

Vegetation

Figure 4-2

See Page 9



See Page 11

Vegetation/Cover Type

- Catclaw Acacia Thorn Scrub
- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed
- Mojave Yucca Scrub

0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 15

See Page 10

See Page 15

See Page 12

Vegetation/Cover Type

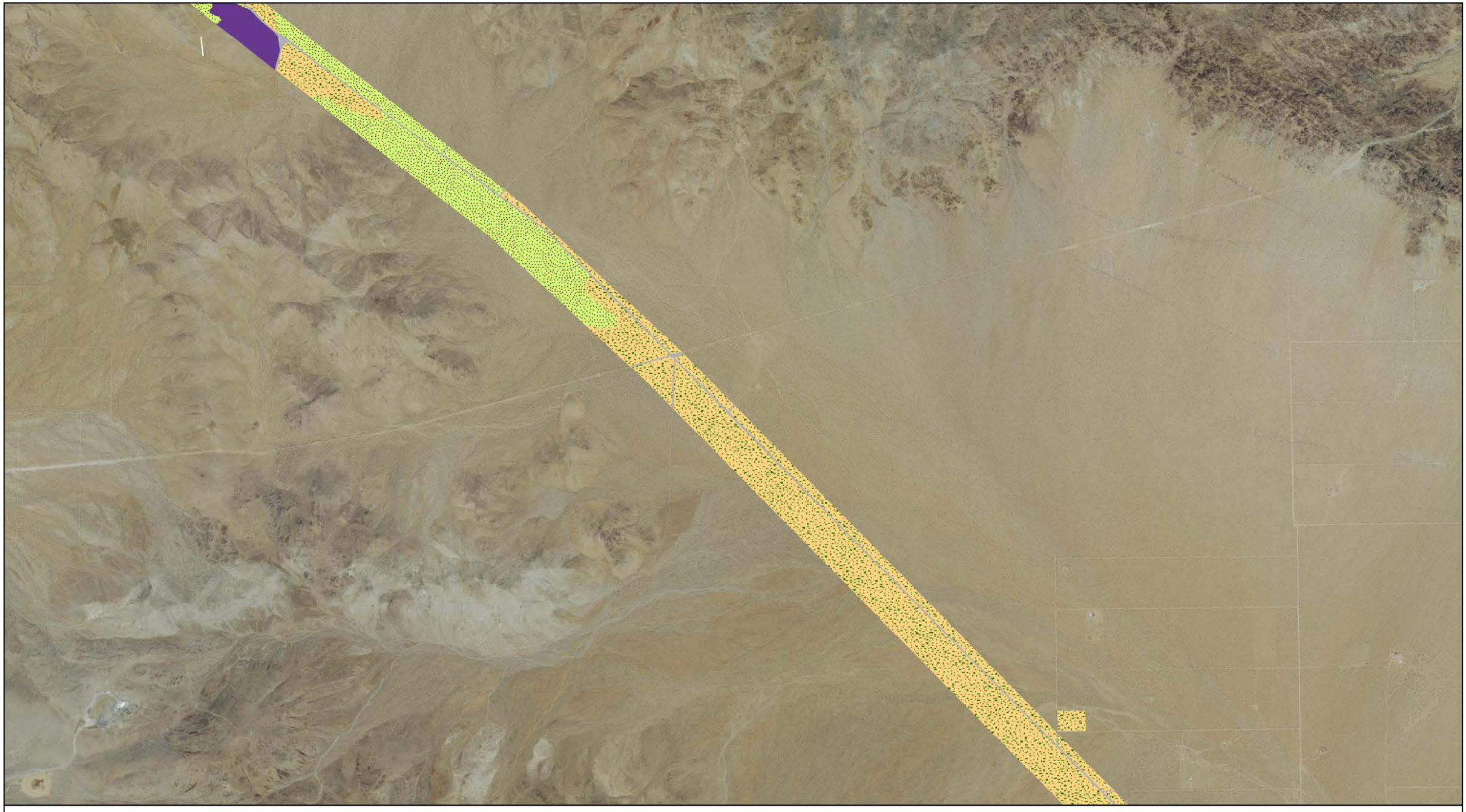
- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed
- Fourwing Saltbush Scrub
- Joshua Tree Woodland
- Mojave Yucca Scrub

0 0.25 0.5 Miles

Vegetation

Figure 4-2

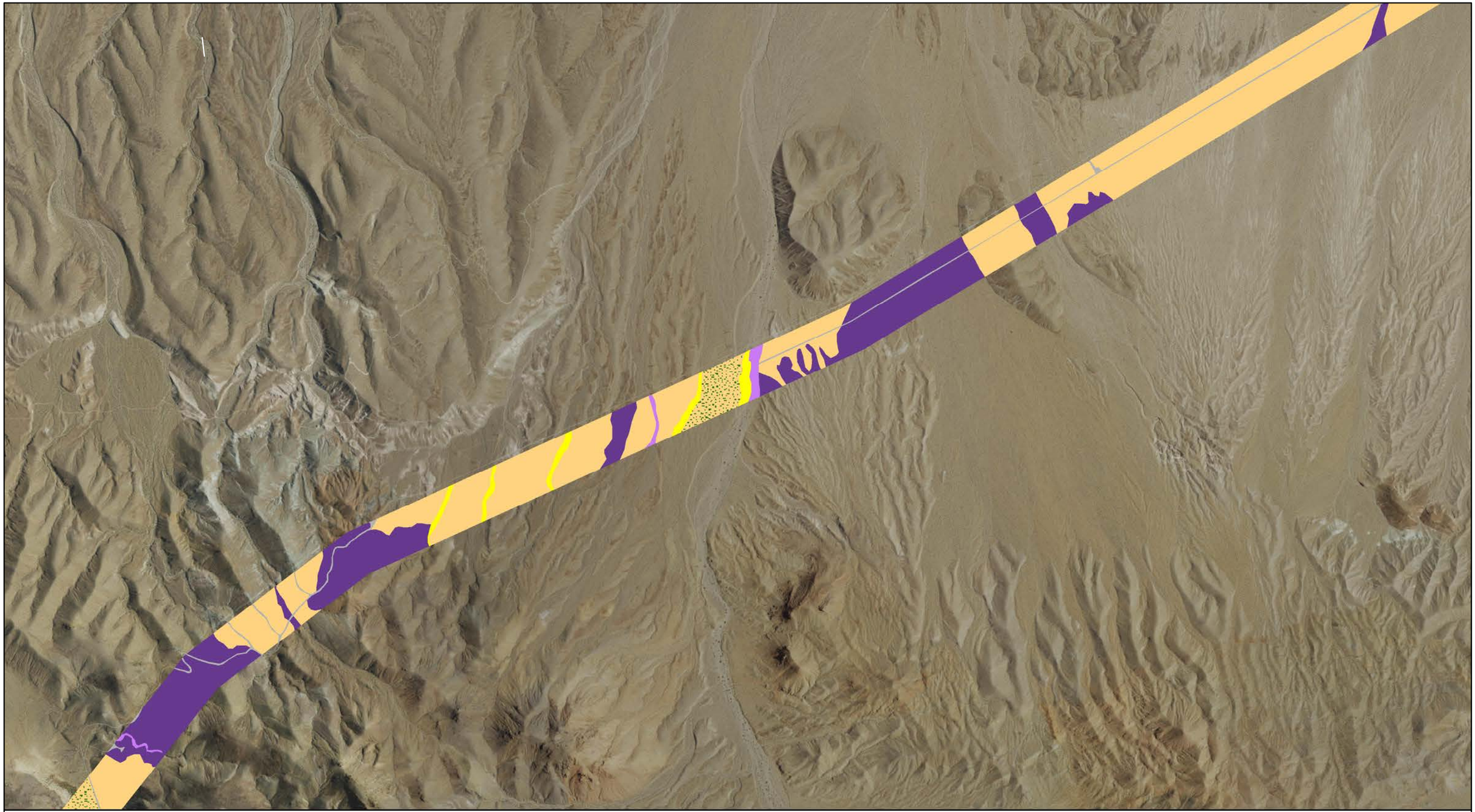
See Page 11



Vegetation

Figure 4-2

See Page 17

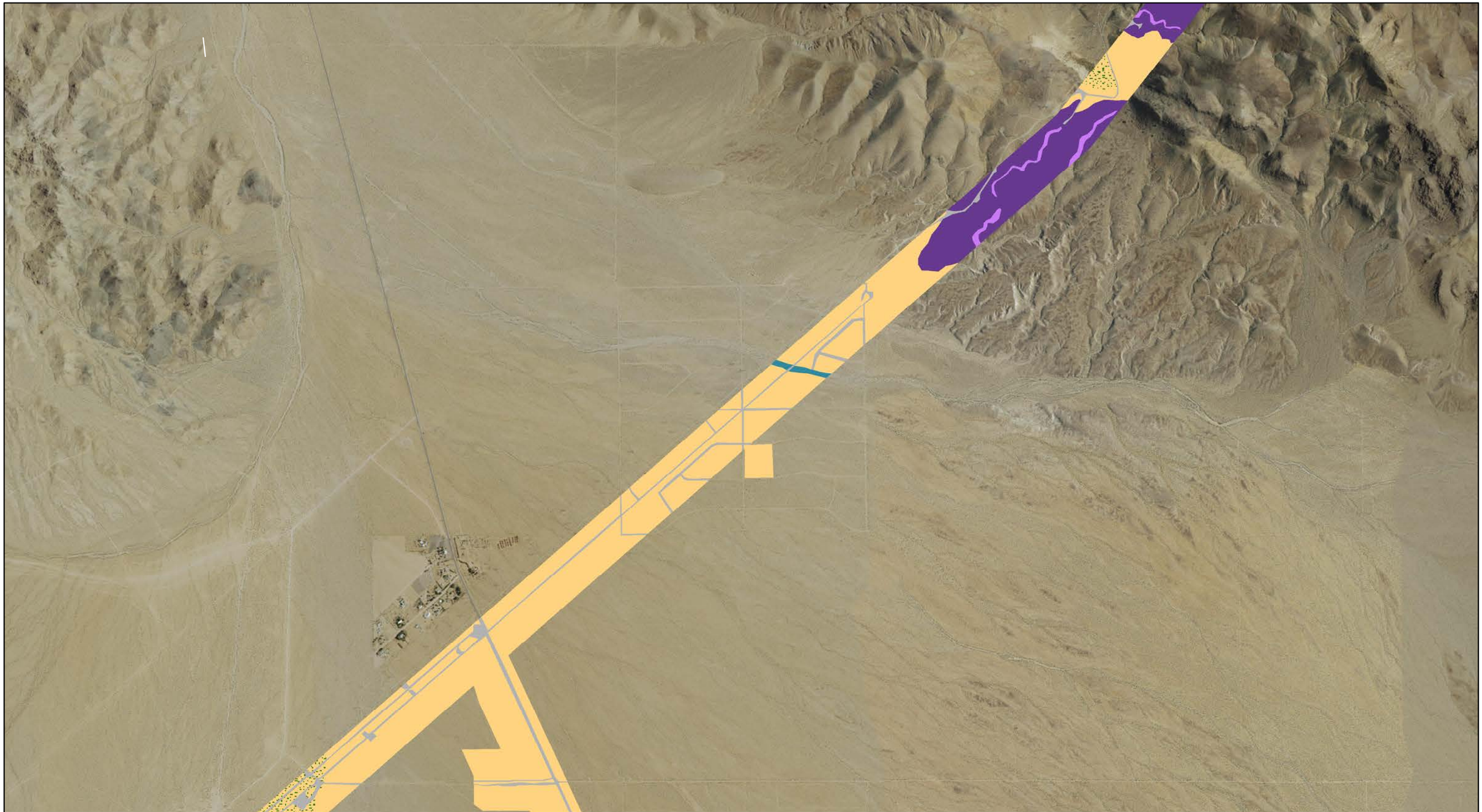


Vegetation

Figure 4-2

See Page 13

See Page 9



See Page 15

Vegetation/Cover Type

- Black-stemmed Rabbitbrush Scrub
- Catclaw Acacia Thorn Scrub
- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed
- Mojave Yucca Scrub

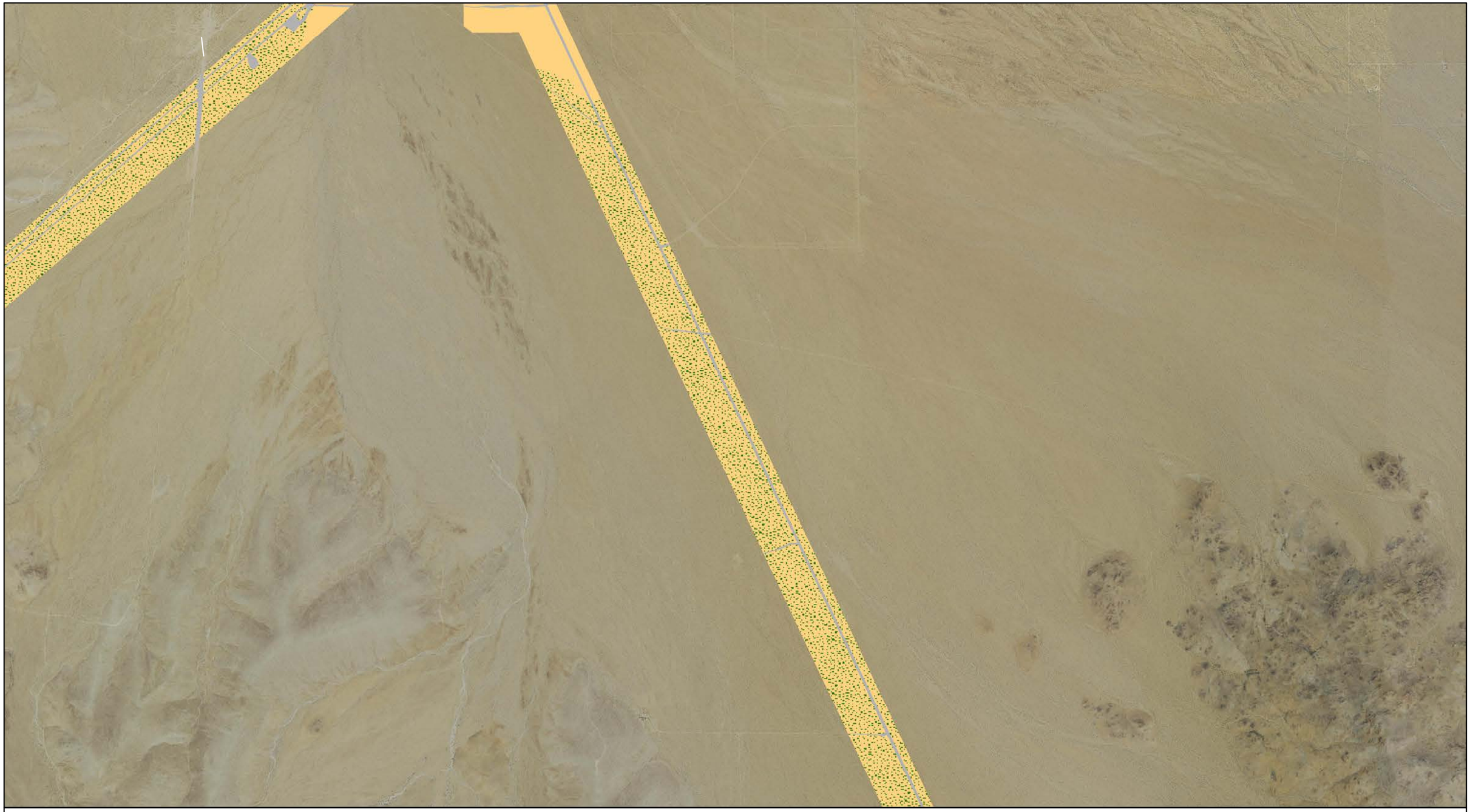
0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 14

See Page 10



See Page 16

Vegetation/Cover Type

- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed

0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 15

See Page 12

See Page 17

Vegetation/Cover Type

- Catclaw Acacia Thorn Scrub
- Creosote Bush Scrub
- Developed
- Mojave Yucca Scrub

0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 16

See Page 12

See Page 18

Vegetation/Cover Type

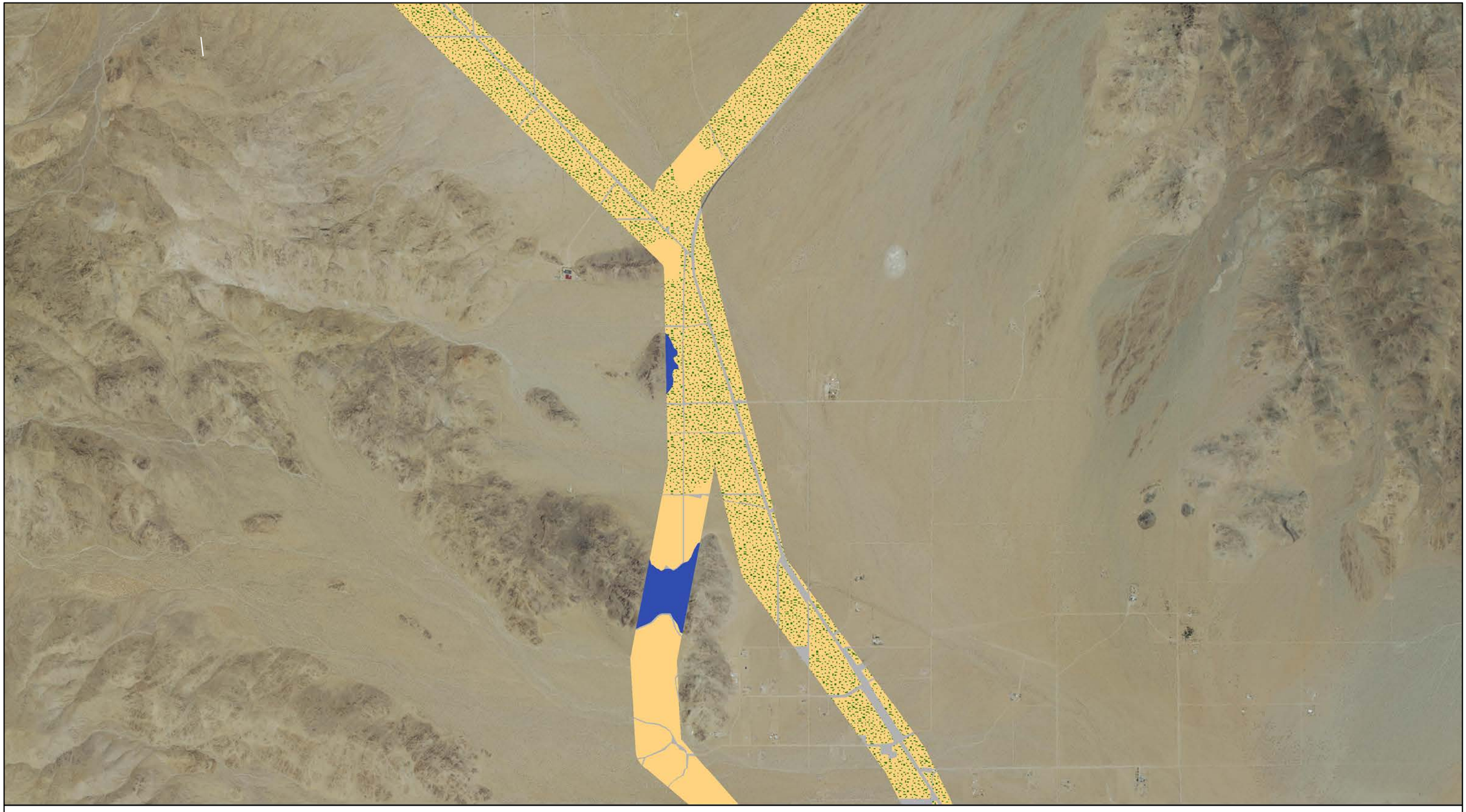
- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed
- Mojave Yucca Scrub

