DRAFT
RESULTS OF FOCUSED SURVEYS FOR LISTED FAIRY SHRIMP SPECIES FOR THE VALLEY-IVYGLEN TRANSMISSION LINE PROJECT PHASE II RIVERSIDE COUNTY, CALIFORNIA

Submitted to:
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EXECUTIVE SUMMARY

At the request of Southern California Edison (SCE), AMEC Environment & Infrastructure, Inc. (AMEC) delineated and assessed potential habitat for listed fairy shrimp species in support of the proposed Valley-Ivyglen Transmission Line Project, Phase II (project). Identified potential habitat was sampled following U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 1996) for two federally listed fairy shrimp species known from the region: Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) and Riverside Fairy Shrimp (*Streptocephalus wootonii*).

The proposed project is designed to improve reliability and meet projected electrical load requirements in western Riverside County, and involves the eventual construction of a new 115 kilovolt (kV) transmission line between the Valley and Ivyglen substations. The project is located in western Riverside County, California and the proposed Phase II transmission line route traverses portions of unincorporated county and the cities of Corona and Lake Elsinore.

The purpose of this report is to summarize the results of fairy shrimp and vernal pool studies that have been conducted within the Phase II project area during the 2012 wet season. Surveys were also conducted at the south end of this area during the 2008-2009 and 2009-2010 wet seasons.

Of 99 pools identified and sampled, none were found to support federally listed fairy shrimp species during the sampling period. The non-sensitive Versatile Fairy Shrimp (*Branchinecta lindahli*) was identified in one pool in the 2011-2012 season, which was a new pool in an area not previously surveyed. No fairy shrimp were found in any other pool during 2011-2012 Phase II surveys.

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ACRONYMS AND ABBREVIATIONS

AMEC	AMEC Environment & Infrastructure, Inc.
CDFG	California Department of Fish and Game
°C	degrees Celsius
cm	centimeter
°F	degrees Fahrenheit
in	inches
kV	kilovolt
m	meter
MSHCP	Multiple Species Habitat Conservation Plan
project	Valley-Ivyglen Transmission Line Project
ROW	right-of-way
SCE	Southern California Edison
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 INTRODUCTION

At the request of Southern California Edison (SCE), AMEC Environment & Infrastructure, Inc. (AMEC) delineated and assessed potential habitat for listed fairy shrimp species in support of the proposed Valley-Ivyglen Transmission Line Project (project). Identified potential habitat was sampled following U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 1996) for two federally listed fairy shrimp species known from the region: Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) and Riverside Fairy Shrimp (*Streptocephalus wootonii*).

The proposed project is designed to improve reliability and meet projected electrical load requirements in western Riverside County, and involves the eventual construction of a new 115 kilovolt (kV) transmission line between the Valley and Ivyglen substations.

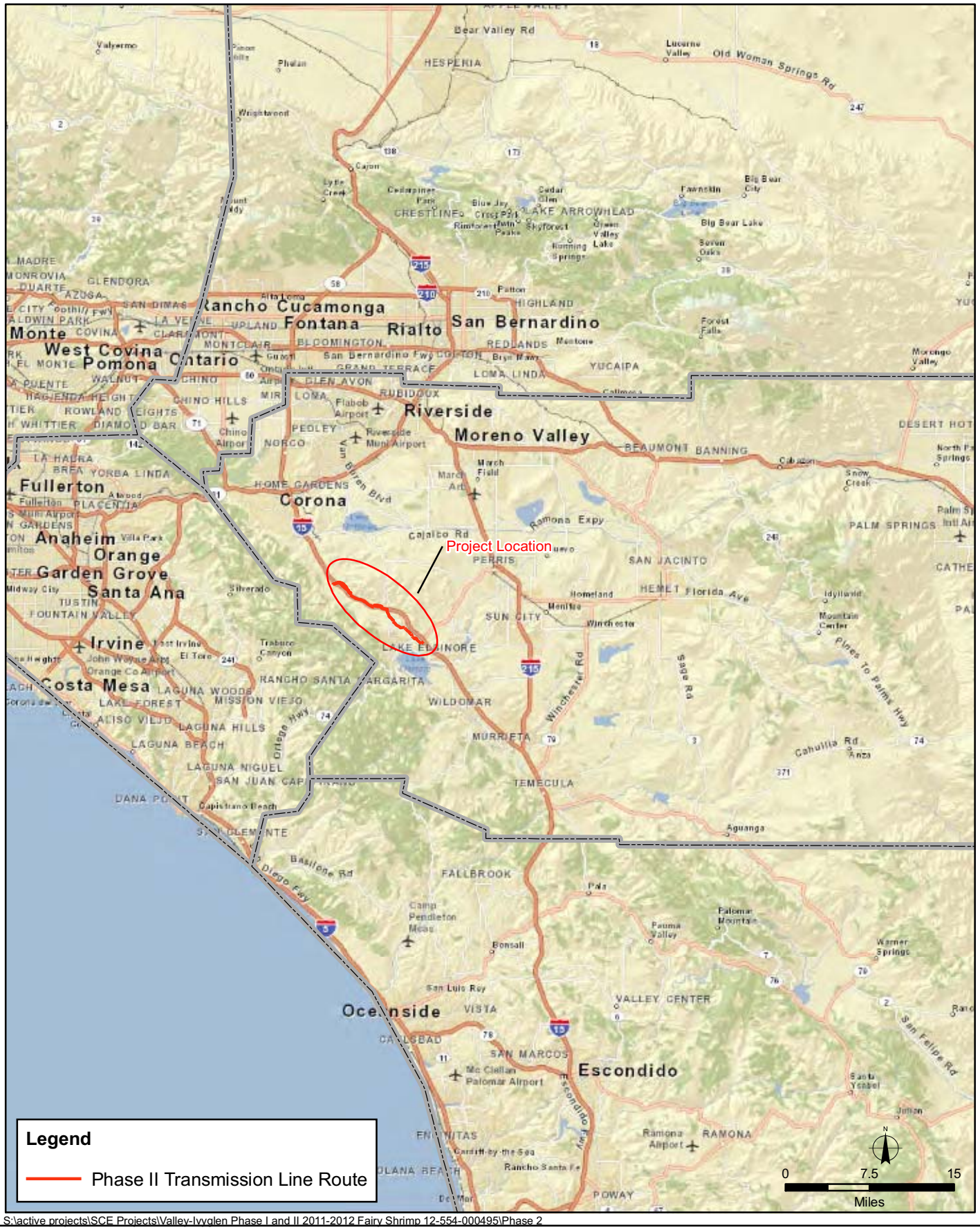
1.1 Project Location and Study Area

The project is located in western Riverside County, California and the proposed Phase II transmission line route traverses portions of unincorporated county and the cities of Corona and Lake Elsinore (See Figures 1 and 2). The route traverses portions of the Lake Elsinore, Lake Mathews, and Alberhill United States Geological Survey (USGS) 7.5-minute series topographic quadrangles.

The project has been divided into two portions: eastern (Phase I) and western (Phase II). Phase I extends from the Valley Substation in the City of Menifee southwest to the corner of Collier Avenue and Third Street in the City of Lake Elsinore. The Valley Substation is located in the City of Menifee on the west side of Menifee Road between McLaughlin and Ethanac Roads. Phase II extends from that corner northwest to the Ivyglen Substation in the City of Corona.

The purpose of this report is to summarize the results of fairy shrimp and vernal pool studies that were conducted within the Phase II portion of the project area (study area) during the 2011-2012 wet season. Phase II will not be discussed further. Fairy Shrimp surveys were also conducted in the Phase II area during the 2008-2009 and 2009-2010 wet seasons (AMEC 2009, 2010), but only at the south end (Pools 4-5, 134-144, and Y2-1). Areas surveyed included the proposed transmission line right-of-way (ROW) and a 500-foot buffer from the centerline of the proposed ROW. AMEC was not given permission to survey and lands belonging to Castle & Cooke, so that area is excluded, with the exception of several public road shoulder pools (see reduced survey area on Figure 2 and pages A2-8 & A2-9 in Appendix A).

The study area is located within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP is a comprehensive, multi-jurisdictional Habitat Conservation Plan, which focuses on conservation of species and their associated habitats in western Riverside County (Riverside County 2003). Section 6.1.2 of the MSHCP requires site surveys of riparian, riverine, and vernal pool resources in order to conserve these resources and the species that use them. The MSHCP does not replace existing federal and state regulations covering lakes, streams, vernal pools, and other wetland areas. Thus, projects must comply with existing regulations for these resources.