0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 17



See Page 19

Vegetation/Cover Type

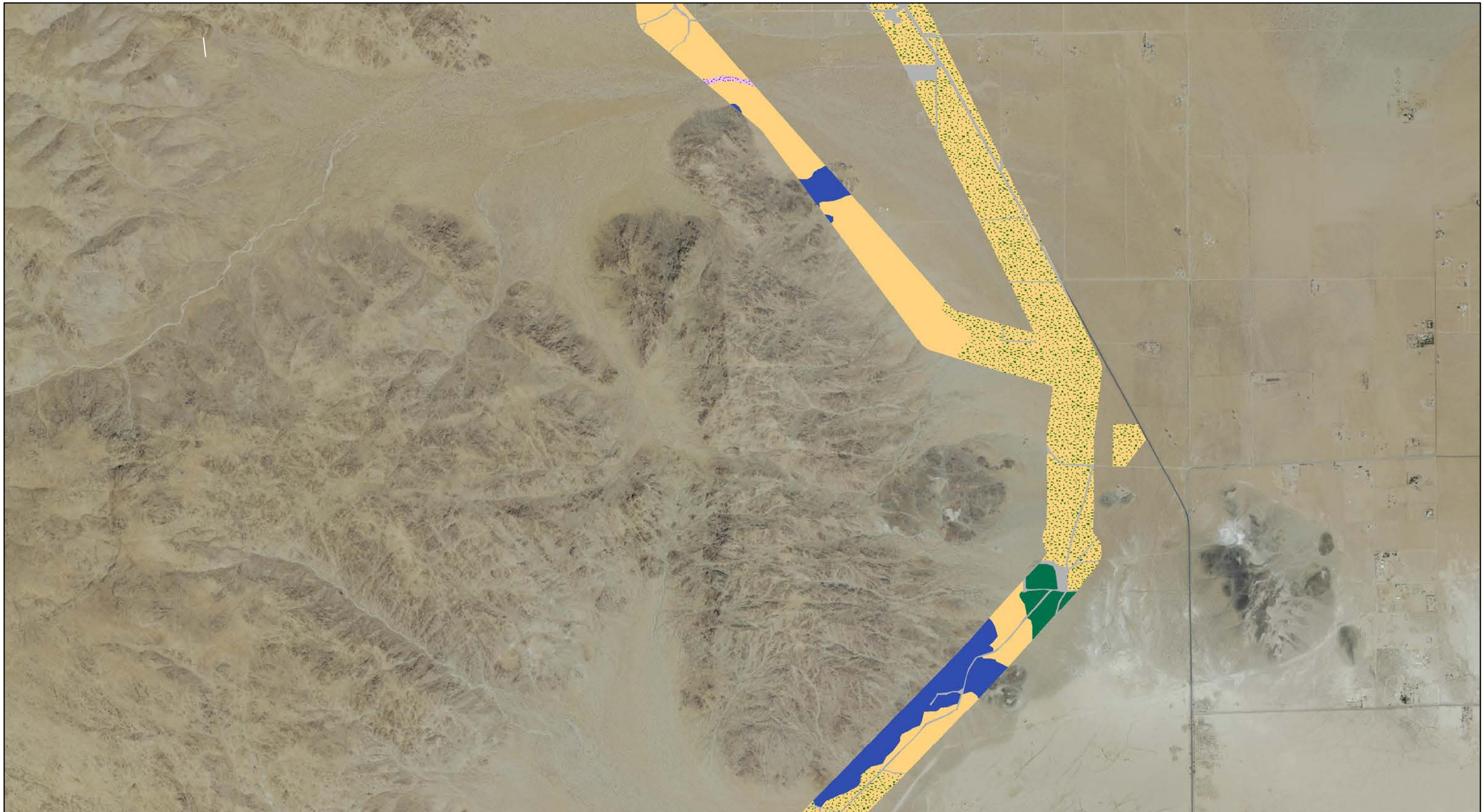
- Cheesebush Scrub
- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed
- White Bursage Scrub

0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 18



See Page 20

Vegetation/Cover Type

- Allscale Scrub
- Cheesebush Scrub
- Creosote Bush - White Bursage Scrub
- Creosote Bush Scrub
- Developed
- Fourwing Saltbush Scrub
- White Bursage Scrub

0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 19

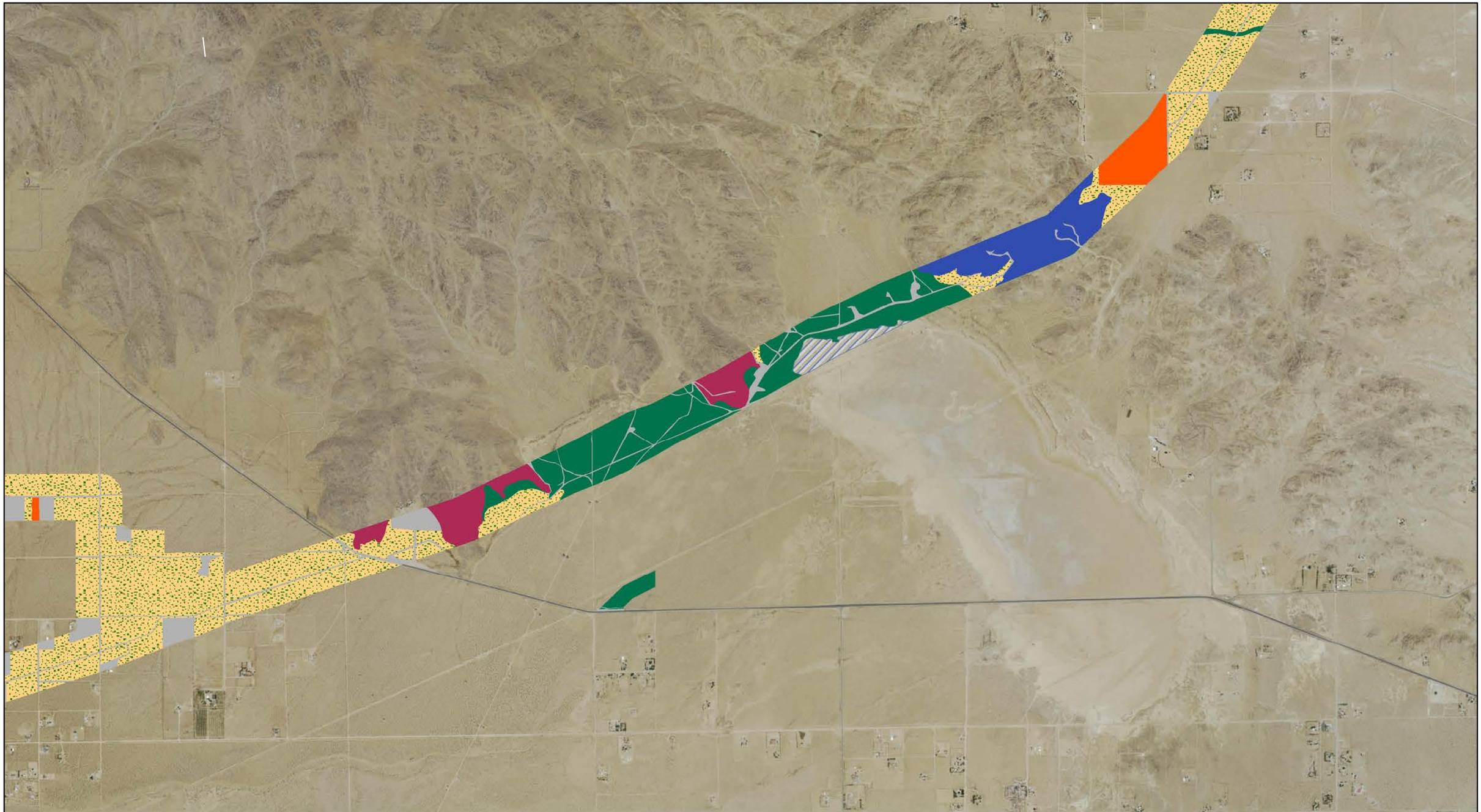
See Page 21

Vegetation

Figure 4-2

See Page 20

See Page 22



Vegetation

Figure 4-2

See Page 23

See Page 21

See Page 24

Vegetation/Cover Type

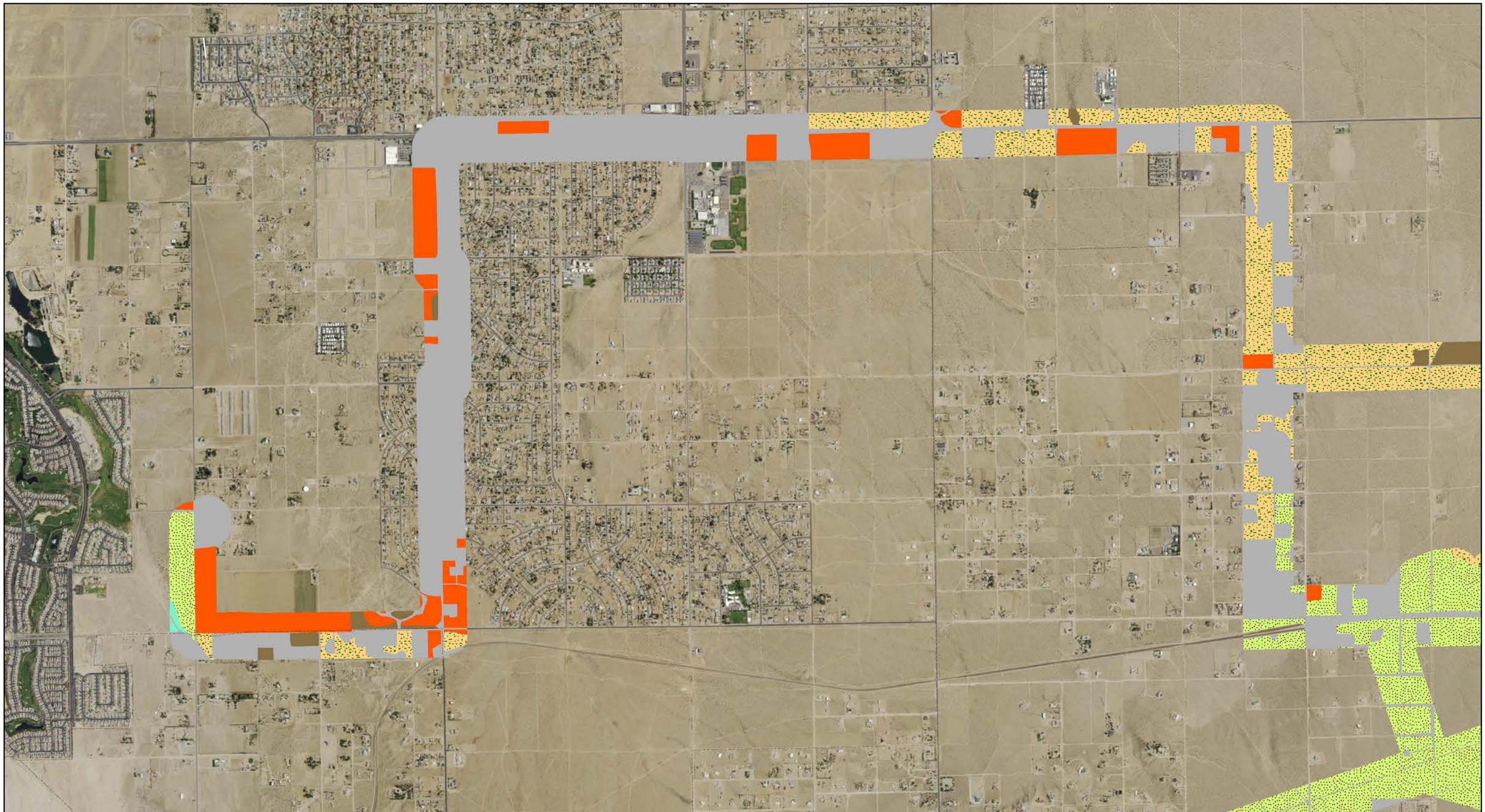
- California Juniper Woodland
- Cheesebush Scrub
- Creosote Bush Scrub
- Developed
- Joshua Tree Woodland
- Mormon Tea Scrub
- Rubber Rabbitbrush Scrub
- Ruderal

0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 22



See Page 26

Vegetation/Cover Type

- Cheesebush Scrub
- Creosote Bush Scrub
- Developed
- Joshua Tree Woodland
- Rubber Rabbitbrush Scrub
- Ruderal
- Sandy Wash

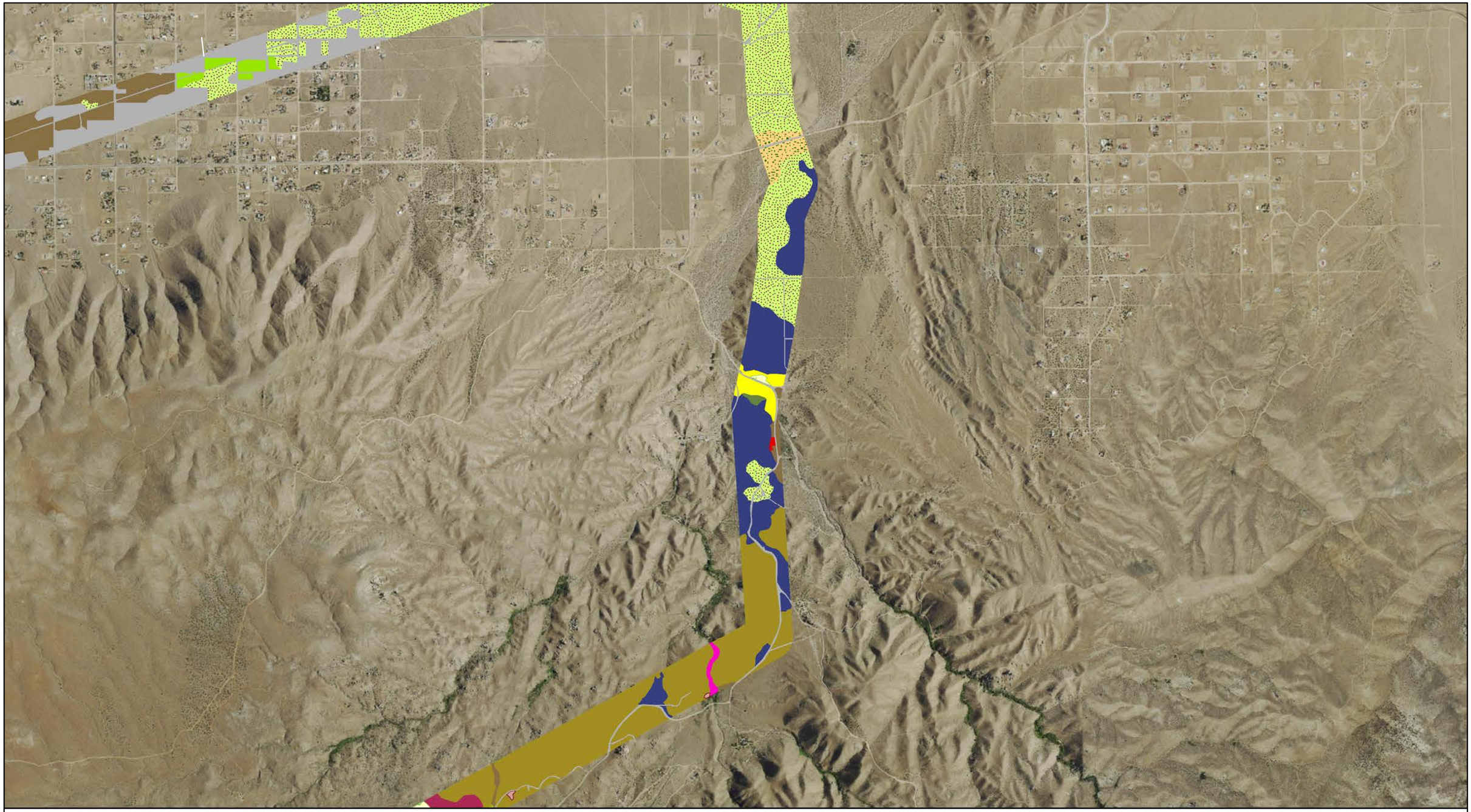
0 0.25 0.5 Miles

Vegetation

Figure 4-2

See Page 22

See Page 26



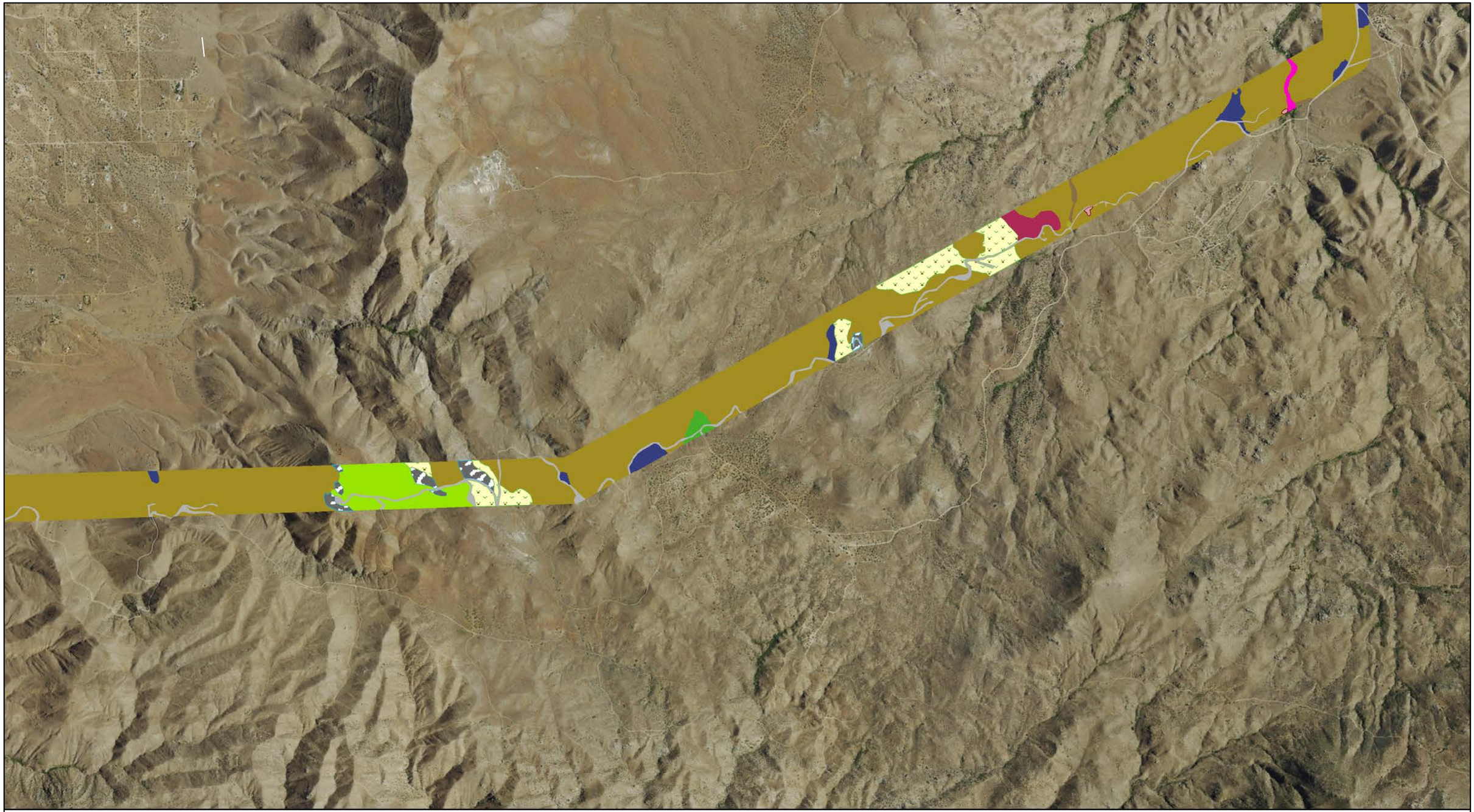
See Page 25

0 0.25 0.5 Miles

Vegetation

Figure 4-2

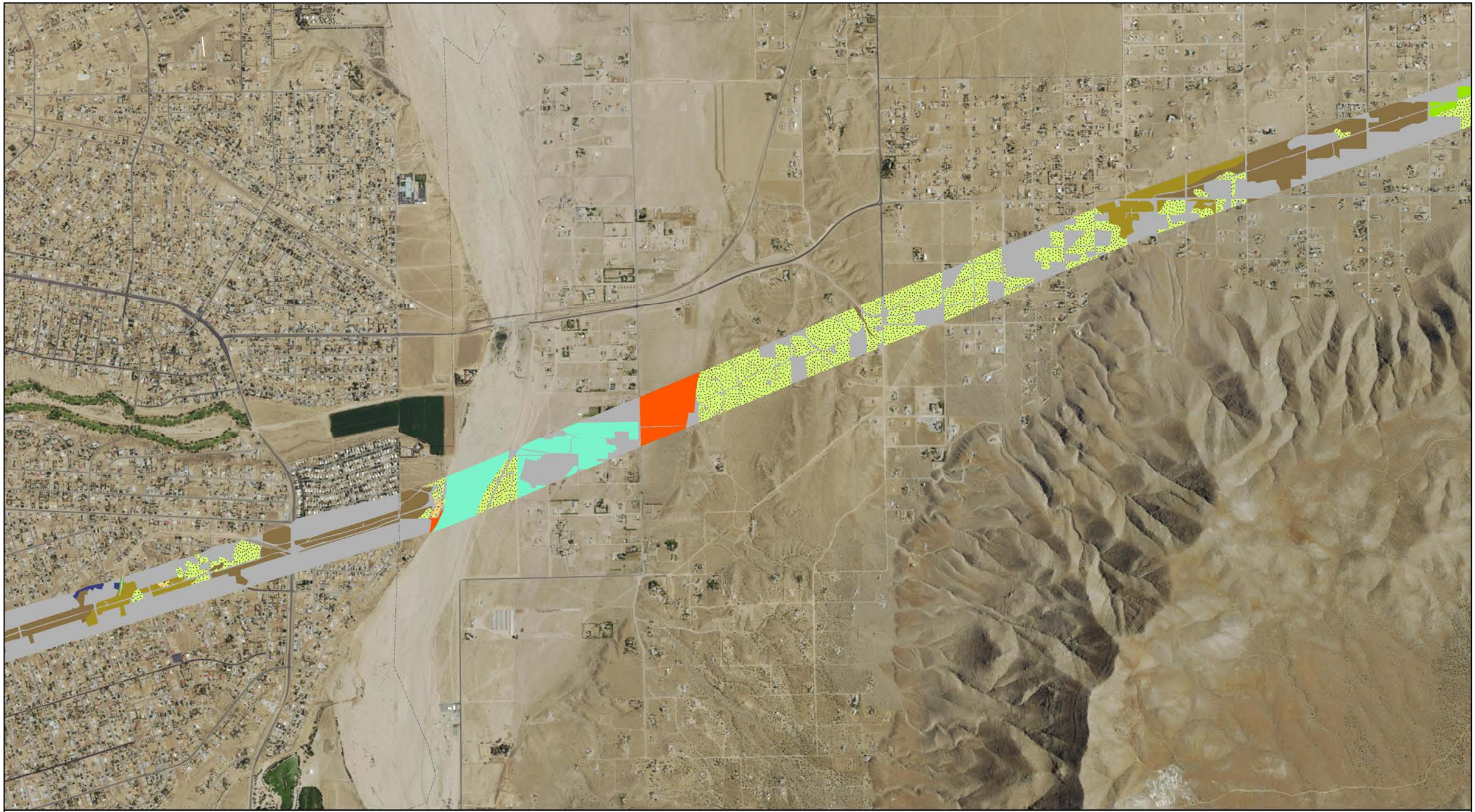
See Page 27



Vegetation

Figure 4-2

See Page 23



Vegetation

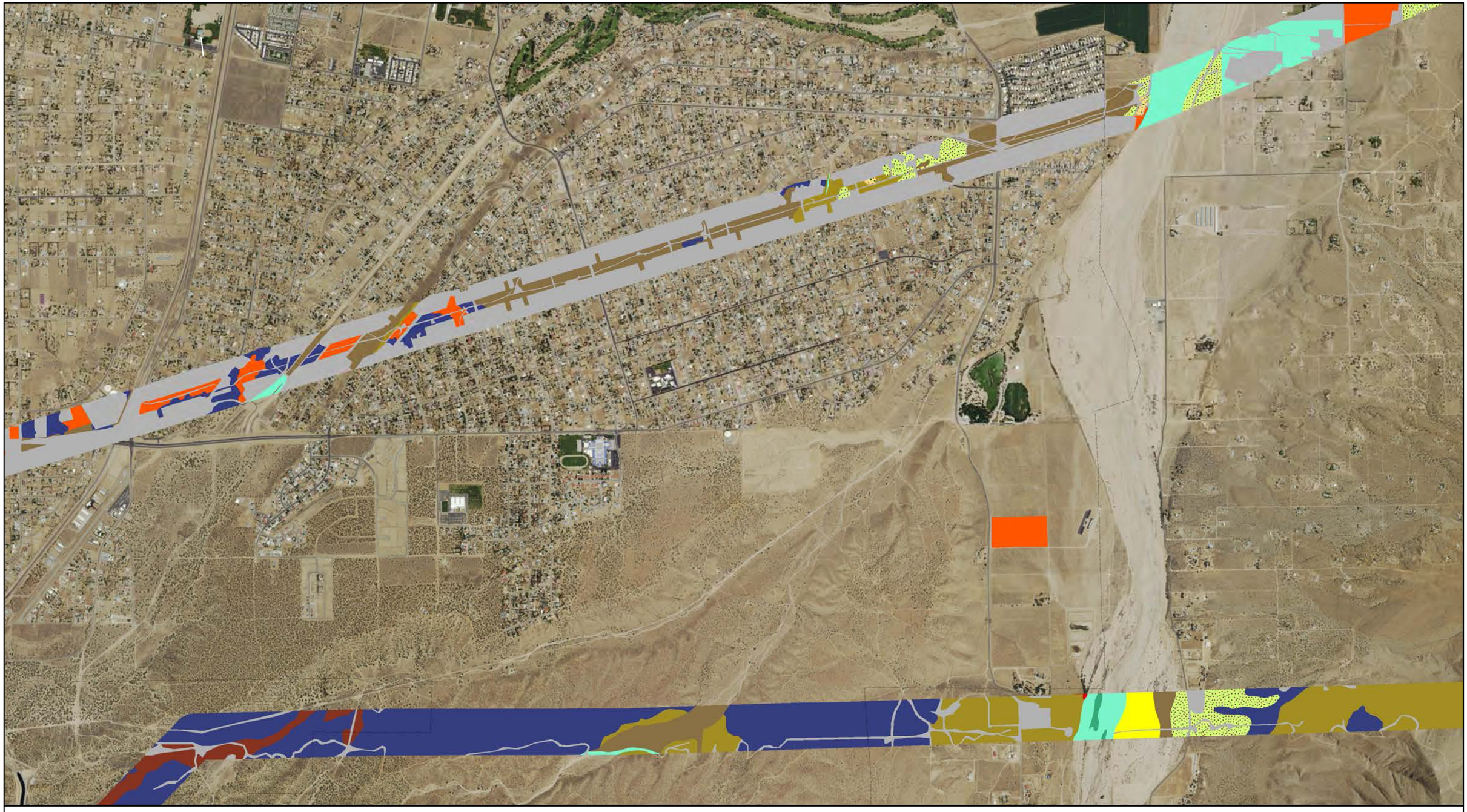
Figure 4-2

See Page 24

See Page 26

See Page 28

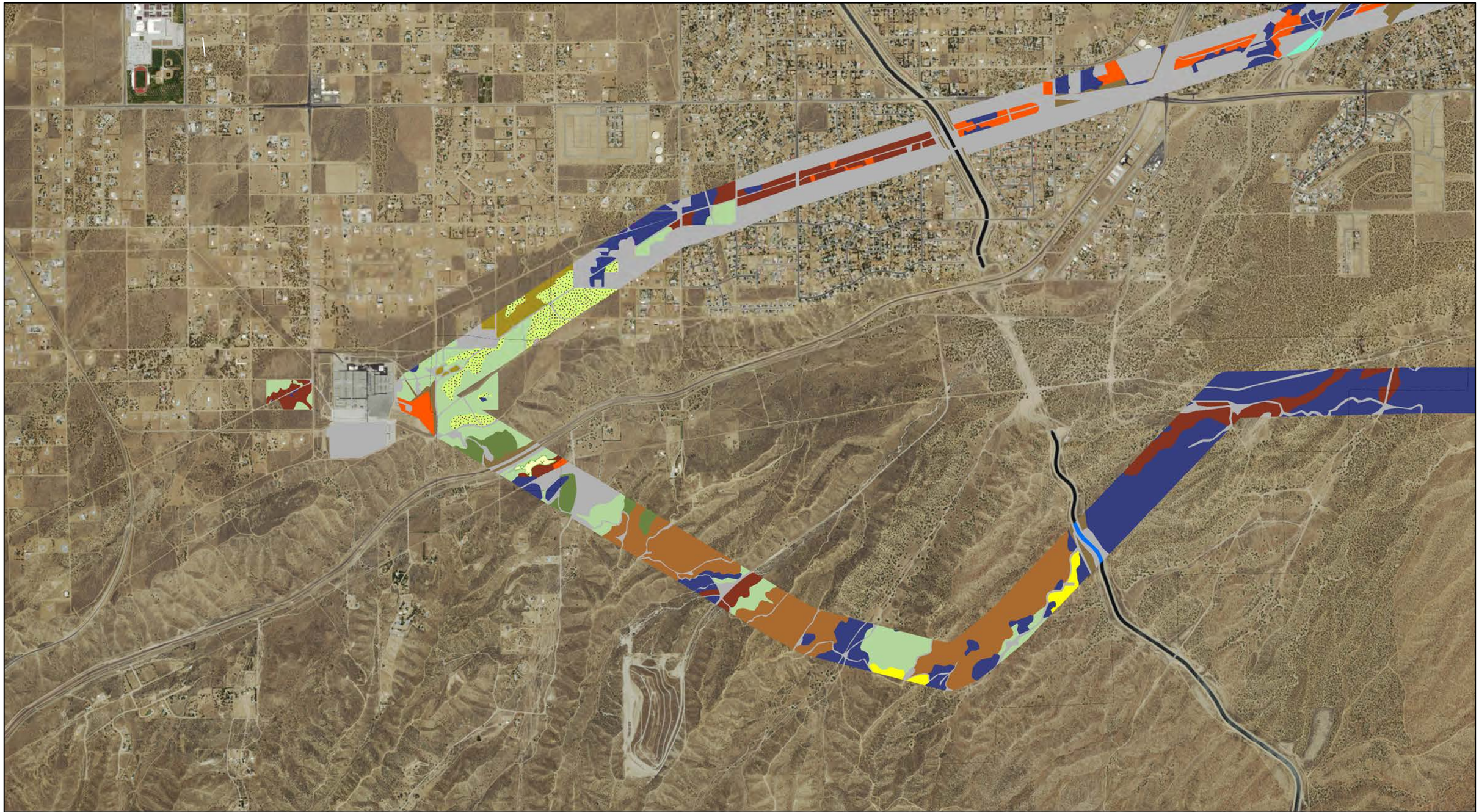
See Page 25



Vegetation

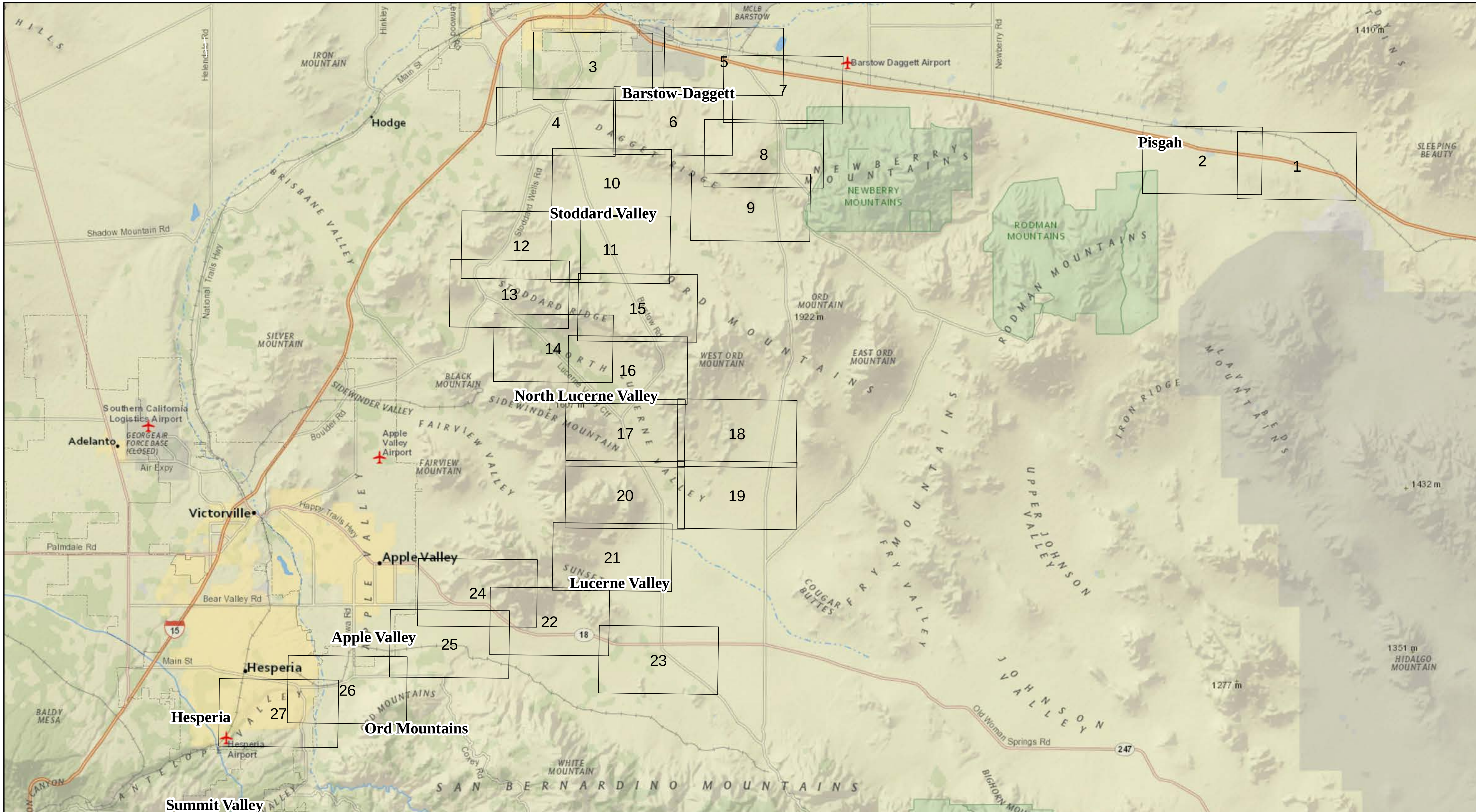
Figure 4-2

See Page 27



Vegetation

Figure 4-2



Map Page

City Boundaries

0 4 8 Miles

Special-Status Plants and Wildlife

Figure 4-3

See Page 2

0 0.25 0.5 Miles

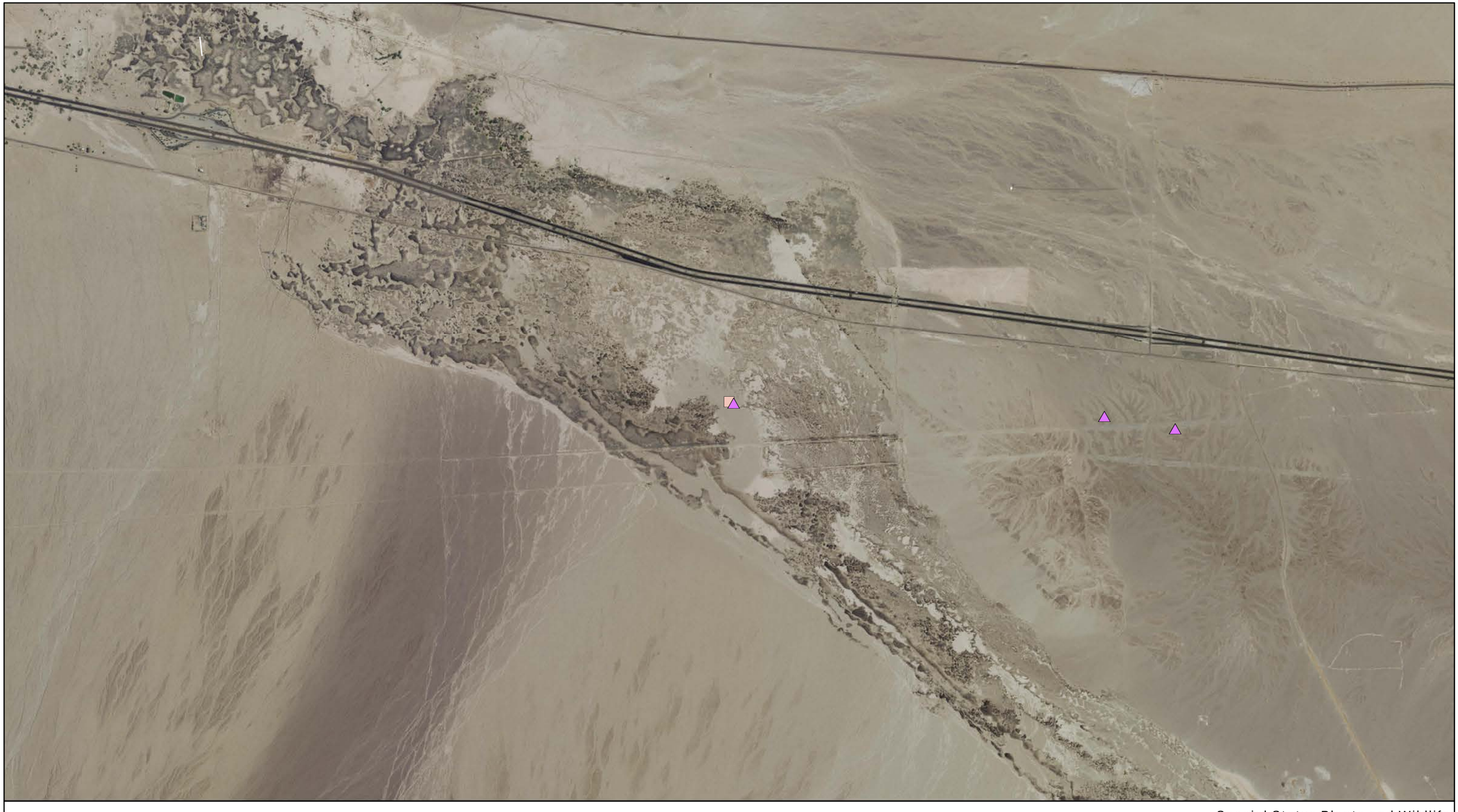
Burrowing Owl Sign (Protocol)
- Burrow

Tortoise Sign (Protocol)
- Burrow
- Scat

Special-Status Plants and Wildlife

Figure 4-3

See Page 1

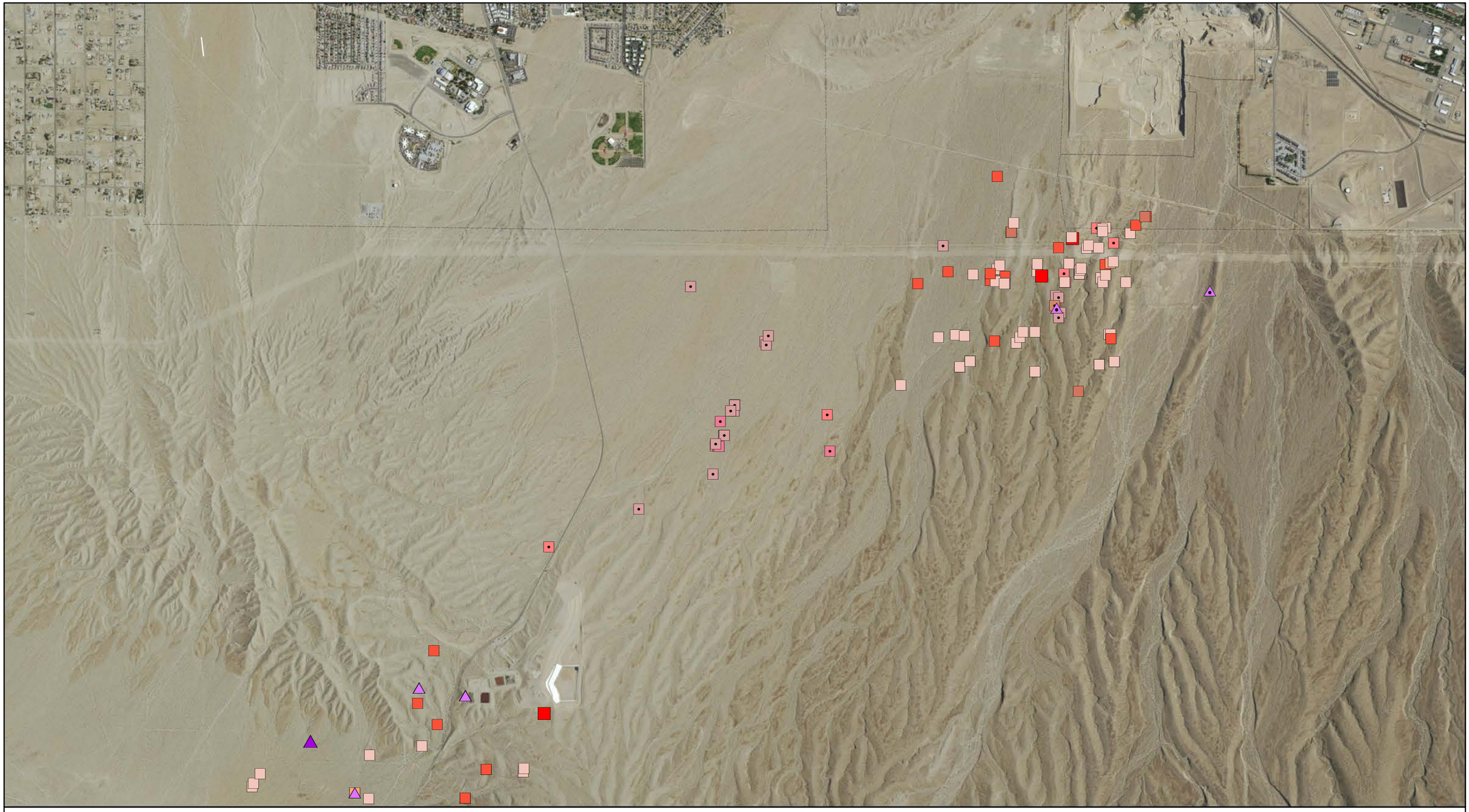


0 0.25 0.5 Miles

Burrowing Owl Sign (Protocol)
Burrow
Tortoise Sign (Protocol)
Burrow

Special-Status Plants and Wildlife

Figure 4-3