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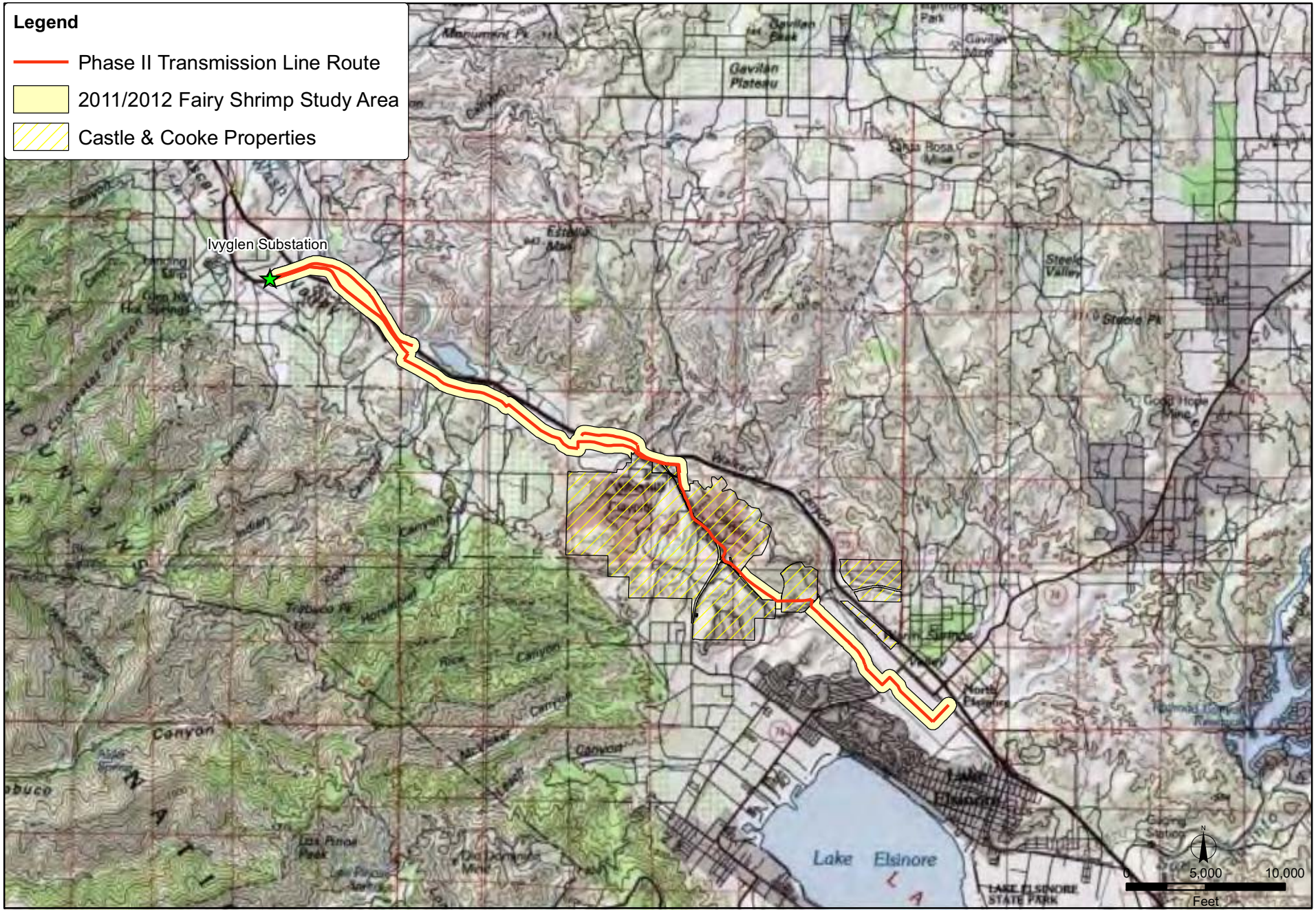
Regional Location
Fairy Shrimp Surveys
Valley-Ivyglen Transmission Line Project: Phase II

FIGURE

1



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Project Location
Fairy Shrimp Surveys
Valley-Ivyglen Transmission Line Project: Phase II

FIGURE
2

2.0 SPECIES DESCRIPTION

2.1 Listing Status and Critical Habitat

Several species of fairy shrimp are considered sensitive by the USFWS and the California Department of Fish and Game (CDFG) (resource agencies) because of their rarity and/or association with sensitive aquatic habitats such as vernal pools (CDFG 1990). Two federally listed fairy shrimp species are known to occur within Riverside County: Riverside County Vernal Pool Fairy Shrimp and Riverside Fairy Shrimp. A third species, Santa Rosa Plateau Fairy Shrimp (*Linderiella santarosae*) is an unlisted sensitive species that occurs only on the Santa Rosa Plateau of Riverside County.

Vernal Pool Fairy Shrimp is a federally listed as threatened species (USFWS 1994). Critical Habitat was designated for this species in the Central Valley of California in 2006 (USFWS 2006). Critical Habitat for Vernal Pool Fairy Shrimp has not been designated in western Riverside County.

Riverside Fairy Shrimp was listed as federally endangered in 1993 (USFWS 1993). Critical Habitat was designated in 2001 (USFWS 2001), and a revised Critical Habitat was proposed in 2004 (USFWS 2004); the final designation of Critical Habitat was announced on 12 April 2005 (USFWS 2005). The proposed project is approximately 9.5 miles northeast of the nearest Riverside Fairy Shrimp Critical Habitat unit, Critical Habitat Unit 2, near Trabuco (USFWS 2005) (see Figure 3).

Western Riverside County, wherein the study area occurs, has historically harbored relatively large populations of fairy shrimp due to natural environmental conditions (e.g., soils, hydrology, and topography) that make much of its habitats conducive to vernal pool formation. These vernal pools, and the fairy shrimp populations they support, have been reduced and fragmented over the years due pressure from human development, such as housing and agriculture. The area however, is still designated as an important vernal pool management area by the USFWS within the larger USFWS Riverside Management Area (USFWS 1998).

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Fairy Shrimp Critical Habitat
Fairy Shrimp Surveys
Valley-Ivyglen Transmission Line Project: Phase II

FIGURE
3

2.1.1 Life History

Fairy shrimp (Class: Crustacea; Order: Anostraca) are conspicuous members of the fauna of ephemeral ponds and vernal pools. California has at least 25 known species of fairy shrimp belonging to six genera (Eriksen and Belk 1999). Fairy shrimp have the ability to produce resting eggs (cysts), which allows them to survive from year to year in ephemeral aquatic habitats, as they can withstand desiccation and freezing. This allows fairy shrimp to avoid many potential aquatic predators that require a year-round water source to survive, such as predatory fish and many frog species. The continued survival of a fairy shrimp population in a particular location requires water to be ponded for a length of time sufficient for the completion of their life cycle. The length of time for fairy shrimp from hatching to sexual maturity and egg-laying is variable depending on environmental conditions and the specific species. In general, a minimum of one to two weeks is required. As such, the presence of fairy shrimp (either free swimming or as cysts in the soil) can be considered an indication of an ephemeral pond or vernal pool that holds water for at least one to two weeks every few years.

Fairy shrimp cysts tend to hatch in pools with relatively cool temperatures, with species-specific differences in responses that are related to temperature regime (USFWS 1998). Lack of hatching at higher temperatures (greater than 77° Fahrenheit [F] or 25° Celsius [C]) protects fairy shrimp from the infrequent summer storms that might otherwise be sufficient to stimulate development, but inadequate for the organisms to complete their life cycles. Also, often less than ten percent of the dormant cyst bank hatches with any one hydration (Hathaway and Simovich 1996). This appears to be an ecological bet-hedging strategy, which helps protect the species from hatching the entire cyst bank during years where rainfall and pooling is insufficient to allow the fairy shrimp to reach sexual maturity and breed. In addition, laboratory studies have shown that many fairy shrimp cysts can hatch after 15 years of dormancy when given the proper environmental conditions (Eriksen and Belk 1999). Four species of fairy shrimp are known to occur in Riverside County: Vernal Pool Fairy Shrimp, Riverside Fairy Shrimp, Versatile Fairy Shrimp (*Branchinecta lindahli*), and Santa Rosa Plateau Fairy Shrimp.

Vernal Pool Fairy Shrimp has three disjunct populations in western Riverside County (see Figure 4), but is more widely distributed within California's Central Valley. Typically, this species is found in sandstone puddles surrounded by foothill grassland. Other habitats include small swale, earth slump, or basalt-flow depression basin with a grassy or sometimes muddy bottom within unplowed grassland. It is found in water ranging from 46.1º F to 73.4º F. Vernal Pool Fairy Shrimp have been observed between December and early May. This species hatches soon after pools fill with water of temperatures less than or equal to 50º F, reaching maturity as quickly as 18 days. However, if water temperatures remain at approximately 59º F, then at least 41 days are required for maturity. This species is known from some of the shortest-lived pools (e.g., six to seven weeks for winter pools or three weeks for spring pools). Although Vernal Pool Fairy Shrimp co-occur with several different fairy shrimp species throughout its range, only four of those have the potential to occur in western Riverside County, as noted above. Vernal Pool Fairy Shrimp is known to co-occur with all of them, but has been found in the same pools as Riverside Fairy Shrimp only as cysts, not swimming together. The primary threats to Vernal Pool Fairy Shrimp are urban and agricultural development of its habitat. The closest known occurrence of Vernal Pool Fairy Shrimp is on the Santa Rosa Plateau, approximately 13 miles

south-southeast of the south project terminus of the Valley Substation. The species is also known to occur in Riverside County in Hemet and Skunk Hollow which are each approximately 16 miles from the study area (USFWS 2006, CDFG 2009, Riverside County 2003) (Figure 4). The Hemet location is east of the Phase II south terminus and Skunk Hollow is southeast of the Phase II south terminus.

Riverside Fairy Shrimp has a very restricted and scattered distribution. In Riverside County this species has been detected in vernal pools and temporary ponds at the Santa Rosa Plateau, Menifee, Lake Elsinore, Skunk Hollow and other Murrieta locations, and in the vicinity of Temecula (Riverside County 2003, CDFG 2012), see Figure 4. Elsewhere, it occurs in locations such as Otay Mesa, Marine Corps Base Camp Pendleton, and Miramar Naval Air Station in San Diego County (Simovich and Fugate 1992). It also has been collected in a few places in Orange County and Baja California Norte, Mexico (Eriksen and Belk 1999). The nearest documented population occurrences are near Lake Elsinore, approximately 3 miles southeast of the south end of the study area. This species typically is found in longer-lived pools that often support spikerush (*Eleocharis* sp.). These pools tend to occur in seasonal grasslands sometimes interspersed with chaparral or coastal sage scrub vegetation. Riverside Fairy Shrimp appears to be a relatively warm-water species (i.e., hatching between 50 °F to 77 °F [10 °Cand 25 °C]) (Eriksen and Belk 1999), typically not appearing until late in the season although it has been observed as early as late January (Eng et al. 1990). In Riverside County it is known to co-occur with two other species of fairy shrimp, including the Versatile Fairy Shrimp and the Vernal Pool Fairy Shrimp, but it has been found swimming together with the Versatile Fairy Shrimp Only. Co-occurrence of the Vernal Pool Fairy Shrimp has been in the form of cysts in the same pool only. It typically occupies long-lasting pools in which the water persists into April or May, and which reach an average minimum depth of 11.8 inches (in) (30 centimeters [cm]) at filling (Eng et al. 1990). Riverside Fairy Shrimp requires approximately two months to reach reproductive age after hatching (USFWS 1998). Like Vernal Pool Fairy Shrimp, the main threats to this species are urban and agricultural development.