Special-Status Plants and Wildlife

Figure 4-3

See Page 3

See Page 6

See Page 10

Burrowing Owl Sign (Protocol)
- Live Sighting
- Burrow

Tortoise Sign (Protocol)
- Live Sighting
- Burrow
- Carcass
- Scat

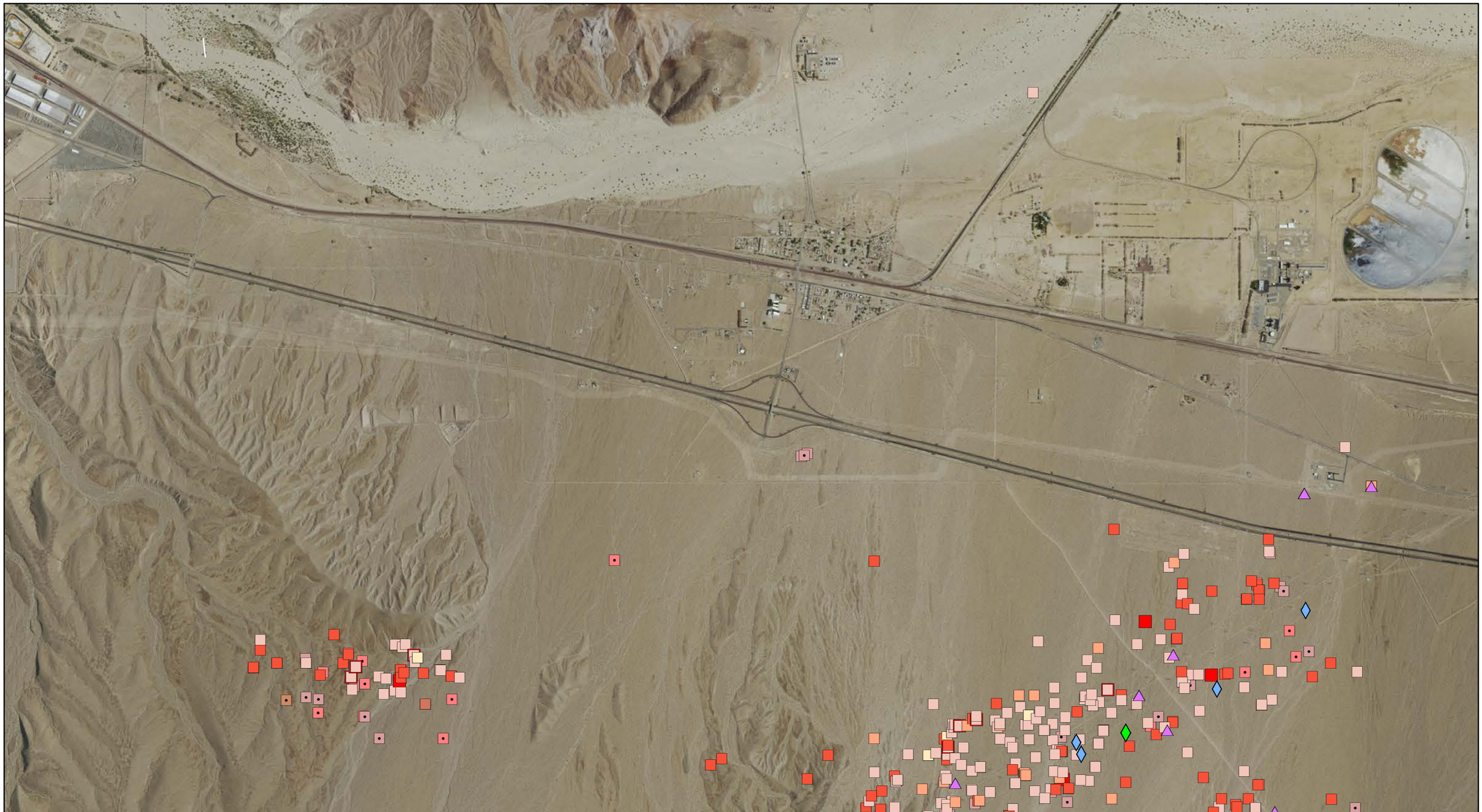
Tortoise Sign (General Obs.)
- Live Sighting
- Burrow
- Carcass

0 0.25 0.5 Miles

Special-Status Plants and Wildlife

Figure 4-3

See Page 7



See Page 6

Special-Status Plants and Wildlife

Figure 4-3

See Page 4

See Page 7

See Page 10

Rare Bird Species Live Sighting (Labeled)

Bird Nest

Burrowing Owl Sign (Protocol)

Burrow

Burrowing Owl Sign (General Obs.)

Burrow

Tortoise Sign (Protocol)

Live Sighting

Burrow

Carcass

Scat/Pellet

Scat

Tortoise Sign (General Obs.)

Live Sighting

Burrow

Carcass

Pallet

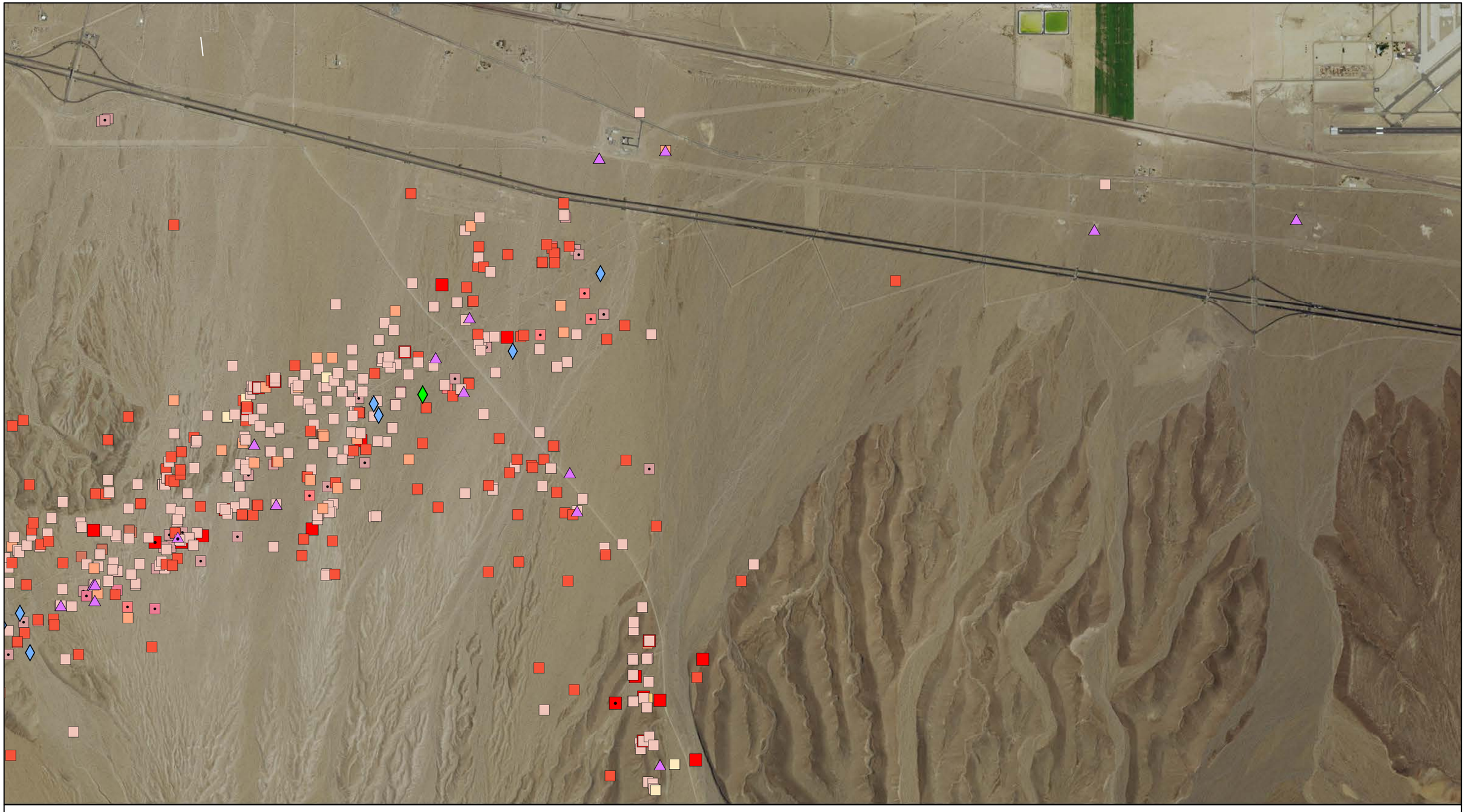
Scat

0 0.25 0.5 Miles

Special-Status Plants and Wildlife

Figure 4-3

See Page 6



See Page 8

Rare Bird Species Live Sighting (Labeled)

Bird Nest

Burrowing Owl Sign (Protocol)

Burrow

Burrowing Owl Sign (General Obs.)