For comparison, Vernal Pool Fairy Shrimp generally hatch earlier in the rainy season, mature more quickly, and use shallower, cooler pools (typical of early season pools) than Riverside Fairy Shrimp. In contrast, Riverside Fairy Shrimp usually hatch later in the season in pools that are warmer and deeper than Vernal Pool Fairy Shrimp, and they are slower to reach sexual maturity. These different ecological niches likely minimize competition between the species for food and other resources, even when they occupy the same pools.

Santa Rosa Plateau Fairy Shrimp is endemic to grassland cool-water vernal pools which are formed on Southern Basalt Flows located at Santa Rosa Plateau. Therefore, it is not expected to occur within the study area (Eriksen and Belk 1999). It is not state or federally listed as Threatened or Endangered.

Versatile Fairy Shrimp commonly occurs in Riverside County and throughout California and may occupy the same pools as Vernal Pool Fairy Shrimp and the Riverside Fairy Shrimp. This species is common and is not considered to be sensitive by the resource agencies.

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Known Locations of Listed Fairy Shrimp in Riverside County
Fairy Shrimp Surveys
Valley-Ivyglen Transmission Line Project: Phase II

FIGURE
4

3.0 SITE CHARACTERIZATION

The topography within the study area is generally flat or with gentle rolling hills. The approximately 13.2 miles of study area contains a combination of agricultural, municipal, private, and reserve land, most with previous disturbances of some kind.

3.1 Climate

The study area is located within a Mediterranean climate region consisting of warm, dry summers and mild, wet winters. In summer, temperatures often reach 100º F and winter temperatures fall as low as 30º F, with an occasional freeze. Average annual temperature ranges are fairly moderate for the area, ranging from 49.3º F to 79.5º F. Average total precipitation for the area is approximately 10 to 15 inches per year (Desert Research Institute [DRI] 2012).

3.1.1 2011-2012 Wet Season

Most precipitation in coastal Southern California occurs from approximately October through May, but annual precipitation records include precipitation events from July 1st through June 30th. The Elsinore station, near Lake Elsinore, is the closest weather station to the study area. The total rainfall for the 2011-2012 season was 6.68 inches, which is 4.98 inches less than the yearly average of 11.66 in (DRI 2012). For comparison, the 2010-2011 season had a total of 22.38 inches (11.67 of which fell in December 2010) and the 2009-2010 season had a total of 16.55 inches (8.88 of which fell in January 2010). The high rainfall totals of the previous two seasons reflect those two extraordinarily wet months. The four previous seasons had rainfall totals of less than nine inches each.

3.2 Topography, Land Use, and Soils

The study area begins in the relatively flat Warm Springs Valley in the south, and then travels northwest, crossing Alberhill Creek/Temescal Wash and continuing through valleys and low rolling hills in the Terra Cotta and Alberhill areas. It then crosses Temescal Wash again, twice in the space of about 1.5 miles. As it continues northwest it parallels and then enters the Temescal Valley, between the Santa Ana Mountains to the southwest and the Gavilan Hills to the northeast, before terminating at the Ivy Glen Substation in Corona. west and then southwest across a series of low, rolling hills.

The study area is located primarily along relatively flat areas that have historically been used for grazing, agriculture, an old railroad, and rural residential development. Much of the proposed ROW is adjacent to existing transmission lines and paved and dirt roads, although there is one unroaded stretch which crosses several canyons southwest of the Temescal Valley.

Soils in the study area are primarily in the Monserate-Arlington-Exeter and Traver-Domino-Willows associations. These soils are characterized as level to moderately steep soils that have a surface layer of sandy loam often with a hardpan. The soils can range from very shallow to relatively deep (USDA 1971). Soils in the study area do not generally have a high clay component; however, there are "lenses" of clay soils in the study area, and several mapped soil types which are considered sensitive. Phase II travels through several mapped soil types which are considered sensitive by the MSHCP (Riverside County 2003). In the south these include Travers series sandy loams, Altamont series clays, and Willows silty clay. Some of these soils are associated with the Alberhill Creek/Temescal Wash drainage. In the northern portion of Phase II, the alignment passes through additional areas of Altamont clays.

3.3 Weather Conditions and Pool Formation

Vernal pool formation is typically affected by precipitation levels and general rainfall patterns specifically wherein precipitation is delivered by relatively few, large storm systems. Large but widely spaced precipitation events may result in saturated soil conditions and temporary pool formation, but greater precipitation levels and/or more closely spaced storms may be required for longer inundation periods.

Precipitation levels during the 2011-2012 wet season (October-May) were less than one-third that of the previous wet season. This is reflected in the reduced number of inundated pools found this year as compared to previous seasons.

Many of the vernal pools that were sampled during the protocol wet season surveys occurred within areas that are extremely dynamic, as most are continually altered by human activities. Such activities included: an active junkyard, recreational activities, and vehicular traffic on unpaved roads, including off-road vehicles. Of the 99 pools inundated during the 2011-2012 wet season surveys, 78 would fall into the above categories (Appendix B: Photographs 2, 4, 6, 8-10). Other pools were formed on topography created by past construction, agricultural (Appendix B: Photograph 7), or commercial activities (Appendix B: Photograph 1) on sites that are now inactive. Twelve pools fell into this category, most of which were not subject to any disturbance during the 2011-2012 season. Nine pools were in basins in channels directly subject to runoff as a result of rain events (Appendix B: Photograph 3). All of these were artificial and/or the result of alteration of natural drainages. Four roadside pools (260 and 247b, e, & f) were inundated for over 120 days (Appendix B: Photographs 6 & 10). All of these were maintained by non-rainfall related water sources. Pool 260 was maintained by runoff from adjacent commercial landscaping and Pools 247b, e, & f were maintained by leakage from a water pumping station. None of the 99 pools encountered in the 2011-2012 season were natural pools in an undisturbed location. Table 1 summarizes the number of pools that were formed as a result of construction related, roadside, and drainage conditions.

Table 1.
Pool Types for the Proposed Valley-Ivyglen Transmission Line Project

Pool Type	Pool Identification Number	Number of Pools
Road/Road Shoulder	137, 238-240, 242-243, 247a-252, 255-259, 261-263, 265-269c, 275-277, 317-320, 334-339b, 342-344, 347-353, 360, 362	78
Related to Past Disturbance	237, 308-316, 333, 355-356	12
Located in Drainage	234, 241, 244, 260, 264, 325, 340, 357-358	9
	Grand Total:	99

Per the USFWS wet season protocol, 99 depressions were classified as vernal pools due to their initial ponding; however, only 20 of these pools were subsequently surveyed per the USFWS protocol either due to their continuing inundation at the two-week follow-up visit(s), or due to shrimp already being present at the first discovery of inundation. This includes pools that were first documented mid-season and remained inundated per the protocol for at least one sampling event. Only one of the 14 pools identified in previous year's surveys was inundated during the 2011-2012 season, and it was dry by the next visit, so was never sampled. A total of 98 new pools were identified during the 2011-2012 wet season which had not been documented during the 2008-2009 or 2009-2010 wet seasons, mainly because the previous year's surveys did not include the majority of the Phase II alignment. Pools with numbers ≤144 were first documented in 2008-2009; pools with a y2 prefix were first documented in 2009-2010, and pools first documented in 2011-2012 were numbered ≥234.

3.4 Vegetation Communities

The vegetation communities and land cover types in the study area are varied, but most pools occur on developed disturbed land, mainly roadsides and unpaved roads. (ruderal habitat), and grasslands. Vegetation communities and land cover types recorded along the Phase II alignment are briefly described below. These communities are classified per the Western Riverside County MSHCP, which is based on the vegetation communities presented in the *Preliminary Descriptions of Terrestrial Natural Communities of California* (Holland 1986; Riverside County 2003).

3.4.1 Agriculture

Agricultural lands within the study area include areas occupied by dairies and livestock feed yards or areas that have been tilled for use as croplands or groves/orchards. The Phase II alignment crosses areas which were in agricultural production in the past, but little, if any, of these lands were in active production in 2012.

3.4.2 Chaparral

Chaparral is a shrub-dominated vegetation community that is composed largely of evergreen species that range from 3 to 12 feet in height (Riverside County 2003). The most common and widespread species within chaparral is chamise (*Adenostoma fasciculatum*). Other common shrub species include manzanita (*Arctostaphylos* spp.), wild-lilac (*Ceanothus* spp.), oak (*Quercus* spp.), redberry (*Rhamnus* spp.), laurel sumac (*Malosma laurina*), mountain-mahogany (*Cercocarpus betuloides*), toyon (*Heteromeles arbutifolia*), and mission manzanita (*Xylococcus bicolor*). Soft-leaved subshrubs are less common in chaparral than in coastal sage scrub (see below) but occur within canopy gaps of mature stands. Common species include California buckwheat (*Eriogonum fasciculatum*), sages (*Salvia* spp.), California sagebrush (*Artemisia californica*), and monkeyflower (*Mimulus* spp.). In addition, herbaceous species, including deerweed (*Lotus scoparius*), nightshade (*Solanum* spp.), Spanish bayonet (*Yucca whipplei*), rock-rose (*Helianthemum scoparium*), onion (*Allium* spp.), soap plant (*Chlorogalum* spp.), bunch grasses (*Nassella* spp., and *Melica* spp.), wild cucumber (*Marah* spp.), bedstraw (*Galium* spp.), and lupine (*Lupinus* spp.) are also present. Chaparral occurs along the Phase II alignment west of the Temescal Valley floor, in places where the alignment touches on the foot of the Santa Ana Mountains.