Burrow

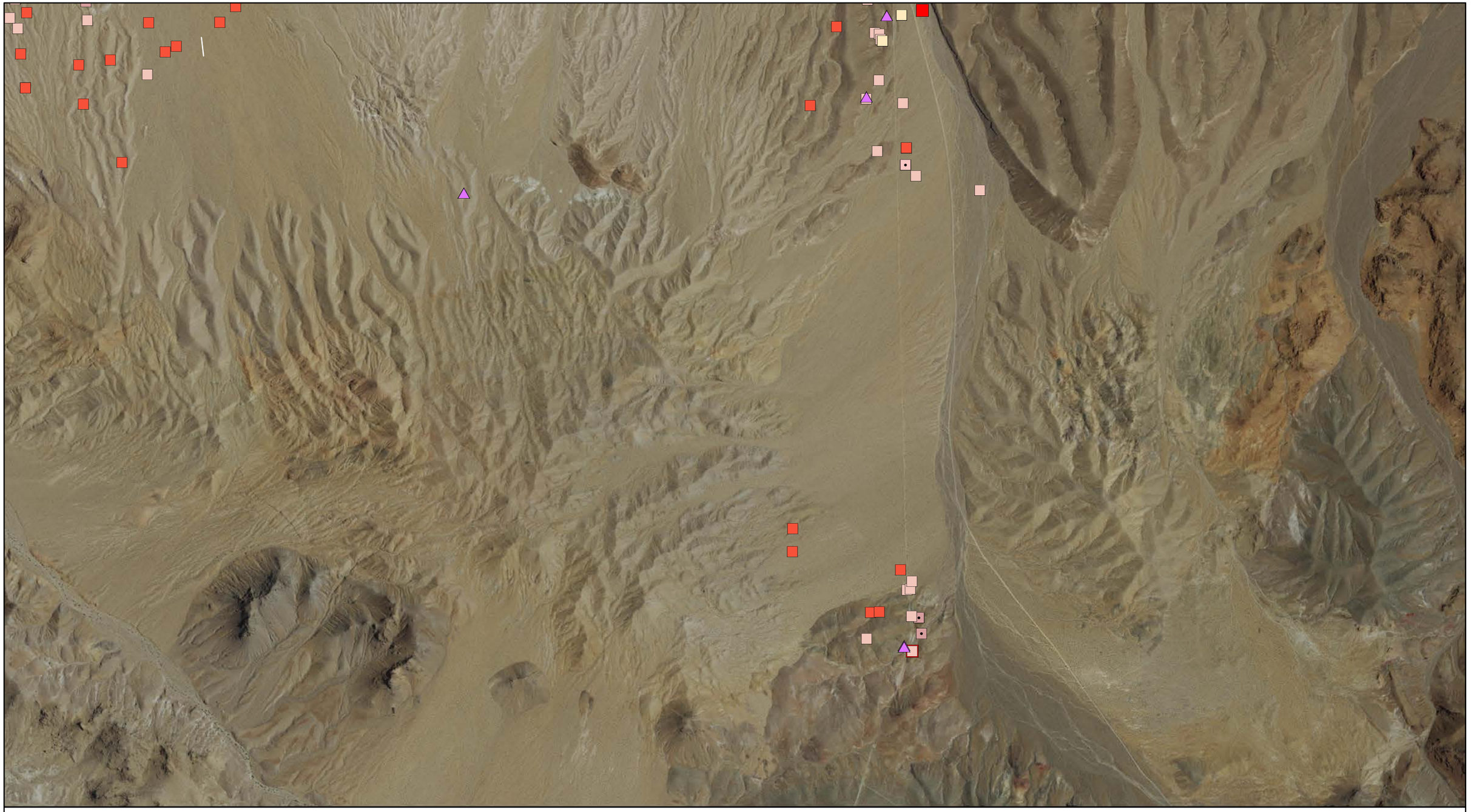
0 0.25 0.5 Miles

Special-Status Plants and Wildlife

Figure 4-3

See Page 7

See Page 6



See Page 9

0 0.25 0.5 Miles

Burrowing Owl Sign (Protocol)
- Burrow

Burrowing Owl Sign (General Obs.)
- Burrow

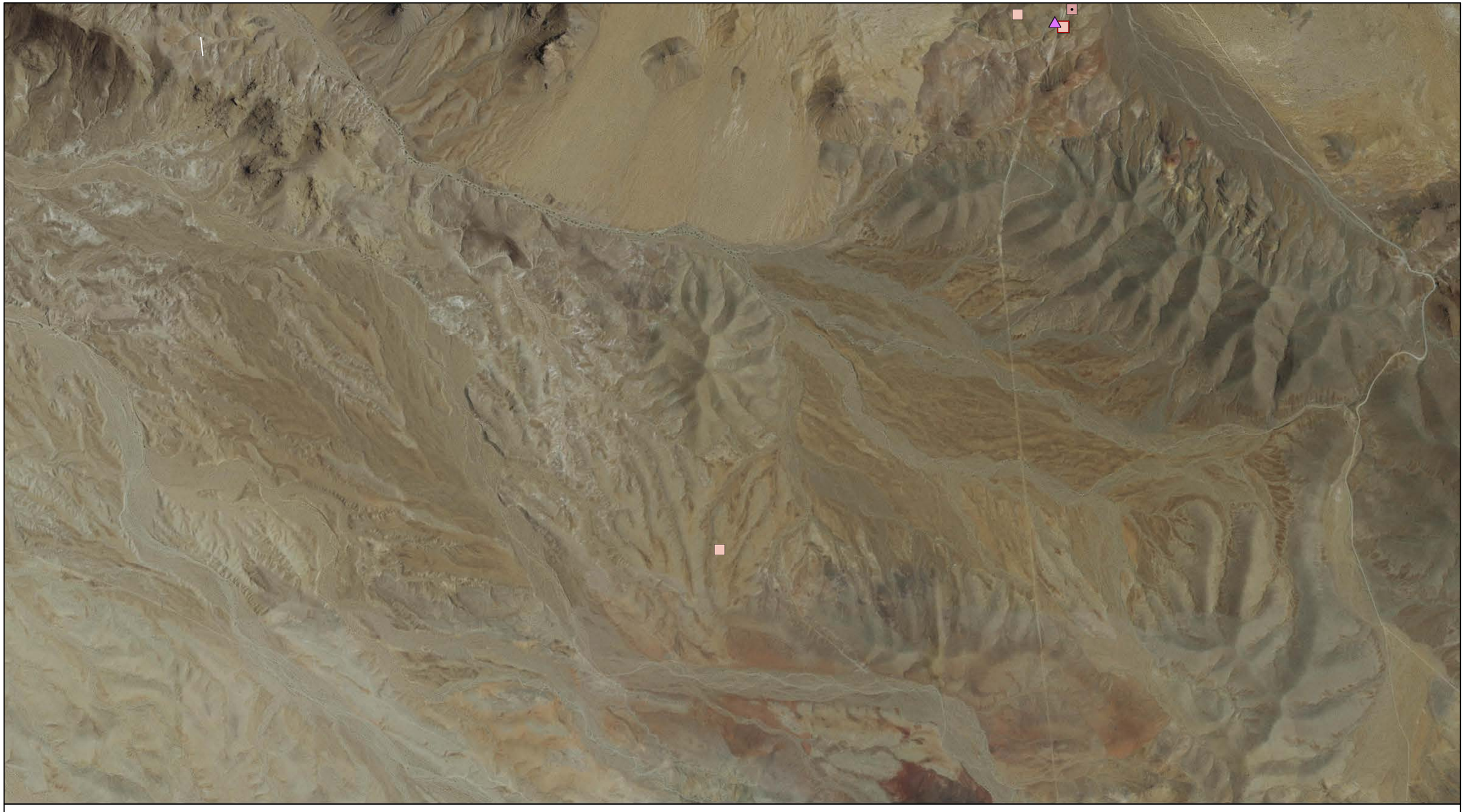
Tortoise Sign (Protocol)
- Live Sighting
- Tracks
- Burrow
- Carcass

Tortoise Sign (General Obs.)
- Scat
- Burrow
- Carcass
- Scat
- Tracks

Special-Status Plants and Wildlife

Figure 4-3

See Page 8



Burrowing Owl Sign (Protocol)
- Burrow

Burrowing Owl Sign (General Obs.)
- Burrow

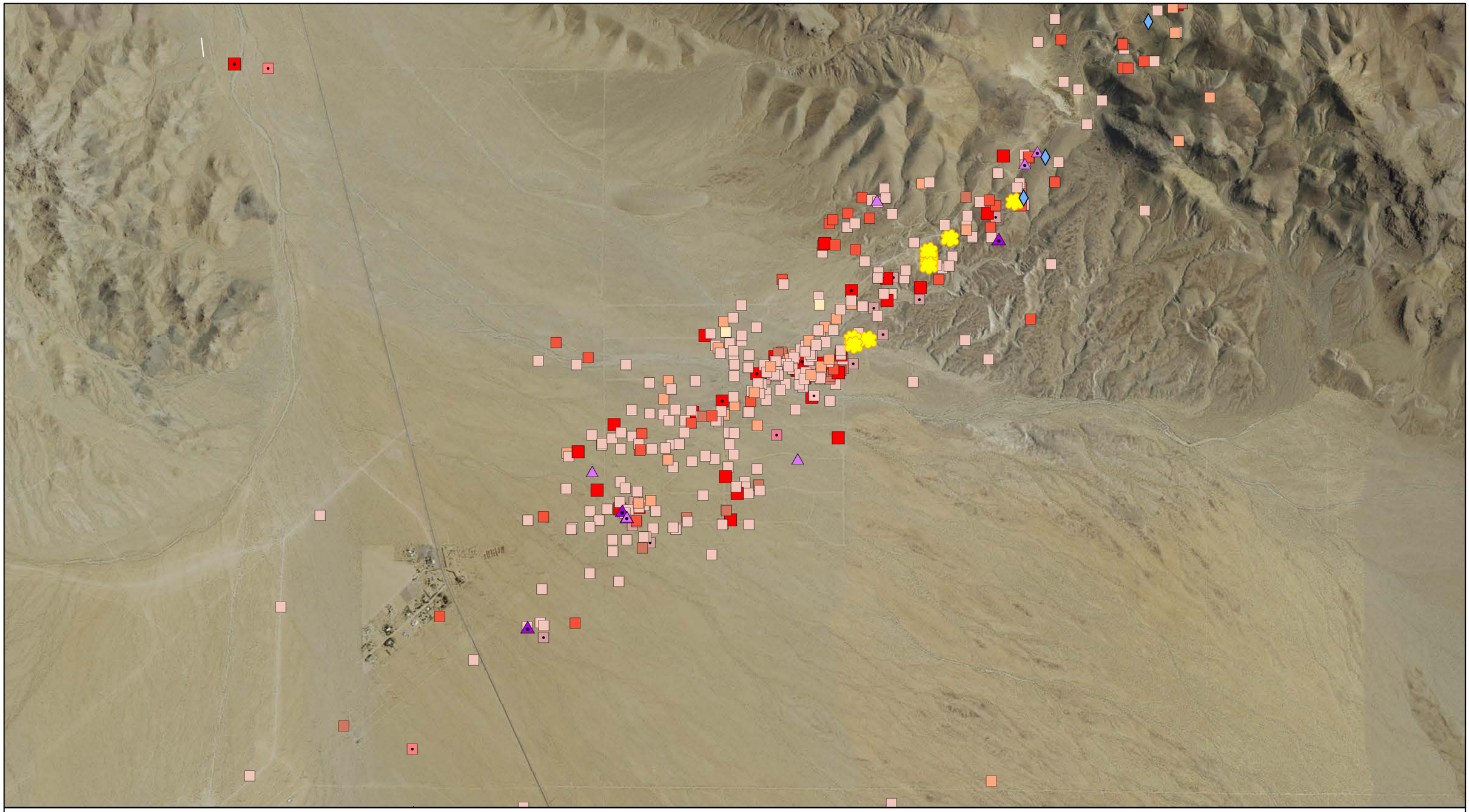
Tortoise Sign (Protocol)
- Live Sighting
- Burrow

Tortoise Sign (General Obs.)
- Burrow

0 0.25 0.5 Miles

Special-Status Plants and Wildlife

Figure 4-3



See Page 11

Special-Status Plants and Wildlife

Figure 4-3

See Page 10

See Page 12

See Page 15

Burrowing Owl Sign (Protocol)
- Live Sighting
- Burrow
- Pellet

Burrowing Owl Sign (General Obs.)
- Burrow
- Pellets

Tortoise Sign (Protocol)
- Live Sighting

- Burrow
- Carcass
- Scat/Pellet
- Scat

Tortoise Sign (General Obs.)
- Burrow
- Pallet

0 0.25 0.5 Miles

Special-Status Plants and Wildlife

Figure 4-3

See Page 10

See Page 11

See Page 13

Bird Nest

Burrowing Owl Sign (Protocol)
- Burrow

Burrowing Owl Sign (General Obs.)
- Burrow
- Carcass
- Pellets

Tortoise Sign (Protocol)
- Live Sighting
- Burrow
- Carcass
- Scat/Pellet

- Scat

Tortoise Sign (General Obs.)
- Burrow
- Carcass
- Pallet

0 0.25 0.5 Miles

Special-Status Plants and Wildlife

Figure 4-3

See Page 12

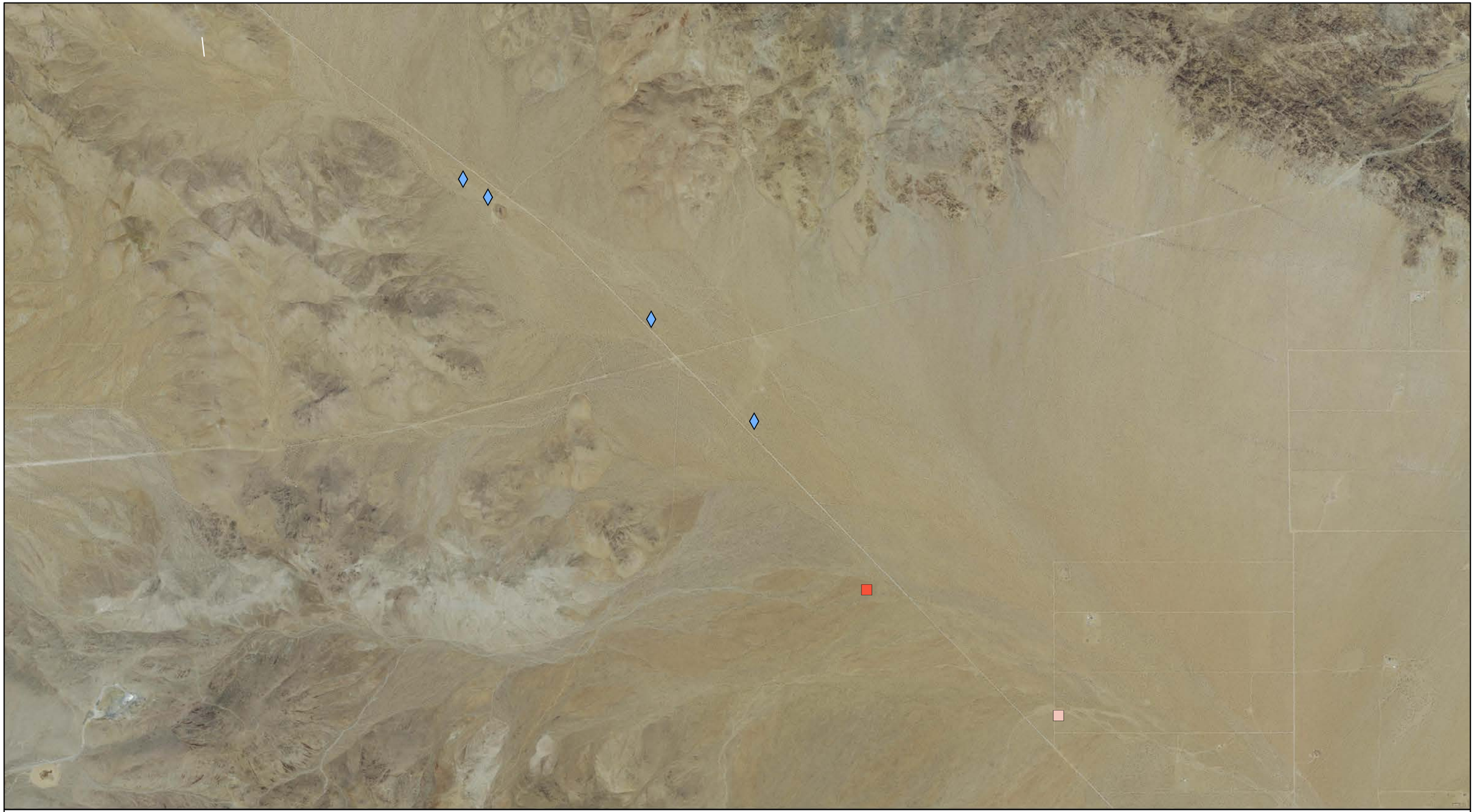
See Page 14

See Page 11

Special-Status Plants and Wildlife

Figure 4-3

See Page 13



See Page 16

Special-Status Plants and Wildlife

Figure 4-3

See Page 11

See Page 14

See Page 16

0 0.25 0.5 Miles

Burrowing Owl Sign (Protocol)
- Burrow

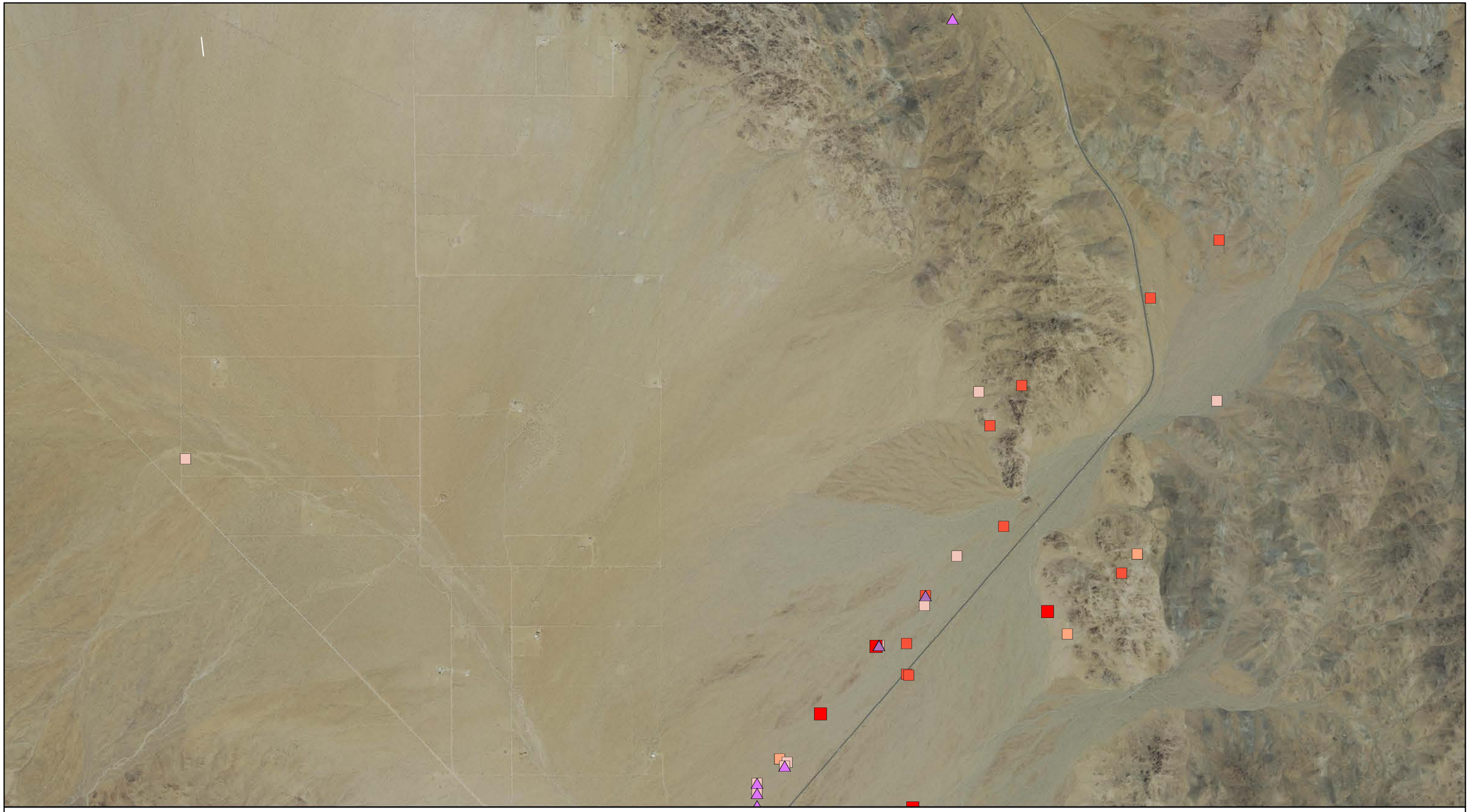
Tortoise Sign (Protocol)
- Burrow
- Scat