3.4.3 Coastal Sage Scrub

In western Riverside County, coastal sage scrub is found both in large contiguous blocks scattered throughout the county, as well as integrated with chaparral and grasslands. Coastal sage scrub is dominated by a characteristic suite of low-statured, aromatic, drought-deciduous shrubs, and subshrub species. Composition varies substantially depending on physical circumstances and the successional status of the vegetation community; however, characteristic species include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), California encelia (*Encelia californica*), and several species of sage (e.g., *Salvia mellifera*, *S. apiana*). Other common species include brittlebush (*Encelia farinosa*), lemonadeberry (*Rhus integrifolia*), sugarbush (*R. ovata*), yellow bush penstemon (*Keckiella antirrhinoides*), Mexican elderberry (*Sambucus mexicana*), sweetbush (*Bebbia juncea*), boxthorn (*Lycium* spp.), coastal prickly pear (*Opuntia littoralis*), coastal cholla (*Cylindropuntia prolifera*), tall prickly-pear (*O. oricola*), and species of dudleya (*Dudleya* spp). Within the study area, coastal sage scrub also occurs in various disturbed phases, as a result of mechanical disturbances such as agriculture, grading, or grazing, characterized by a sparse, open shrub habitat separated by grasses or bare ground.

3.4.4 Developed or Disturbed Land

Developed or disturbed land consists of disced, cleared, or otherwise altered areas. Developed lands may include roadways, existing buildings, and structures. Disturbed lands may include ornamental plantings for landscaping, exotics, or ruderal vegetation dominated by nonnative, weedy species such as mustard (*Brassica* sp.), fennel (*Foeniculum vulgare*), tocalote (*Centaurea melitensis*), and Russian thistle (*Salsola tragus*). The majority of the identified pools

occur within developed habitat, along dirt roads, building pads, or other manmade features that result in soil compaction or exposure of hardpan soils suitable for pooling.

3.4.5 Grasslands

Two general types of grasslands occur in western Riverside County: native dominated perennial grassland (valley and foothill grassland); and nonnative dominated, primarily annual grassland (nonnative grassland), which is the dominat grassland on the project alignment.

Valley and foothill grasslands typically contain the perennial bunch grasses, such as purple needlegrass (*Nassella pulchra)* and foothill needlegrass (*N. lepida*). Lesser amounts of other native grasses, such as onion grass (*Melica* spp.), wild rye (*Leymus* spp.), muhly (*Muhlenbergia* spp.), and cane bluestem (*Bothriochloa barbinodis*), also may be present. In addition, nonnative grasses or forbs may be present to varying degrees. Native herbaceous plants commonly found within valley and foothill grasslands include yellow fiddleneck (*Amsinckia menziesii*), common calyptridium (*Calyptridium monardum*), suncup (*Camissonia* spp.), Chinese houses (*Collinsia heterophylla*), California poppy (*Eschscholzia californica*), tarweed (*Hemizonia* spp.), coast goldfields (*Lasthenia californica*), common tidy-tips (*Layia platyglossa*), lupine (*Lupinus* spp.), popcornflower (*Plagiobothrys* spp.), blue dicks (*Dichelostemma capitata*), muilla (*Muilla* spp.), blue-eyed grass (*Sisyrinchium bellum*), and dudleya (*Dudleya* spp.). Little, if any, of this vegetation type occurs on Phase II.

Where grasslands occur on Phase II, they are nonnative grasslands are likely to be dominated by several species of grasses that have evolved to persist in concert with human agricultural practices: slender oat (*Avena barbata*), wild oat (*A. fatua*), fox tail chess (*Bromus madritensis*), soft chess (*B. hordeaceus*), ripgut grass (*B. diandrus*), barley (*Hordeum* spp.), rye grass (*Lolium multiflorum*), English ryegrass (*L. perenne*), rat-tail fescue (*Vulpia myuros*), and Mediterranean schismus (*Schismus barbatus*).

3.4.6 Meadows and Marshes

Meadow and marsh vegetation communities occur in both flowing and still water. This vegetation community includes cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), sedges (*Cyperus* spp.), smartweed (*Polygonum* spp.), watercress (*Rorippa* spp.), and yerba mansa (*Anemopsis californica*). It also contains perennial and biennial herbs (e.g., *Oenothera* spp., *Lupinus* spp., *Potentilla* spp., and *Sidalcea* spp.) and grasses (e.g., *Agrostis* spp., *Deschampsia* spp., and *Muhlenbergia* spp.). Rooted aquatic plant species with floating stems and leaves, such as pennywort (*Hydrocotyle* spp.), water smartweed (*Polygonum amphibium*), pondweeds (*Potamogeton* spp.), and water-parsley (*Oenanthe sarmentosa*) may also be present. Meadows are not present on Phase II, but the alignment skirts some marshland, primarily in the south.

3.4.7 Riparian Forest, Woodland, and Scrub

Riparian vegetation, including forest, woodland, and scrub subtypes, is distributed in waterways and drainages throughout much of western Riverside County. Depending on community type, a riparian community may be dominated by any of several trees or shrubs, including box elder (*Acer negundo*), bigleaf maple (*A. macrophyllum*), coast live oak (*Quercus agrifolia*), white alder (*Alnus rhombifolia*), sycamore (*Platanus racemosa*), Fremont's cottonwood (*Populus fremontii*), California walnut (*Juglans californica*), Mexican elderberry (*Sambucus mexicana*), wild grape (*Vitis girdiana*), giant reed (*Arundo donax*), mule fat (*Baccharis salicifolia*), tamarisk (*Tamarix* spp.), or any of several species of willow (*Salix* spp.). In addition, various understory herbs may be present, such as saltgrass (*Distichlis spicata*), wild cucumber (*Marah macrocarpus*), mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica*), and poison-oak (*Toxicodendron diversilobum*) (Riverside County 2003). Subcategories of these habitat types within the study area include mule fat scrub, southern cottonwood-willow riparian forest, and southern sycamore-alder riparian woodland. Within the study area, riparian habitats occur primarily along stream courses, floodplains, and riverbanks.

3.4.8 Riversidean Alluvial Fan Sage Scrub

Riversidean alluvial fan sage scrub generally occurs on alluvial fans and benches along the floodplains of larger waterways in the Riverside County. Alluvial scrub is made up predominantly of drought-deciduous soft-leaved shrubs, but with significant cover of larger perennial species typically found in chaparral. Scalebroom (*Lepidospartum squamatum*) generally is regarded as an indicator of Riversidean alluvial fan sage scrub. In addition to scalebroom, alluvial scrub typically is composed of white sage (*Salvia apiana*), redberry (*Rhamnus crocea*), California buckwheat, Spanish bayonet (*Hesperoyucca whipplei*), California croton (*Croton californicus*), cholla (*Cylindropuntia* spp.), tarragon (*Artemisia dracunculus*), yerba santa (*Eriodictyon* spp.), broom baccharis (*Baccharis sarothroides*), and mountain-mahogany (*Cercocarpus betuloides*). Annual species composition has not been studied, but is probably similar to that found in understories of neighboring shrubland vegetation. The alignment skirts this vegetation community in several locations.

3.4.9 Woodlands and Forests

Woodland and forest vegetation communities in western Riverside County are dominated by Engelmann oak (*Quercus engelmannii*), coast live oak, canyon live oak (*Q. chrysolepis*), interior live oak (*Q. wislizenii*), and black oak (*Q. kelloggii*) in the canopy, which may be continuous to intermittent or savannah-like. Four-needle pinyon pine (*Pinus quadrifolia*), single-leaf pinyon pine (*P. monophylla*), and California juniper (*Juniperus californica*) are the canopy species of peninsular juniper woodland, which most commonly occur in southern California, forming a scattered canopy from 10 to 49 feet (ft) (3 to 15 meters [m]) tall. Phase II skirts some individual oaks and some limited oak woodlands.
Open Water.

Open water habitat typically is unvegetated due to a lack of light penetration. However, open water may contain suspended organisms such as filamentous green algae, phytoplankton (including diatoms), and desmids. Floating plants such as duckweed (*Lemna* spp.), water buttercup (*Ranunculus aquatilis*), and mosquito fern (*Azolla filiculoides*) also may be present. Open water includes inland depressions, ponds, lakes, reservoirs, and stream channels containing standing water and often occur in conjunction with riparian and upland vegetation communities. Depth may vary from hundreds of feet to a few inches (Riverside County 2003). The Phase II alignment skirts permanent open water only in the south.

4.0 SURVEY METHODOLOGY

Focused surveys for listed fairy shrimp species were conducted by John F. Green under the authority of USFWS Permit TE-054011-5. A notification letter, dated 20 November 2012, was submitted to the USFWS prior to sampling inundated pools (Appendix C). Surveys were conducted according to USFWS survey guidelines for wet season surveys (USFWS 1996). Once the pools were inundated with at least 1.2 in (3.0 cm) of water following a storm event, pools were sampled once every two weeks until the pools were no longer inundated (or until they experienced 120 days of continuous inundation). In cases where the pools dry and then refill within the same wet season, the pool sampling is reinitiated every time they reach the 1.2 in (3.0 cm) of standing water criterion, and sampling is started within eight days of reaching that criterion, with continual sampling every two weeks. Pools were sampled using a net with a mesh size smaller than (0.1 in) 3.2 millimeters.

All inundated pools were sampled upon each site visit. Pools were sampled with a net. All fairy shrimp netted were identified to species, when maturity level allowed. If only immature fairy shrimp were encountered in the pool, which did not yet exhibit the adult characteristics needed for identification, their life history status was noted and identification was planned for the next survey visit.

A total of 20 pools (out of 99 inundated for at least one visit) were sampled. Table 2 summarizes sampling visits for the study area. Appendix A depicts pool locations, and Appendix D summarizes pool sampling information.