Special-Status Plants and Wildlife

Figure 4-3

See Page 15

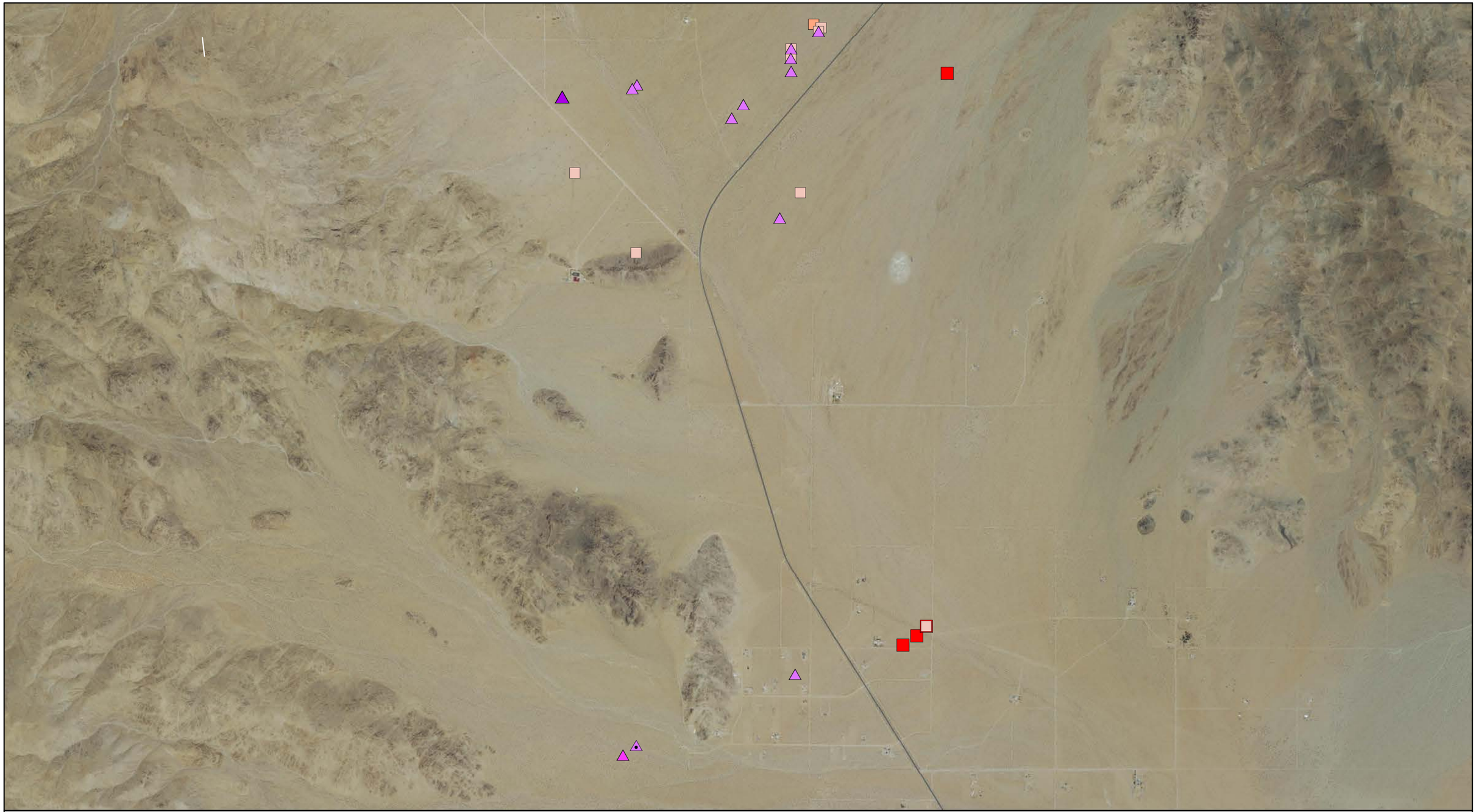
See Page 14



Special-Status Plants and Wildlife

Figure 4-3

See Page 16



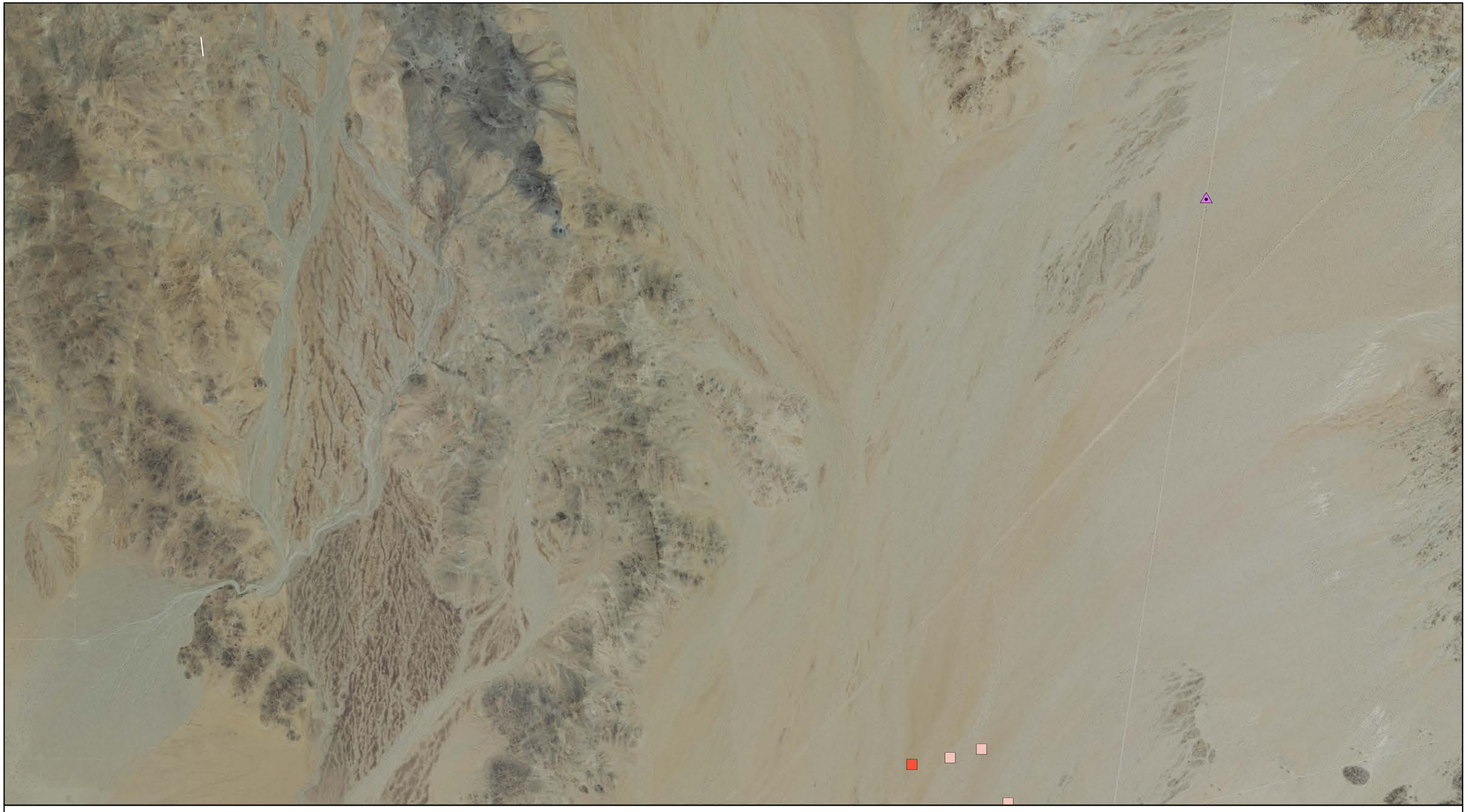
See Page 18

Special-Status Plants and Wildlife

Figure 4-3

See Page 16

See Page 17



See Page 19

0 0.25 0.5 Miles

Burrowing Owl Sign (Protocol)
- Burrow

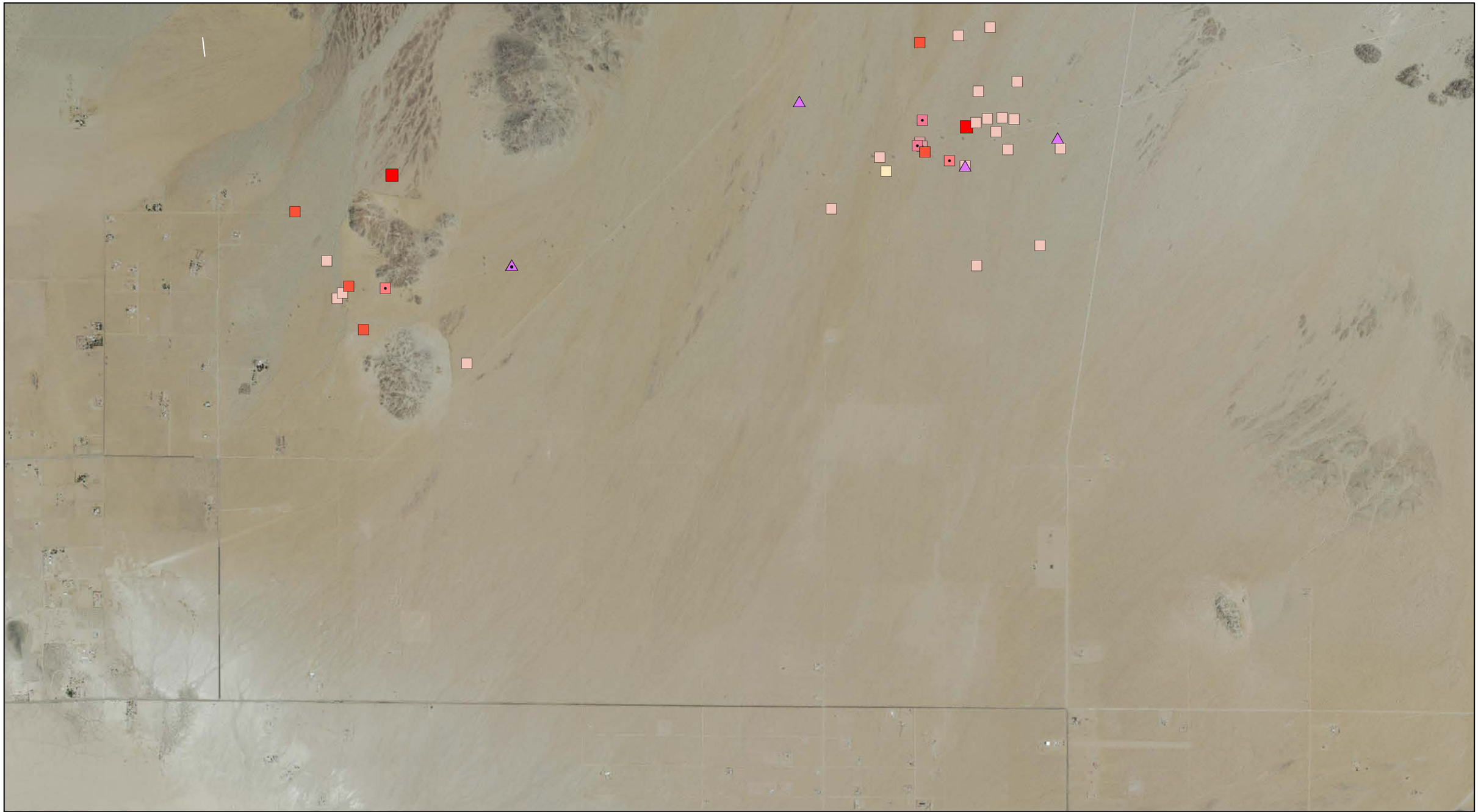
Tortoise Sign (Protocol)
- Burrow
- Carcass

Special-Status Plants and Wildlife

Figure 4-3

See Page 18

See Page 20



0 0.25 0.5 Miles

Burrowing Owl Sign (Protocol)
- Burrow

Burrowing Owl Sign (General Obs.)
- Burrow
- Pellets

Tortoise Sign (Protocol)
- Live Sighting
- Tracks
- Burrow
- Carcass

Tortoise Sign (General Obs.)
- Burrow
- Carcass
- Scat

Special-Status Plants and Wildlife

Figure 4-3

See Page 17

See Page 19

See Page 21

0 0.25 0.5 Miles

Burrowing Owl Sign (Protocol)
- Burrow
- Scat/Pellet

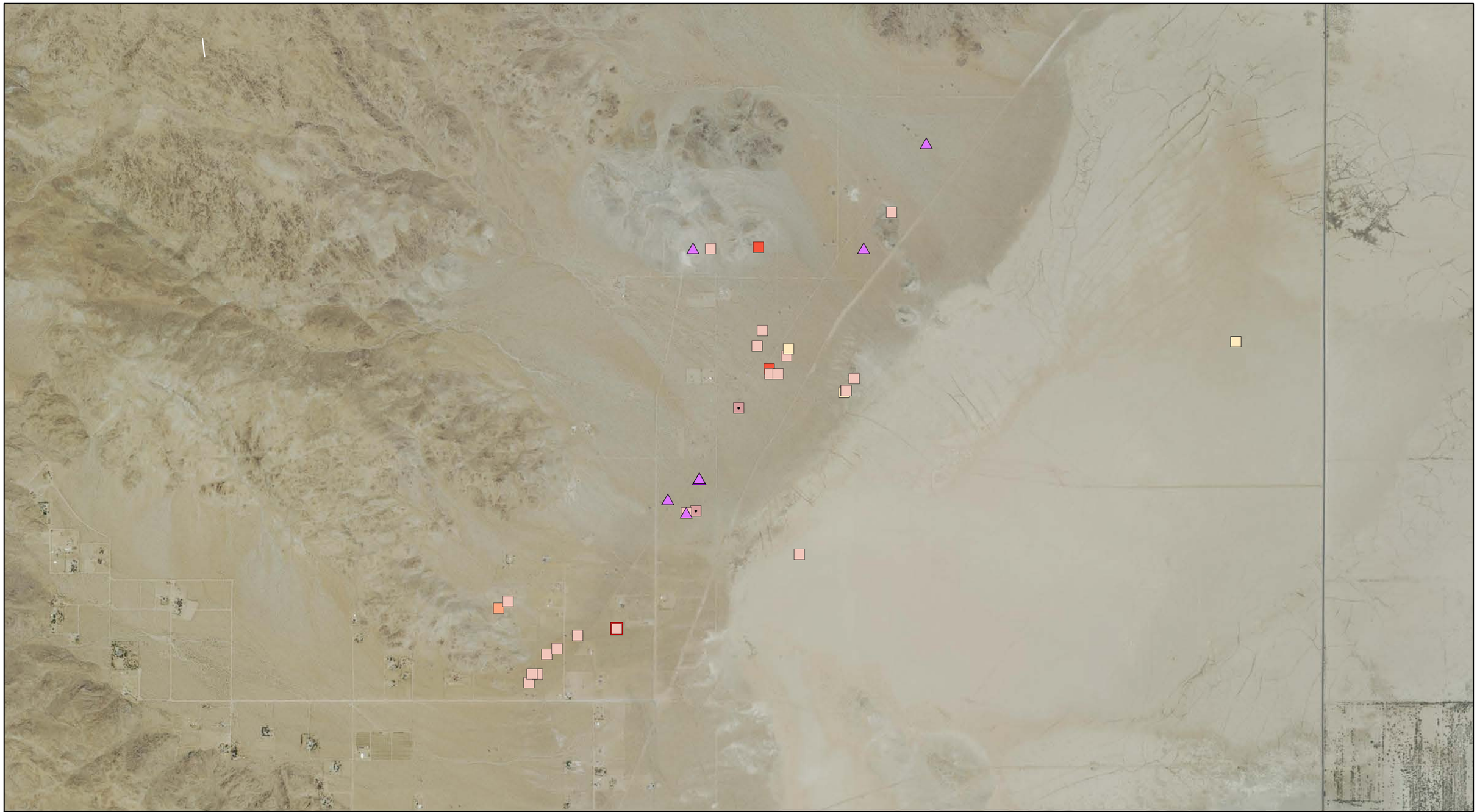
Burrowing Owl Sign (General Obs.)
- Burrow