Table 2.
Sampling Visits for the Proposed Valley-Ivyglen Transmission Line Phase II Project Fairy Shrimp Surveys

Date	Survey #	Activity
22 November 2011	0	Checked for ponding after rain event; ponding observed and will begin sampling inundated pools in two weeks.
6 December 2011	1	Sampled inundated pools.
20 December 2011	2	Continued to sample inundated pools. Rain events had occurred which refilled/inundated many pools.
3 January 2012	3	Sampled inundated pools.
17 January 2012	4	Continued to sample inundated pools. Rain events had occurred which refilled/inundated some pools.
31 January 2012	5	Sampled inundated pools.
14 February 2012	6	Sampled inundated pools.
28 February 2012	7	Continued to sample inundated pools. Rain events had occurred which refilled/inundated many pools.
13,19,& 22 March 2012	8	Sampled inundated pools, some new pools found in previously closed areas.
27 March 2012	9	Continued to sample inundated pools. Rain events had occurred which refilled/inundated many pools.
10 & 12 April 2012	10	Continued to sample inundated pools, one new pool found in newly added area.
24 April 2012	11	Continued to sample inundated pools. Rain events had occurred which refilled/inundated a few pools.
8 May 2012	12	Sampled inundated pools.
16 May 2012	13	Continued to sample inundated pools, all now dry except for three that reached their 120 day limit on this date, thus making this the final visit.

5.0 SURVEY RESULTS

A total of 99 pools were identified during 2011-2012 focused wet season surveys, but only 20 exhibited inundation suitable for sampling. The locations of the identified pools are included in Appendix A and detailed pool information is included as Appendix D.

The study area is highly dynamic, as the local residents utilize the unpaved access roads daily and the majority of the pools are in or adjacent to the existing access roads. Residents drive vehicles, hike, walk their dogs, as well as other recreational activities, which alter the pools. As such, pool depths, boundaries, and length of inundation are continually changing. Construction sites with graded lots, roads, and pads are currently inactive, or are influenced by runoff and storm drain flows. These pools remained relatively untouched at the time of the surveys. These pool types (active access roads and inactive construction sites) typically are not considered vernal pools, but they do support Versatile Fairy Shrimp, a ubiquitous species.

Pools within the study area not only changed at the beginning and the end of the wet season, but between sampling visits. A pool would be inundated at the beginning of the season and would not refill even with sufficient rain because vehicular activity or a flood event had reconfigured the pool. Conversely, a pool would be formed in the middle of the season that was not present upon initiation of surveys). Therefore, several pools were only sampled once. Although they fit the criteria of holding at least 1.2 in (3 cm) of water for over eight days, they were altered by recreational activity or dried up prior to the next sampling visit. Of the 20 pools sampled, 11 were sampled only once.

No listed fairy shrimp species were identified in any of the pools. Only Versatile Fairy Shrimp, not considered sensitive by resource agencies, was detected in one pool (Appendix B: Photographs 4-5). Other pools did not support any fairy shrimp species during the 2011-2012 season. Table 3 provides information relating to Versatile Fairy Shrimp occupancy and Appendix D provides pool sampling information.

Table 3.
Pools with Versatile Fairy Shrimp Occupancy during Surveys

Survey Week	Number of Pools Occupied*/Inundated	Survey Week (continued)	Number of Pools Occupied*/Inundated
1	1 / 6	8	0 / 18
2	0 / 27	9	1 / 90
3	0 / 3	10	0 / 7
4	0 / 11	11	0 / 8
5	0 / 10	12	0 / 4
6	0 / 5	13	0 / 3
7	0 / 40		

Notes:
*Occupied by Versatile Fairy Shrimp or *Branchinecta* sp. (too small to identify)

The 2011-2012 season had several rain events which filled, maintained, or refilled pools, but was also interspersed with dry periods and unseasonably high temperatures which sometimes caused rapid drying of pools. This resulted in one pool with *Branchinecta* shrimp which were too small to confidently identify drying prior to the next survey visit, preventing positive identification. This pool, however, had adult Versatile Fairy Shrimp in it on a previous visit this season, so it is likely that those juveniles were Versatile Fairy Shrimp as well.

6.0 CONCLUSION

Pooling in the study area was associated with depressions in disturbed and developed areas. Most of these pools are associated with existing access roads and shoulders.

Only Versatile Fairy Shrimp were positively identified during 2011-2012 focused wet season surveys. This is also the only species of fairy shrimp found in the study area during two previous years of surveys (south end). No listed fairy shrimp were detected (i.e., Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp). Versatile Fairy Shrimp is a ubiquitous species, is distributed throughout the study area, and is not considered sensitive by resource agencies.

This survey result confirms that listed fairy shrimp were not detected within potentially suitable habitat during AMEC's 2011-2012 wet season surveys.

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.

John F. Green
Permit Number TE-054011-5

Date

7.0 REFERENCES

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APPENDIX A

STUDY AREA MAPS

Legend

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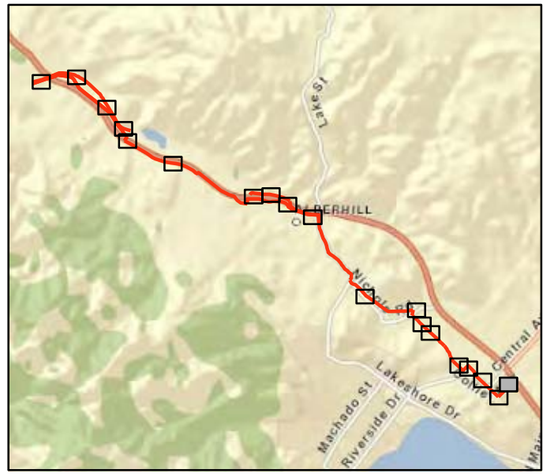
- Vernal Pools First Identified in 2009/2010 Season
- Vernal Pools First Identified in 2011/2012 Season
- Phase II Transmission Line Route
- 2011/2012 Fairy Shrimp Study Area
- Castle & Cooke Properties



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Appendix A
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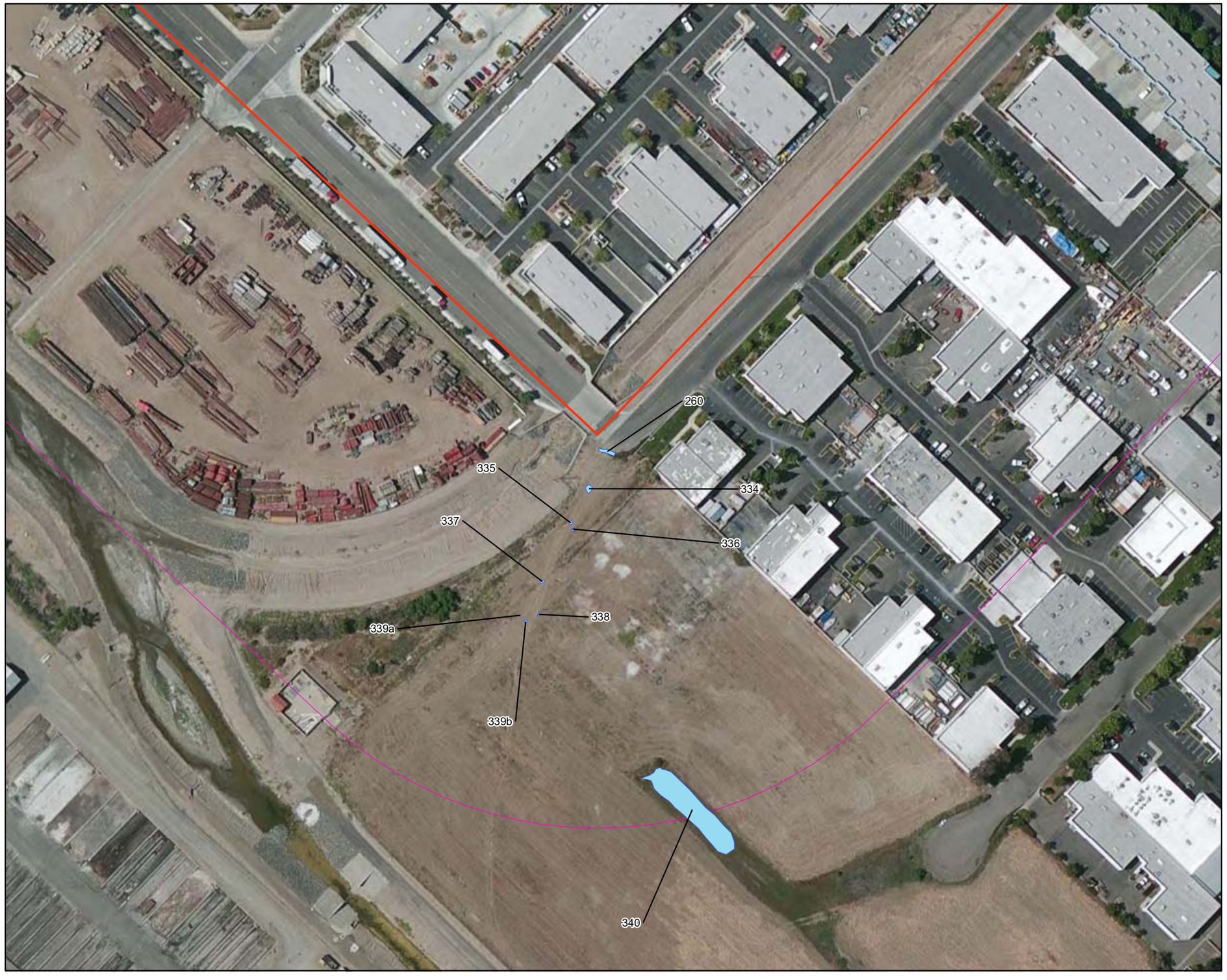
Valley-Ivyglen Transmission Line Project: Phase II



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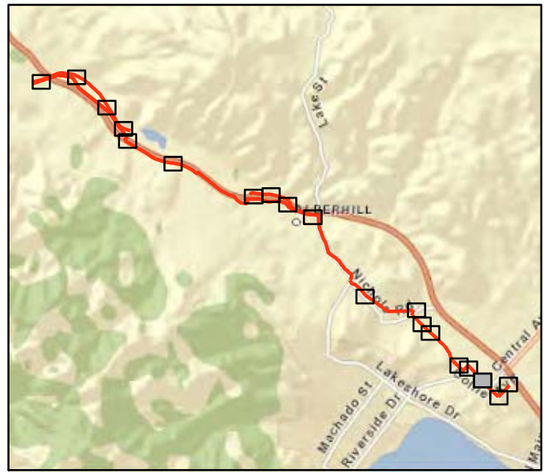

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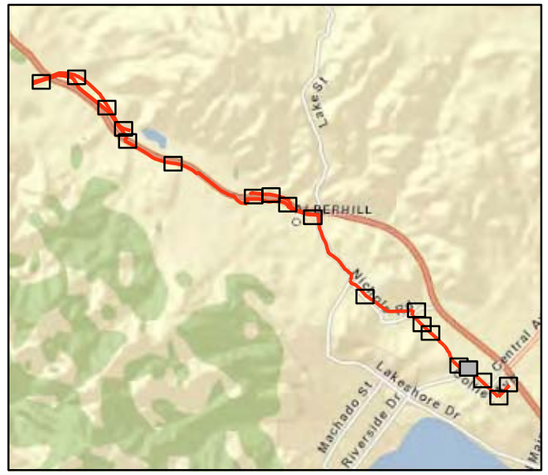

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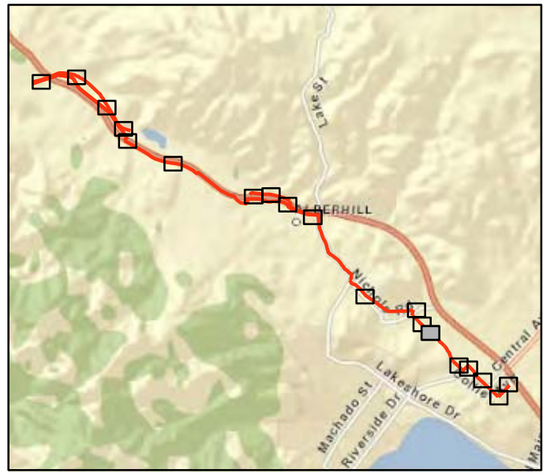

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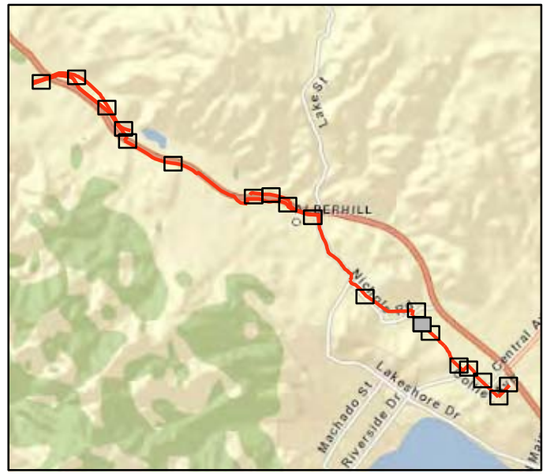

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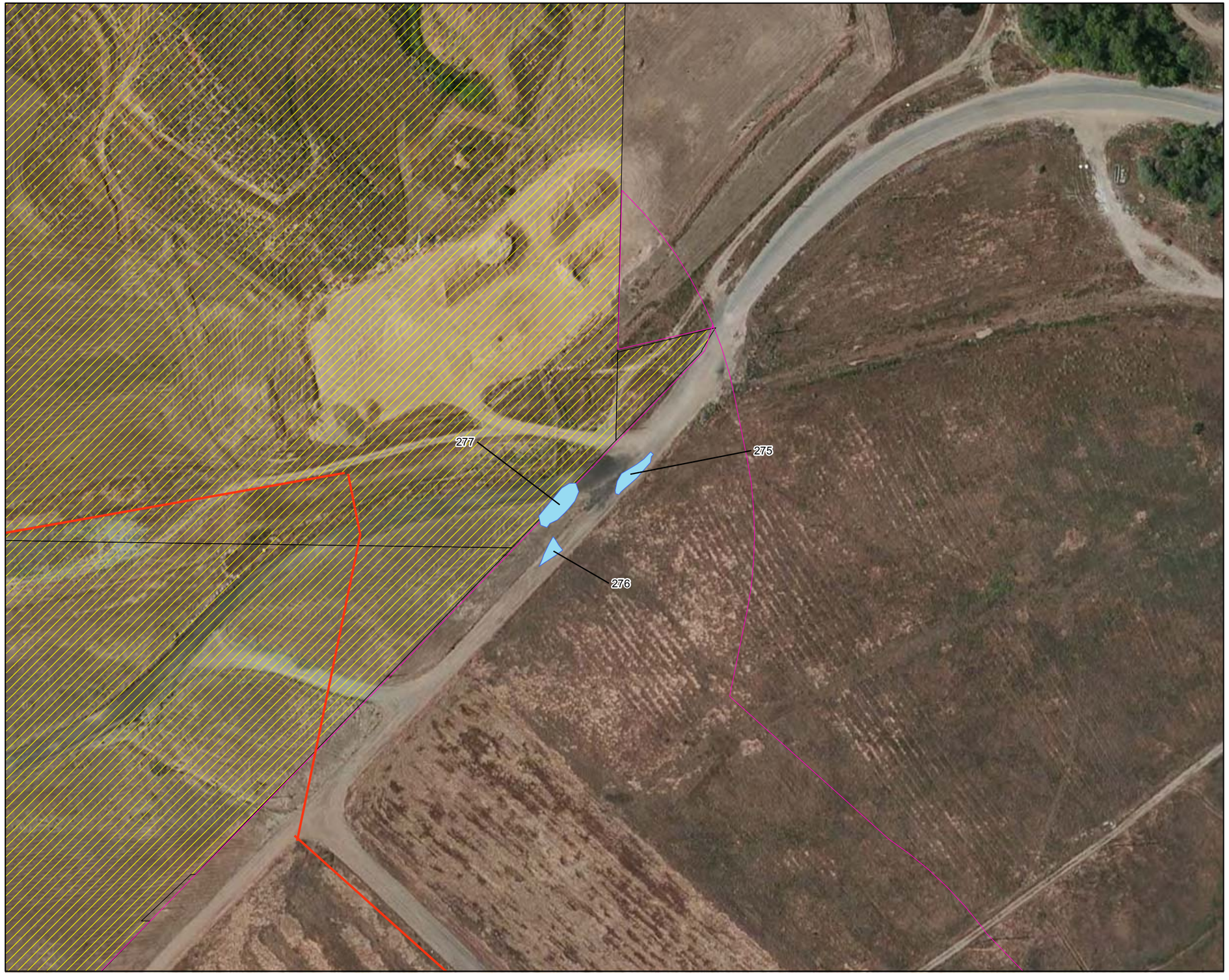

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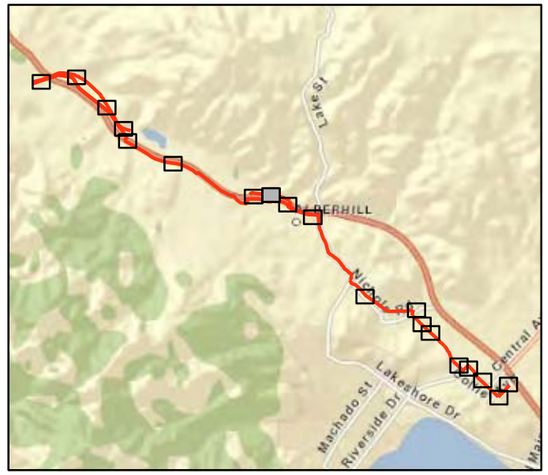

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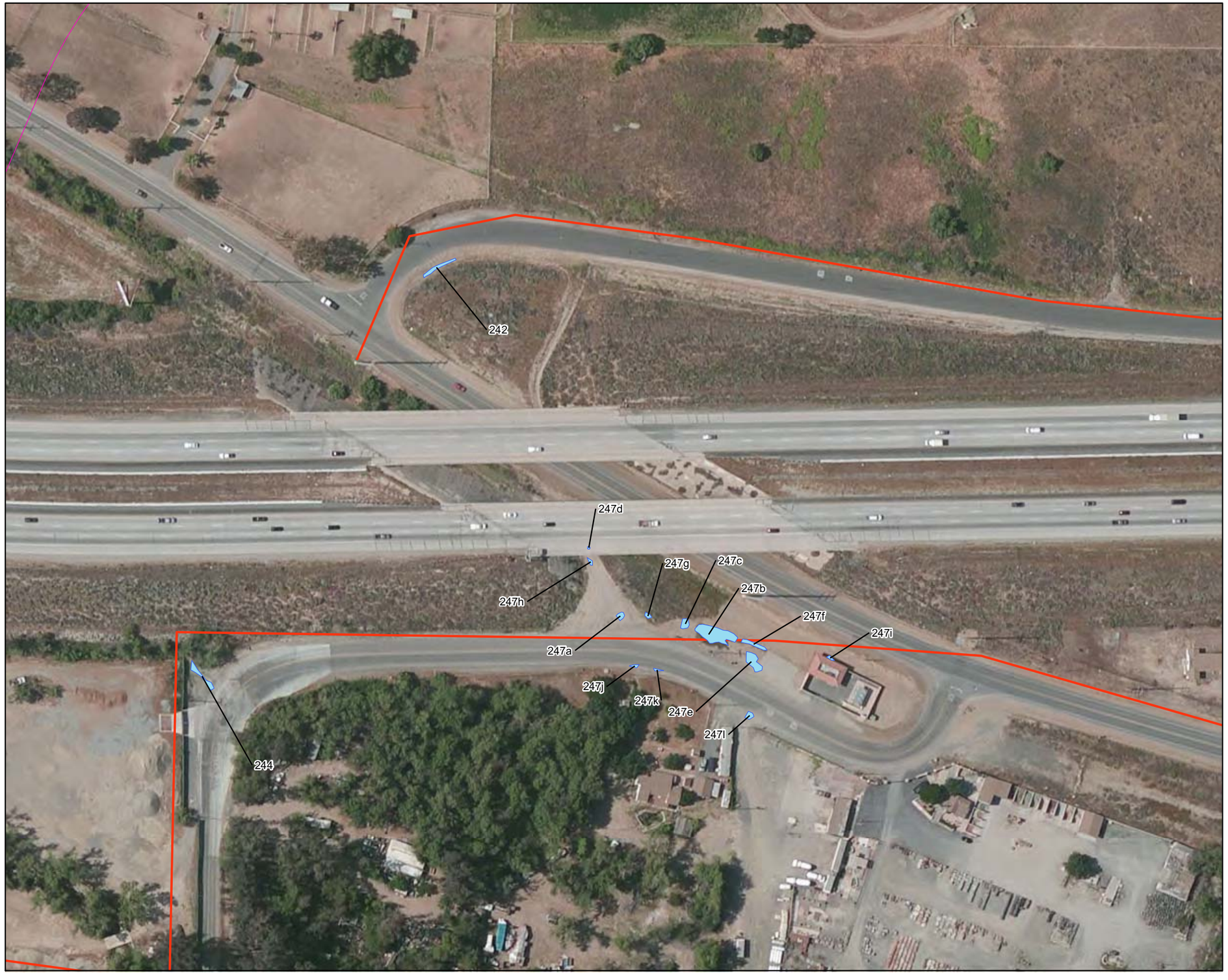