Perris Sign (Protocol)
- Burrow
- Carcass
- Scat

Special-Status Plants and Wildlife

Figure 4-3

See Page 20



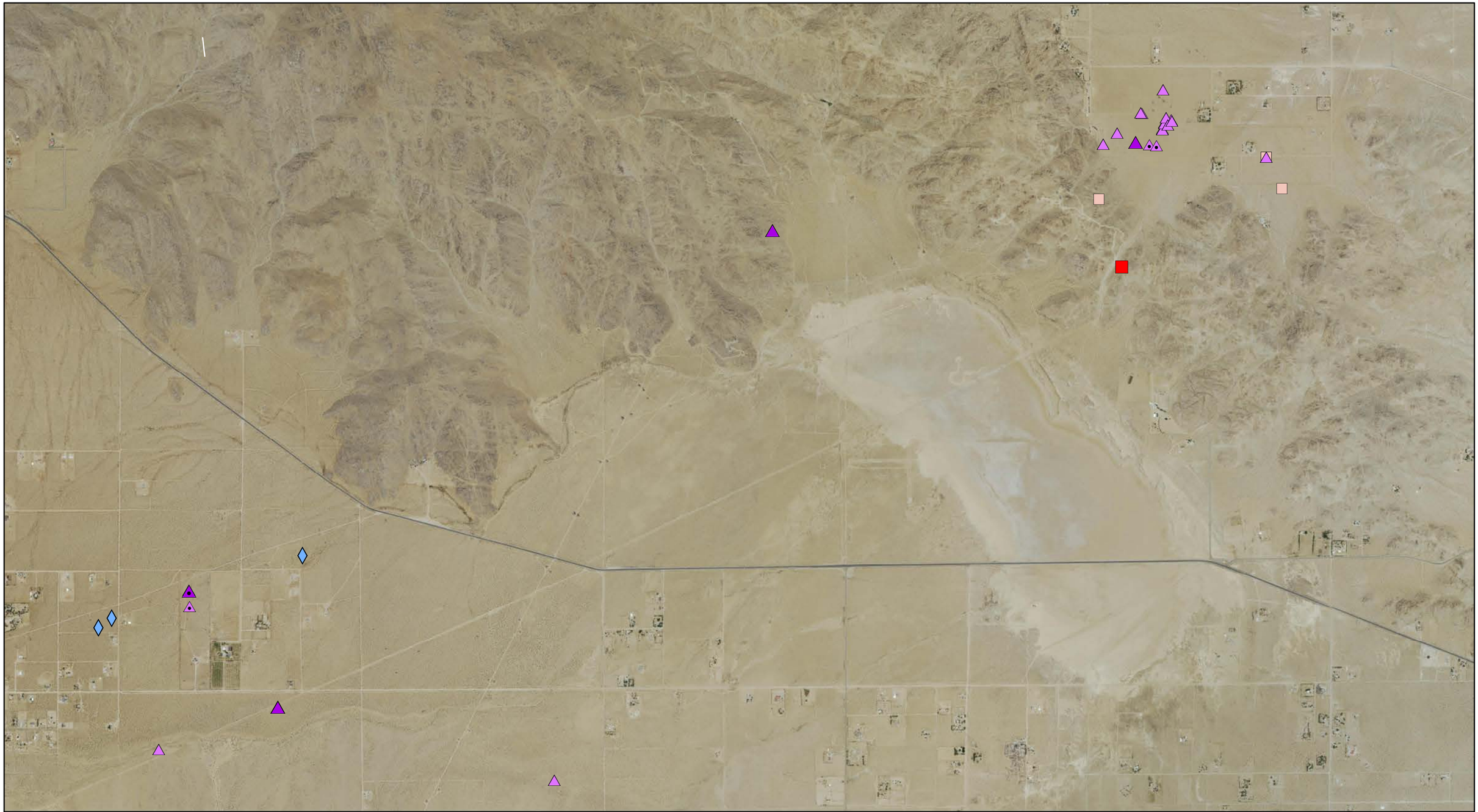
Special-Status Plants and Wildlife

Figure 4-3

See Page 21

See Page 25

See Page 23



0 0.25 0.5 Miles

Bird Nest

Burrowing Owl Sign (Protocol)
- Live Sighting
- Burrow

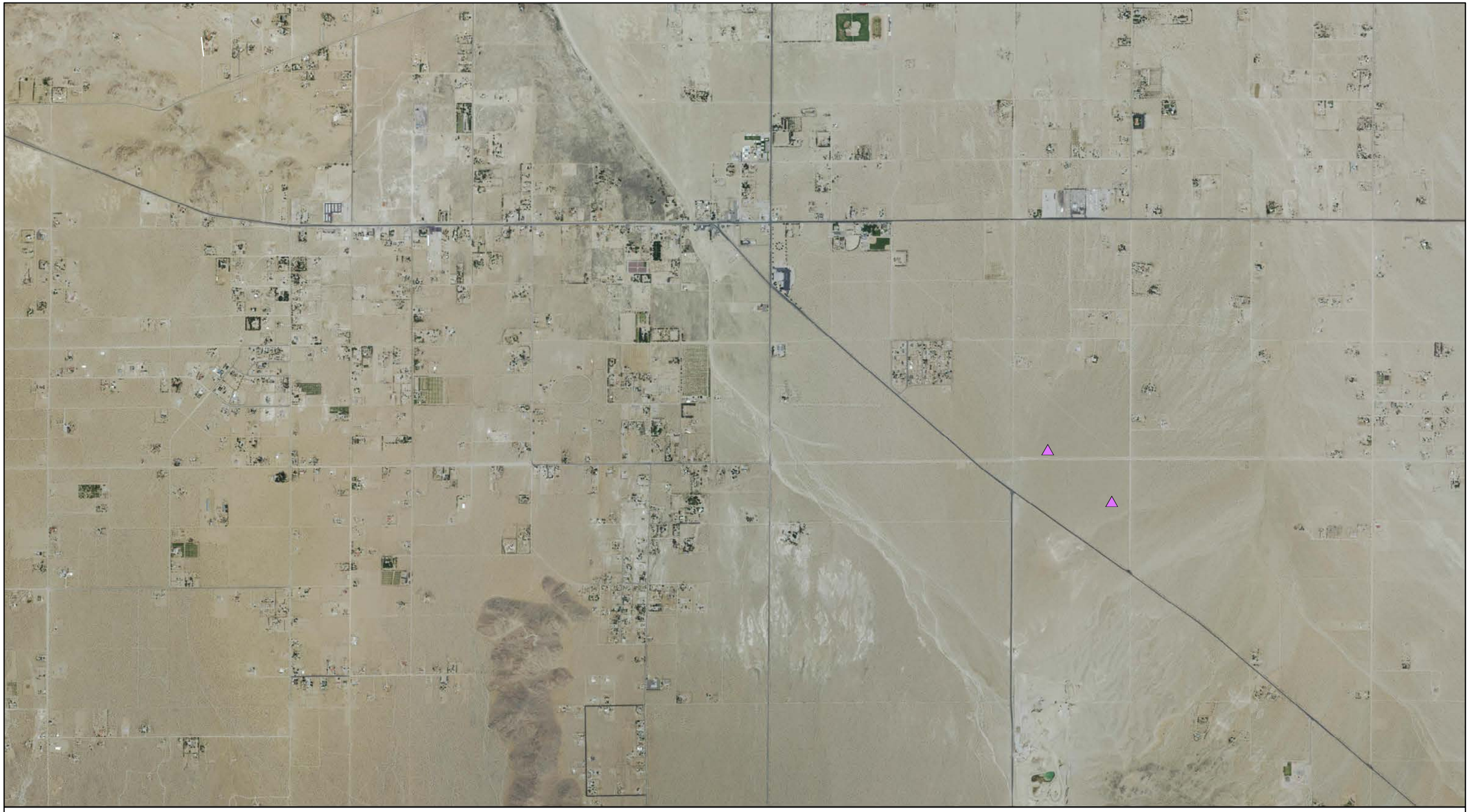
Burrowing Owl Sign (General Obs.)
- Live Sighting
- Burrow

Tortoise Sign (Protocol)
- Live Sighting
- Burrow

Special-Status Plants and Wildlife

Figure 4-3

See Page 22



Special-Status Plants and Wildlife

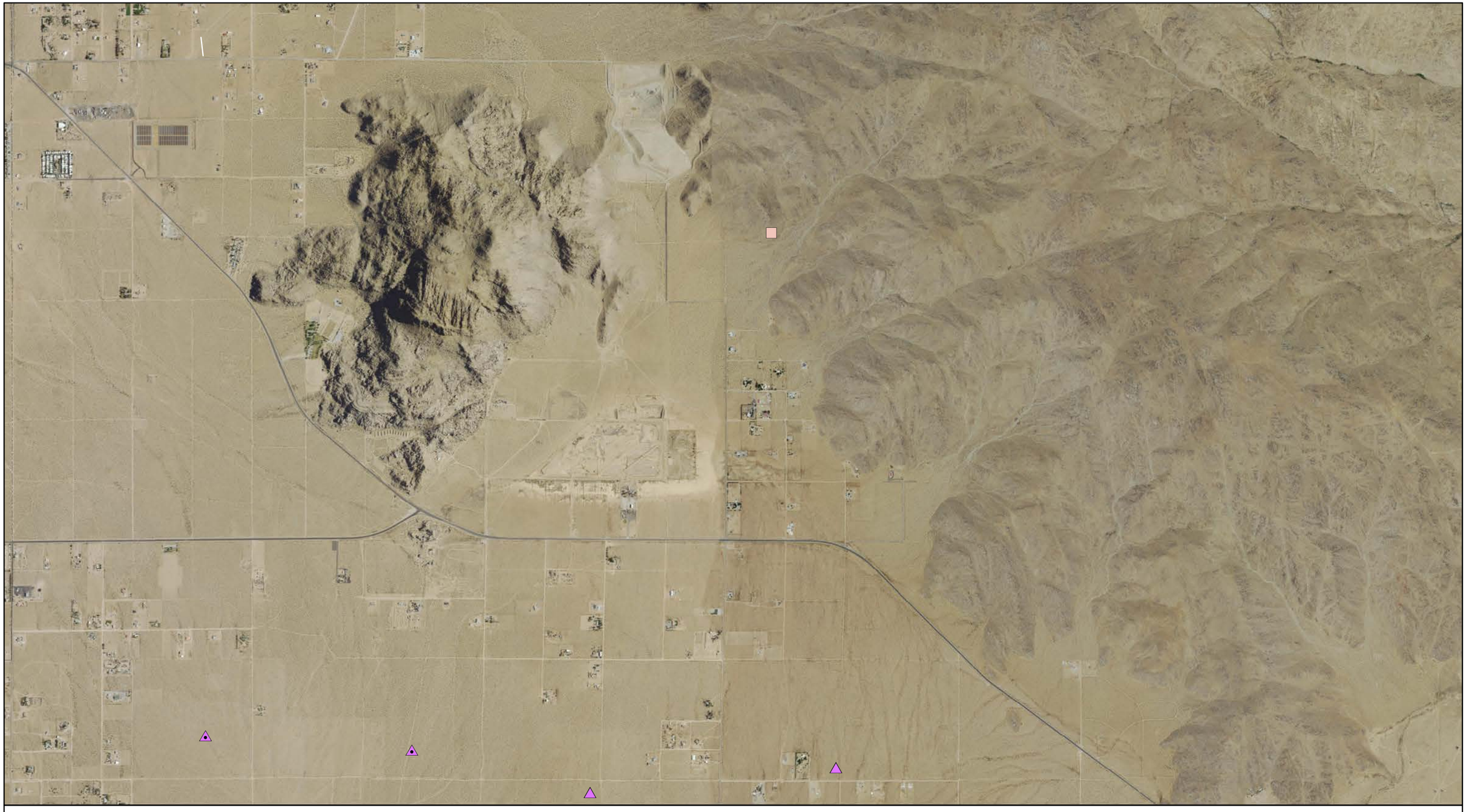
Burrowing Owl Sign (Protocol)

▲ Burrow

0 0.25 0.5 Miles

Figure 4-3

See Page 22



See Page 25

Burrowing Owl Sign (Protocol)
- Burrow

Burrowing Owl Sign (General Obs.)
- Burrow

Tortoise Sign (Protocol)
- Burrow

0 0.25 0.5 Miles

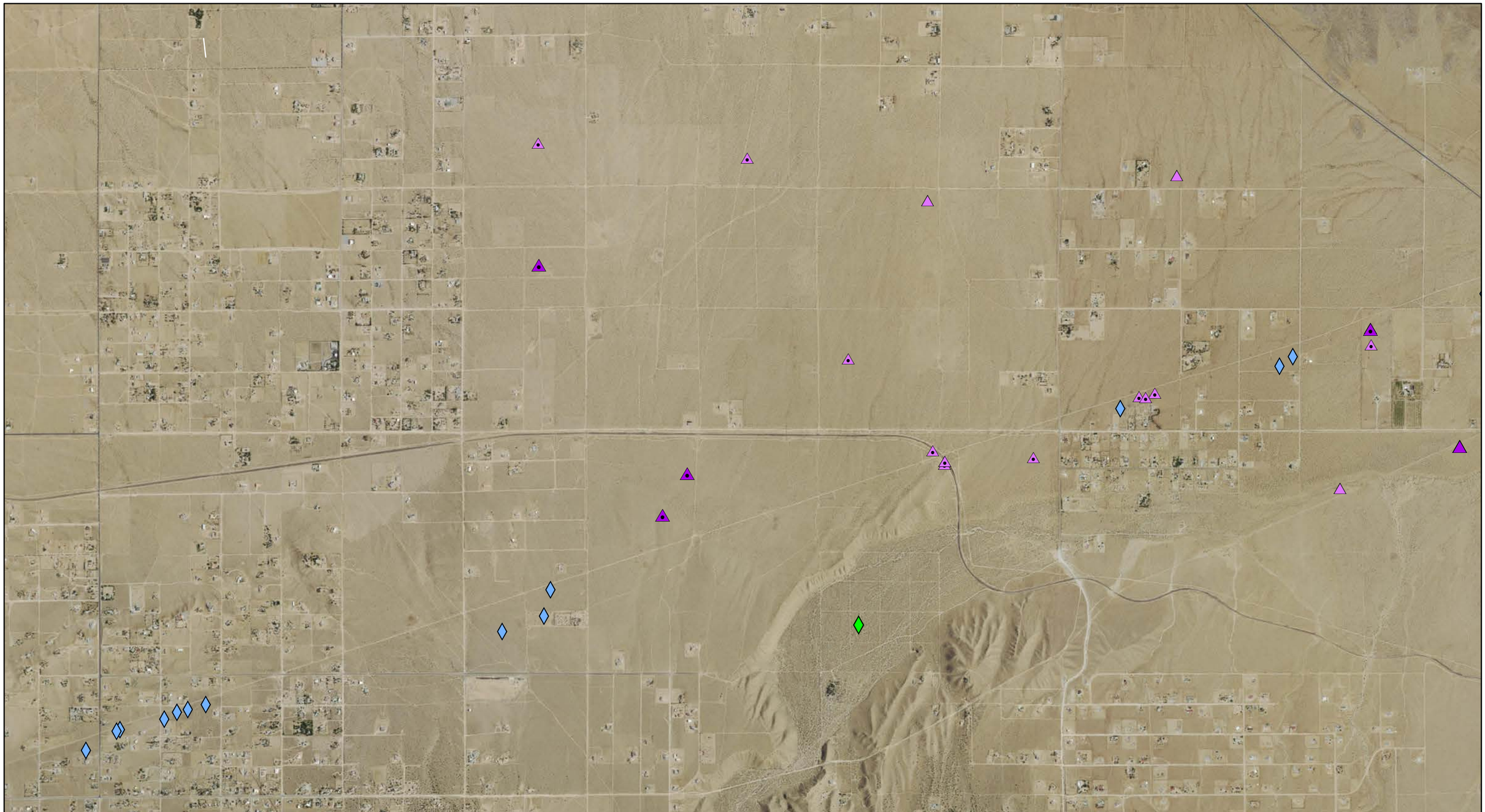
Special-Status Plants and Wildlife

Figure 4-3

See Page 24

See Page 26

See Page 22



0 0.25 0.5 Miles

Rare Bird Species Live Sighting (Labeled)

Bird Nest

Burrowing Owl Sign (Protocol)

Live Sighting

Burrow

Burrowing Owl Sign (General Obs.)