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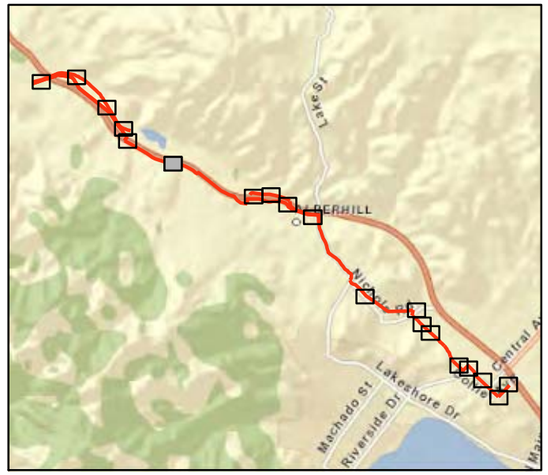

Map Notes-
Source:S:\active projects\SCE Projects\
Valley-Ivyglen Phase I and II 2011-2012
Fairy Shrimp 12-554-000495\Phase 2
Survey: 2011_2012_vernal_pools,
2010_vernal_pools_final,
merged_field_pools_031109
Route: line12 & UGroute(SCE 2011)
Projection: NAD 83 state plane CA 406ft

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0 85 170 340
Feet

1 inch = 125 feet

Appendix A
Vernal Pools
Valley-Ivyglen Transmission Line Project: Phase II

Legend

- Vernal Pools First Identified in 2008/2009 Season
- Vernal Pools First Identified in 2009/2010 Season
- Vernal Pools First Identified in 2011/2012 Season
- Phase II Transmission Line Route
- 2011/2012 Fairy Shrimp Study Area
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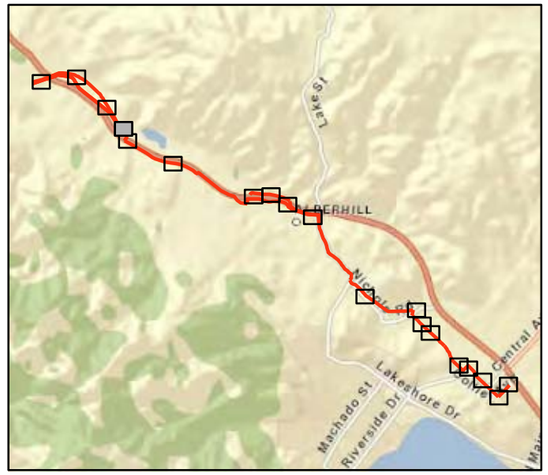

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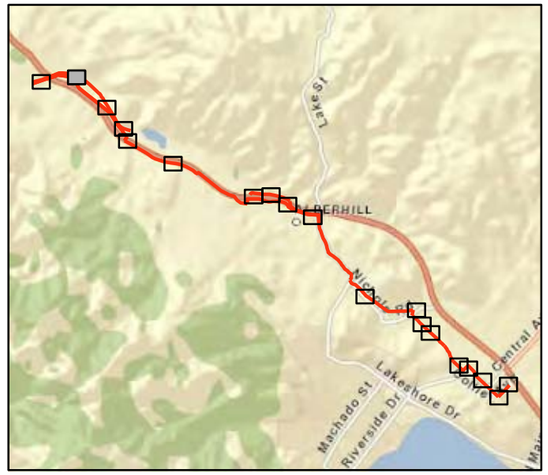

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Valley-Ivyglen Transmission Line Project: Phase II

APPENDIX B

STUDY AREA PHOTOGRAPHS

Photograph 1: Pool 237 in an abandoned commercial yard (Taken 22 November 2011).

Photograph 2: This complex of roadside pools at 239 was heavily impacted by road construction during the 2011-2012 season (Taken 22 November 2011).

FIGURE

B-1

Study Area Photographs
Proposed Valley - Ivyglen Transmission Line Project,
Phase II

Photograph 3: Pool 241 formed in a basin next to the culvert at upper left (Taken 22 November 2011).

Photograph 4: Road shoulder Pool 247a was the only one that had fairy shrimp in it during the 2011-2012 surveys. Versatile Fairy Shrimp were in it at the time of this photo (Taken 6 December 2011).

F I G U R E

Study Area Photographs
Proposed Valley - Ivyglen Transmission Line Project,
Phase II

B-2

Photograph 5: Versatile Fairy Shrimp from Pool 247a (Taken 6 December 2011).

Photograph 6: Pool 260 remained inundated for over 120 days due to landscaping runoff (Taken 3 January 2012).

Study Area Photographs
Proposed Valley - Ivyglen Transmission Line Project,
Phase II

FIGURE

B-3

Photograph 7: Pool 315 at the edge of abandoned agricultural lands (Taken 19 March 2012).

Photograph 8: Pool 342 on a junkyard road (Taken 27 March 2012).

Study Area Photographs
Proposed Valley - Ivyglen Transmission Line Project,
Phase II

FIGURE

B-4

Photograph 9: Pool 238 obliterated by road maintenance (Taken 6 April 2012).

Photograph 10: Three pools in the 247 complex were maintained for over 120 days due to leakage from the water pumping station at upper right (Taken 22 November 2011).

Study Area Photographs
Proposed Valley - Ivyglen Transmission Line Project,
Phase II

FIGURE

B-5

APPENDIX C

USFWS NOTIFICATION LETTER

To	Ms. Erin McCarthy Recovery Permit Coordinator U.S. Fish and Wildlife Service 6010 Hidden Valley Road Suite 100 Carlsbad, California 92011
From	John F. Green
Tel	951-369-8060
Fax	951-369-8035
Date	20 November 2011
Subject	Notification of Initiation of Surveys for Federally-listed Vernal Pool Branchiopods along Phase II of the Valley-Ivyglen Subtransmission Line Project, Riverside County, CA

Dear Ms. McCarthy,

This letter is to inform the U.S. Fish and Wildlife Service (USFWS) that AMEC Environment & Infrastructure, Inc. (AMEC) is proposing to conduct wet-season surveys for federally-listed vernal pool Branchiopods in accordance with USFWS *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* along the alignment of Phase II of the Valley-Ivyglen Subtransmission Line Project (VIG) on behalf of Southern California Edison (SCE). All surveys will be conducted by either John F. Green (TE-054011-5) or Nicole Kimball (TE-053598-3), and possibly Karen Miller LaCoste (TE-820658). It is anticipated that the vernal pool surveys will begin after the next significant rain event.

Phase II of the Valley-Ivyglen Subtransmission Line is a linear project which begins within the Lake Elsinore USGS 7.5' quadrangle in Section 31, Township 5 south, Range 4 west. From there it travels northwest, terminating within the Lake Matthews USGS 7.5' quadrangle in Section 2, Township 5 south, Range 6 west. The site passes through commercial and residential areas both urban and rural, and through undeveloped valleys and hillsides (see Figure 1, Phase II).

Please contact me at the numbers above or at john.f.green@amec.com if you have any questions regarding this notification.

Sincerely,

John F. Green

AMEC Environmental & Infrastructure, Inc.
3120 Chicago Ave., Ste. 110t
Riverside, CA 92507 www.amec.com

APPENDIX D

POOL SAMPLING INFORMATION

Appendix D. Pool Sampling Information for the Proposed Valley-Ivyglen Transmission Line Project

Pool	Week	Date	Time of Sample	Actual Depth (cm)	Max Depth (cm)	Actual Length (m)	Actual Width (m)	Max Length (m)	Max Width (m)	Water Temp (°C)	Air Temp (°C)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
4					20			12	3							Const		abandoned project
5					28			72.5	13							Const		abandoned project
134					no past year's data			past year's data missing								Const		Looks like old business demolished here
135																Const		Looks like old business demolished here
136																Const		abandoned project
137					18			18	9							Const		abandoned project
138					19			64	7							Const		abandoned project
139					30.5			5.5	3.5							Const		abandoned project
140					18			30	6							Const		abandoned project
141					13			22	15							Const		abandoned project
142					21			20	10							Const		abandoned project
143					33			37	11.5							Const		abandoned project
144					28			41	15							Const		abandoned project
Y2-1					15			4.5	2							Const		abandoned project
239g	5	01/31/2012	***	10	13	1	1	2.5	2	?	?	?	?	?	?	Const		pool present, but unable to access due to road construction
239g	8	03/13/2012	11:32	?	13	?	?	2.5	2	?	?	?	?	?	?	Const		pool present, but unable to access due to road construction
239g	9	03/27/2012	3:56	11	13	3	4.5	4.5	3	25.6	20.4	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247a	1	12/06/2011	10:00	5	5	1	0.5	1	0.5		15	VFS	100s	juvenile/adult	F, M	RR	***	road shoulder, disturbed, garbage, tracks
247a	2	12/20/2011	?	13	13	3.5	7	3.5	7	?	?	***	***	***	***	RR	***	believed to have dried, newly refilled
247a	9	03/27/2012	2:44	11	13	5	8	5	8	25.6	21	*Branchinecta* sp. too small to ID confidently	10s	juvenile	***	RR	one adult scavenger or diving beetle	FS most likely VFS because this species was previously detected in the pool
247b	1	12/06/2011	10:10	17	17	5	2	5	2		15	***	***	***	***	RR	water boatmen	road shoulder, disturbed, garbage, tracks
247b	2	12/20/2011	?	15	16	3	10	6	17	?	?	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247b	5	01/31/2012	?	13	20	2.7	9	6.1	16.8	12.2	?	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247b	6	02/14/2012	10:25	17	20	2	12	6.1	16.8	11.1	14.4	***	***	***	***	RR	scavenger beetles, diving beetles, backswimmers	road shoulder, disturbed, garbage, tracks
247b	7	02/28/2012	1:53	15	20	3	10	6.1	16.8	13.3	12.8	***	***	***	***	RR	seed shrimp, possible cranefly larvae	road shoulder, disturbed, garbage, tracks