Live Sighting

Burrow

Special-Status Plants and Wildlife

Figure 4-3

See Page 27

Special-Status Plants and Wildlife

Bird Nest

0 0.25 0.5 Miles

Figure 4-3

See Page 25

See Page 26

Special-Status Plants and Wildlife

Figure 4-3

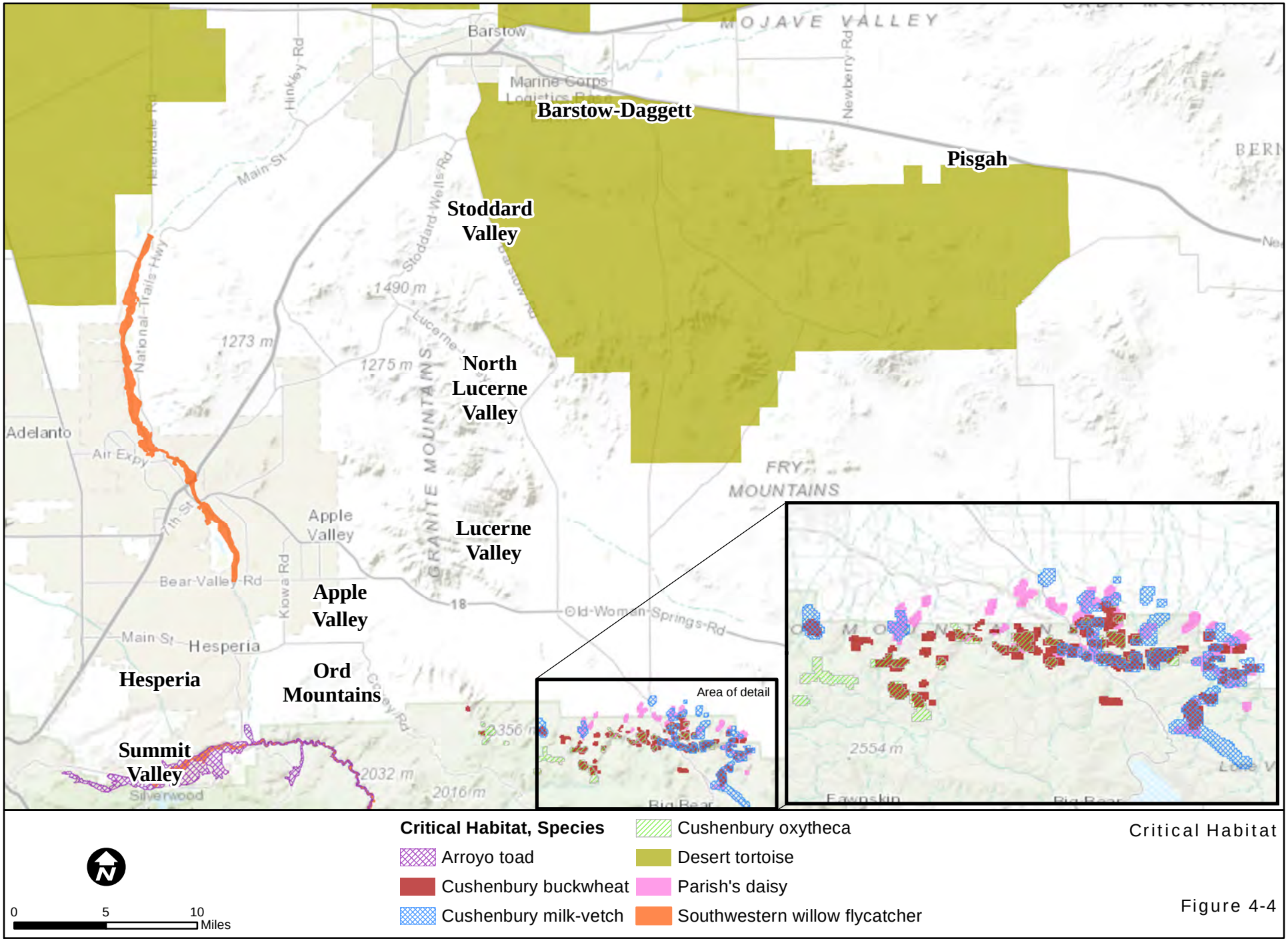
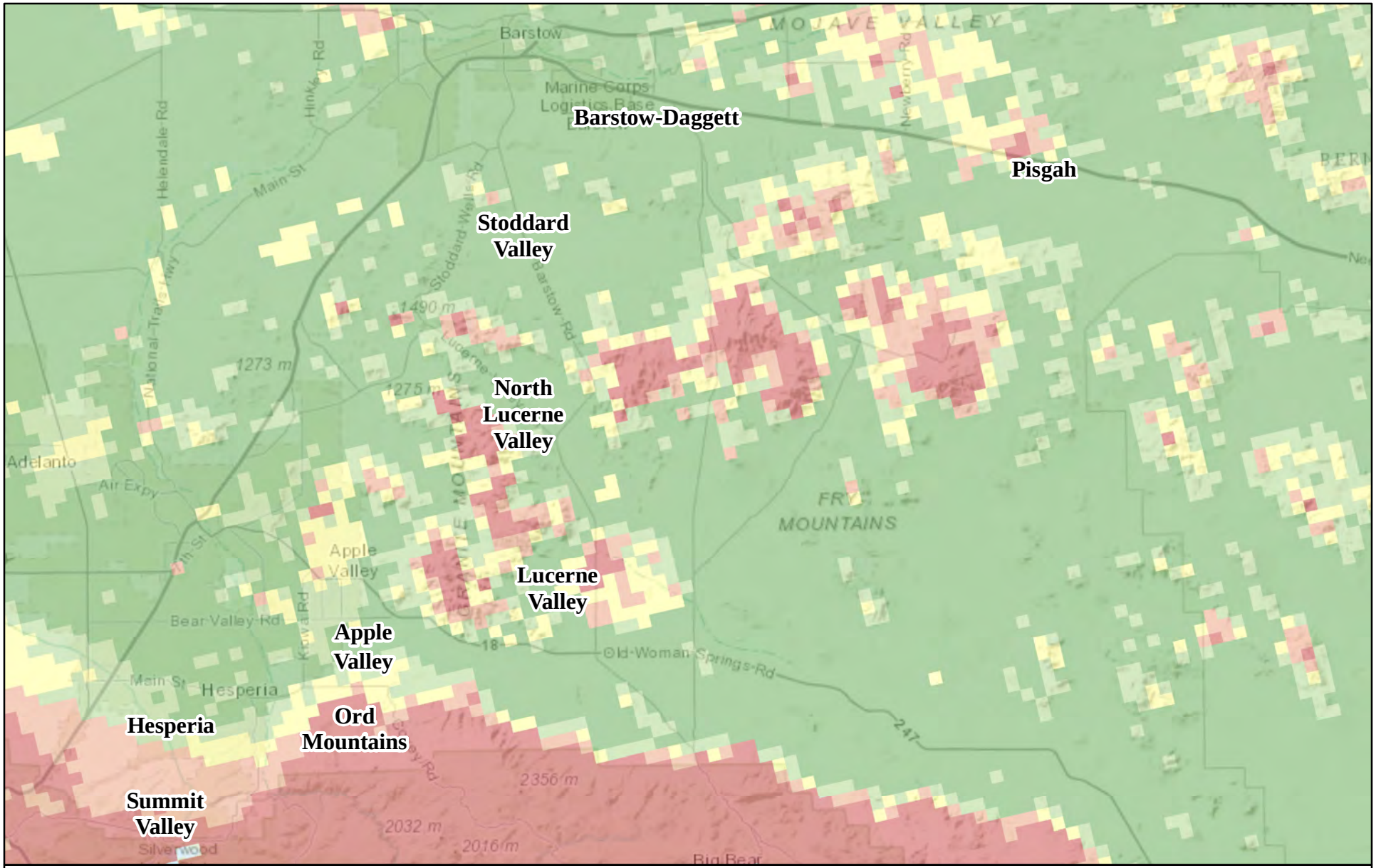
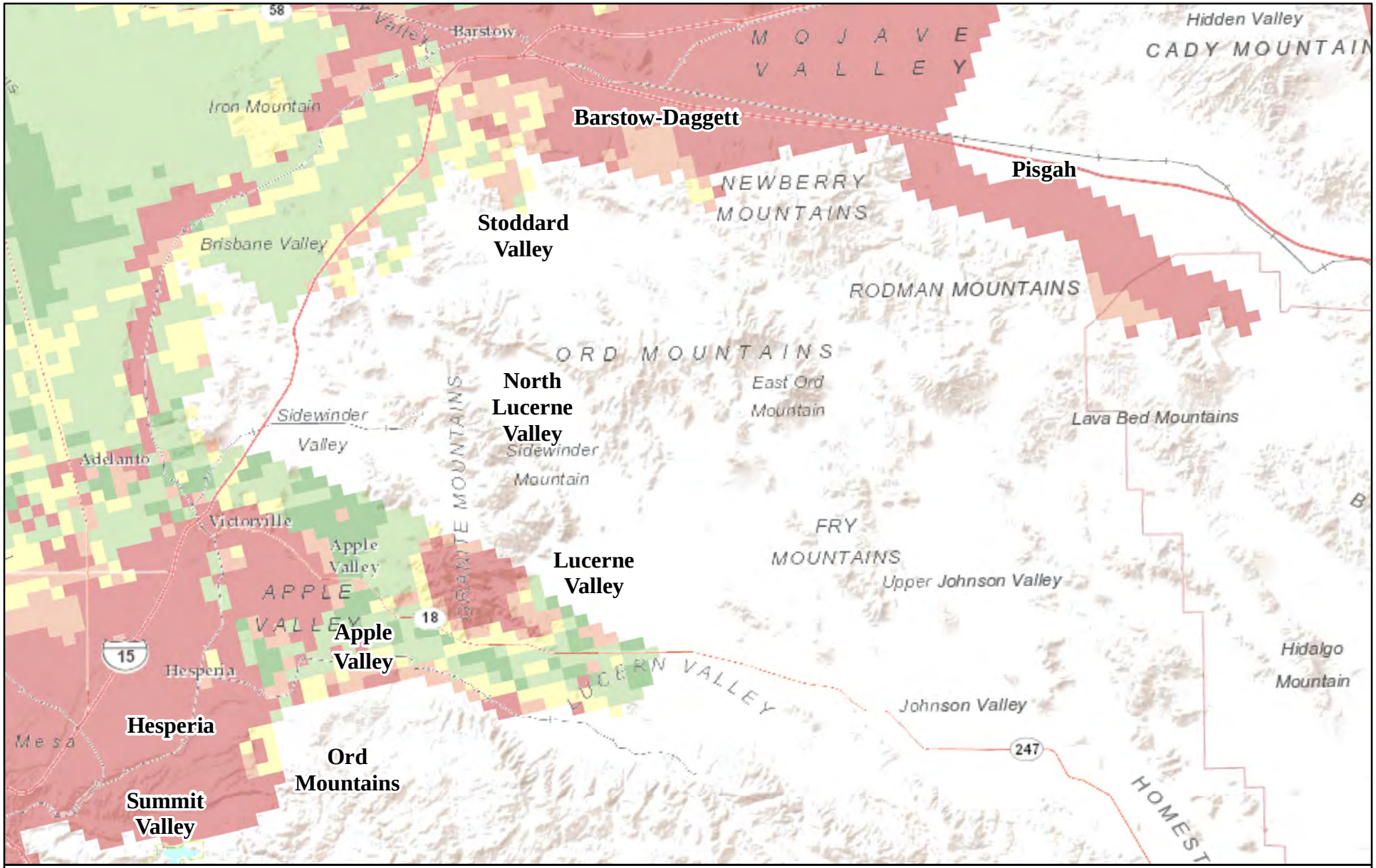

Barstow
MOJAVE VALLEY
Marine Corps Logistics Base
Barstow-Daggett
Pisgah
Stoddard Valley
North Lucerne Valley
Lucerne Valley
Apple Valley
Hesperia
Ord Mountains
Summit Valley
Adelanto
Air Expy
Main St
Hinkley Rd
Newberry Rd
Stoddard Wells Rd
National Trails Hwy
Lucerne
Bear Valley Rd
Kiowa Rd
Old Woman Springs Rd
Crowy Rd
Silverwood
GRANITE MOUNTAINS
FRY MOUNTAINS
1490 m
1273 m
1275 m
2356 m
2032 m
2016 m
2554 m
Area of detail
Critical Habitat, Species
Arroyo toad
Cushenbury buckwheat
Cushenbury milk-vetch
Cushenbury oxytheca
Desert tortoise
Parish's daisy
Southwestern willow flycatcher
0
5
10
Miles
Critical Habitat

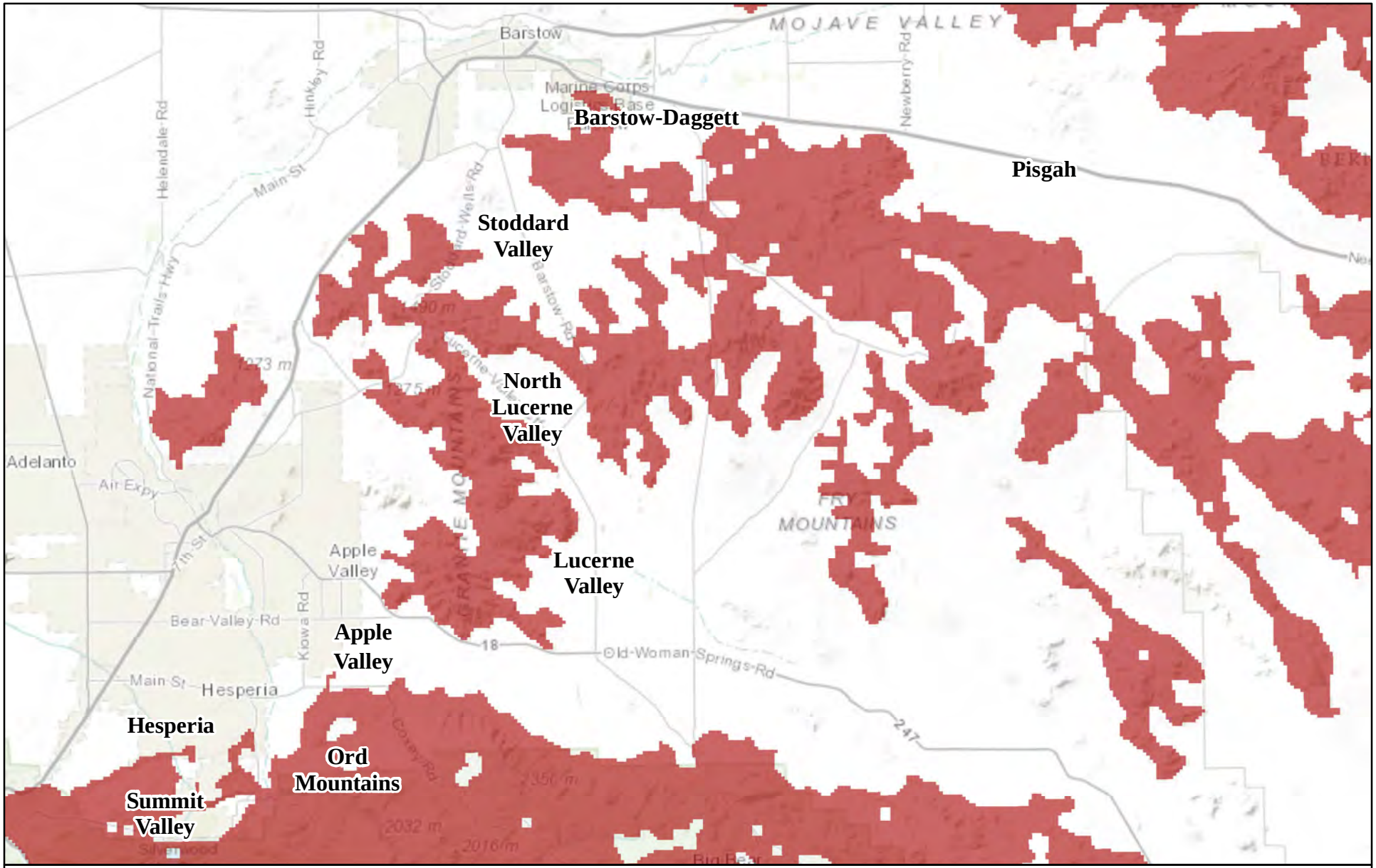
Figure 4-4

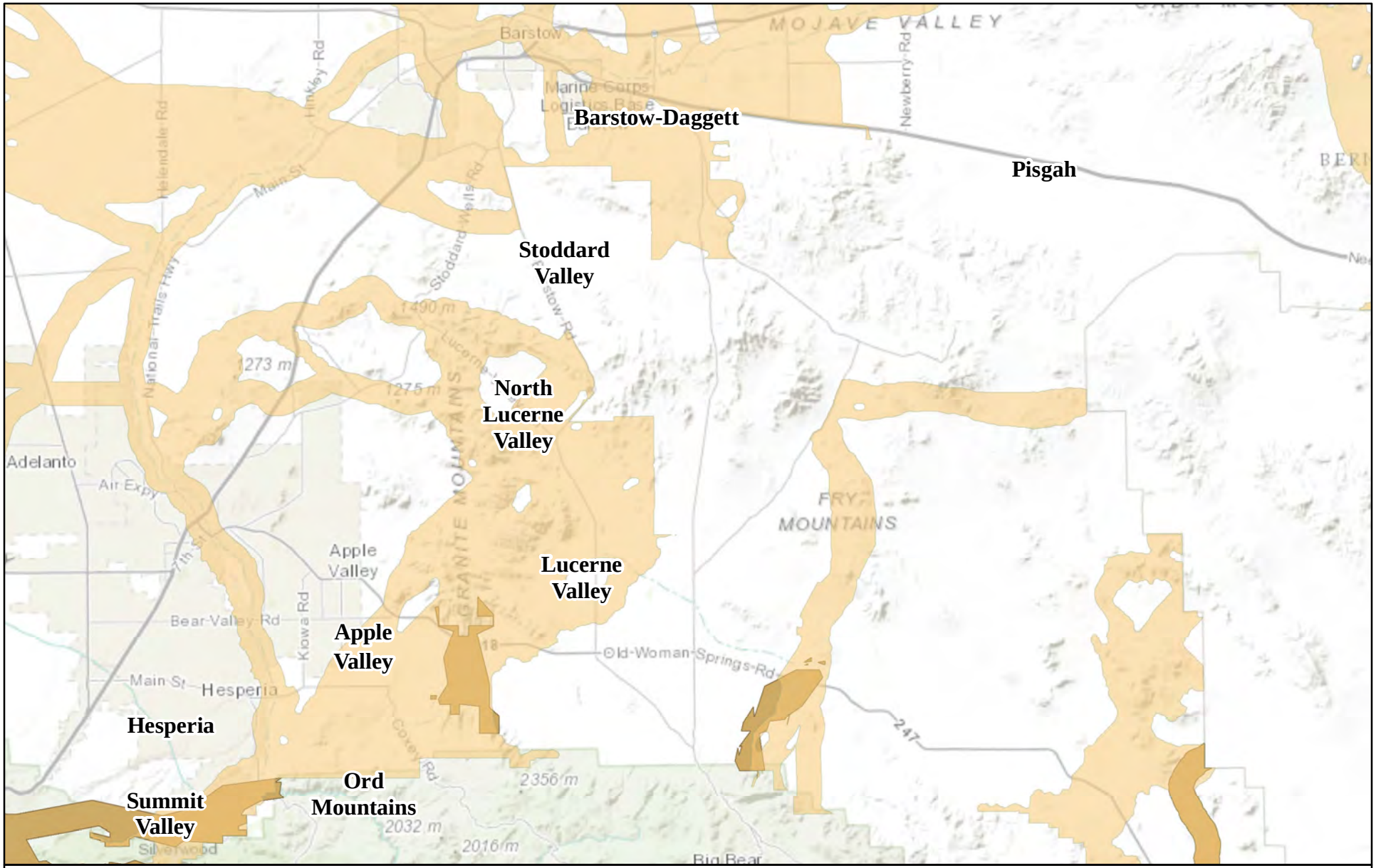

Barstow
Marine Corps Logistics Base
Barstow-Daggett
Pisgah
Stoddard Valley
North Lucerne Valley
Lucerne Valley
Apple Valley
Hesperia
Ord Mountains
Summit Valley
Adelanto
Air Expy
Bear Valley Rd
Main St
Old Woman Springs Rd
Helendale Rd
Hinkley Rd
Newberry Rd
Stoddard Wells Rd
Barstow Rd
National Trails Hwy
Lucerne
Kiowa Rd
Silverwood
Big Bear
1490 m
1273 m
1275 m
2356 m
2032 m
2016 m
MOJAVE VALLEY
MOUNTAINS
0
5
10
Miles
Desert Tortoise Modeled Habitat
Probability of Occurrence
0% - 20%
20% - 40%
40% - 60%
60% - 80%
80% - 100%
Desert Tortoise Modeled Habitat
Figure 4-5



Mohave Ground Squirrel Modeled Habitat

Figure 4-6


Barstow-Daggett
Pisgah
Stoddard Valley
North Lucerne Valley
Lucerne Valley
Apple Valley
Hesperia
Ord Mountains
Summit Valley
Barstow
MOJAVE VALLEY
Adelanto
Apple Valley
Hesperia
Old Woman Springs Rd
Bear Valley Rd
Main St
Air Expy
Helendale Rd
Hinkley Rd
Newberry Rd
Stoddard Wells Rd
Barstow Rd
National Trails Hwy
Kiowa Rd
Calico Ghost Town
MOUNTAINS
0
5
10
Miles
Desert Bighorn Sheep Species Distribution Model (DRECP)
Desert Bighorn Sheep
Modeled Habitat
Figure 4-7



Desert Linkages

Figure 4-8