Appendix D. Pool Sampling Information for the Proposed Valley-Ivyglen Transmission Line Project

Pool	Week	Date	Time of Sample	Actual Depth (cm)	Max Depth (cm)	Actual Length (m)	Actual Width (m)	Max Length (m)	Max Width (m)	Water Temp (°C)	Air Temp (°C)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
247b	8	03/13/2012	11:05	15	20	2	6	6.1	16.8	13.3	12.8	***	***	***	***	RR	diving beetles, mosquito larvae	road shoulder, disturbed, garbage, tracks
247b	9	03/27/2012	2:52	19	20	3.5	7	6.1	16.8	25.6	21	***	***	***	***	RR	adult diving or scavenger beetles	road shoulder, disturbed, garbage, tracks
247b	10	4/101/12	9:10	19	20	2.5	12	6.1	16.8	11.7	14.4	***	***	***	***	RR	water boatmen, mayfly larvae	road shoulder, disturbed, garbage, tracks
247b	11	04/24/2012	11:00	24	24	2.5	14	6.1	16.8	21.1	16.5	***	***	***	***	RR	water boatmen, mosquito larvae, water beetles, emergent vegetation	road shoulder, disturbed, garbage, tracks
247b	12	05/08/2012	10:18	11.5	24	1.5	3	6.1	16.8	24.4	29.4	***	***	***	***	RR	water boatmen, water beetles & beetle larvae, emergent vegetation	road shoulder, disturbed, garbage, tracks
247b	13	05/16/2012	11:30	16	24	2.5	9	6.1	16.8	23.3	30.6	***	***	***	***	RR	water beetles & beetle larvae, emergent vegetation	road shoulder, disturbed, garbage, tracks, mowed; 120 day limit
247e	1	12/06/2011	10:15	2	2	2	0.5	2	0.5	?	15	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247e	2	12/20/2011	?	3	4	1	5	4.6	9	?	?	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247e	6	02/14/2012	10:43	4	8	1	6	4.6	9	15	14.4	***	***	***	***	RR	diving beetles	road shoulder, disturbed, garbage, tracks
247e	7	02/28/2012	1:57	3	8	1	6	4.6	9	13.3	12.8	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247e	8	03/13/2012	11:12	3	8	1	5	4.6	9	18.9	12.8	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247e	9	03/27/2012	2:56	3	8	1	6	4.6	9	25.6	21	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247e	10	4/101/12	9:21	4	8	1	5.5	4.6	9	14.4	14.4	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247e	11	04/24/2012	11:07	4	8	1	6	4.6	9	26.7	16.5	***	***	***	***	RR	seed shrimp, emergent vegetation	road shoulder, disturbed, garbage, tracks
247e	12	05/08/2012	10:10	4	8	1	2	4.6	9	25.5	29.4	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247e	13	05/16/2012	11:25	4.5	8	1	7	4.6	9	32.2	30.6	***	***	***	***	RR	water beetles, seed shrimp	road shoulder, disturbed, garbage, tracks; 120 day limit
247f	1	12/06/2011	10:20	5	5	1	0.5	1	0.5	?	15	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247f	2	12/20/2011	?	3	3	2	16	2	16	?	?	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks

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Pool	Week	Date	Time of Sample	Actual Depth (cm)	Max Depth (cm)	Actual Length (m)	Actual Width (m)	Max Length (m)	Max Width (m)	Water Temp (°C)	Air Temp (°C)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
247f	6	02/14/2012	10:35	12	13	1	9	1	10.7	11.7	14.4	***	***	***	***	RR	scavenger beetles, diving beetles	road shoulder, disturbed, garbage, tracks
247f	7	02/28/2012	1:55	8	13	1.5	6	1.5	10.7	13.3	12.8	***	***	***	***	RR	mosquito larvae	road shoulder, disturbed, garbage, tracks
247f	8	03/13/2012	11:08	13	13	1	4	1.5	10.7	14.4	12.8	***	***	***	***	RR	mosquito larvae	road shoulder, disturbed, garbage, tracks
247f	9	03/27/2012	2:54	14	14	1.5	9	1.5	10.7	25.6	21	***	***	***	***	RR	mosquito larvae	road shoulder, disturbed, garbage, tracks
247f	10	4/101/12	9:16	8	14	1	8	1.5	10.7	13.3	14.4	***	***	***	***	RR	mayfly larvae	road shoulder, disturbed, garbage, tracks
247f	11	04/24/2012	11:04	8	14	1	8	1.5	10.7	21.1	16.5	***	***	***	***	RR	mosquito larvae, water beetles, algal mats, emergent vegetation snails, copepods	road shoulder, disturbed, garbage, tracks
247f	12	05/08/2012	10:15	2	14	0.1	2	1.5	10.7	22.2	29.4	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
247f	13	05/16/2012	11:34	5	14	1	3	1.5	10.7	27.8	30.6	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks, mowed; 120 day limit
260	1	12/06/2011	?	11	11	2	1	3	1	?	?	***	***	***	***	RR	snails, water boatmen	road shoulder, disturbed, garbage, tracks
260	2	12/20/2011	?	7	9	1	3	1	3	?	?	***	***	***	***	RR	snails, dragonfly & damselfly larvae	road shoulder, disturbed, garbage, tracks
260	3	01/03/2012	?	9	12	3	1	3	1	?	?	***	***	***	***	RR	snails, stonefly larvae, dragonfly larvae	road shoulder, disturbed, garbage, tracks
260	4	01/17/2012	?	9	13	3	1	3	1	12.8	?	***	***	***	***	RR	snails, dragonfly larvae	road shoulder, disturbed, garbage, tracks
260	5	01/31/2012	?	10	13	3	1	3	1	7.8	?	***	***	***	***	RR	snails, dragonfly & damselfly larvae	road shoulder, disturbed, garbage, tracks
260	6	02/14/2012	9:19	13	13	3	1	3	1	9.4	11.5	***	***	***	***	RR	snails, stonefly larvae	road shoulder, disturbed, garbage, tracks
260	7	02/28/2012	10:22	12	13	7	2	10	4	10	12.6	***	***	***	***	RR	dragonfly & damselfly larvae	road shoulder, disturbed, garbage, tracks
260	8	03/13/2012	10:31	14	14	6	2	10	4	12.2	11.7	***	***	***	***	RR	damselfly & mosquito larvae	road shoulder, disturbed, garbage, tracks
260	9	03/27/2012	9:10	14	14	6	2.5	7	4	10	10.8	***	***	***	***	RR	frog eggs, water beetle	road shoulder, disturbed, garbage, tracks
263	1	12/06/2011	?	3	12	1	1	5.5	4	?	?	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks

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Pool	Week	Date	Time of Sample	Actual Depth (cm)	Max Depth (cm)	Actual Length (m)	Actual Width (m)	Max Length (m)	Max Width (m)	Water Temp (°C)	Air Temp (°C)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
263	2	12/20/2011	?	13	13	3	5.5	4	5.5	?	?	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
263	6	02/14/2012	9:38	8.75	12	2.5	3	5.5	4	8.9	9.7	***	***	***	***	RR	***	road shoulder, disturbed, garbage, tracks
263	7	02/28/2012	11:15	15	15	12	4.5	12	4.5	12.8	11.1	***	***	***	***	RR	adult diving or scavenger beetles	road shoulder, disturbed, garbage, tracks
264	3	01/03/2012	?	20	30	30	5	50	6	?	?	***	***	***	***	RR	***	road shoulder, disturbed, tracks
264	4	01/17/2012	?	18	30	30	3.5	50	6	?	?	***	***	***	***	RR	***	road shoulder, disturbed, tracks
264	5	01/31/2012	?	20	30	2.2	22	50	6	13.3	?	***	***	***	***	RR	scavenger beetles, diving beetles, water boatmen, backswimmers, other unidentified insect larvae	road shoulder, disturbed, tracks
308	9	03/27/2012	12:05	10	13	3	19	3	19	22.2	19.1	***	***	***	***	vacant lot	***	disturbed, garbage, discing/plowing
310	9	03/27/2012	12:44	5	6	0.5	0.3	0.5	0.3	25.6	19.1	***	***	***	***	RR	***	road shoulder, disturbed, tracks
312	9	03/27/2012	12:37	3	4	11	10	11	10	25.6	19.1	***	***	***	***	vacant lot	***	disturbed, tracks, garbage
313	9	03/27/2012	12:40	6	6	3	4	3	4	25.6	19.1	***	***	***	***	vacant lot	***	disturbed, tracks, garbage
314	9	03/27/2012	12:32	5	5	1	0.5	3	2	25.6	19.1	***	***	***	***	vacant lot	***	disturbed, garbage
315	9	03/27/2012	12:25	7	7	4	13	4	13	21.1	19.1	***	***	***	***	vacant lot	***	disturbed, garbage, discing/plowing
316	9	03/27/2012	12:20	14	14	1	3	1	3	11.1	19.1	***	***	***	***	vacant lot	***	disturbed, garbage
317	9	03/27/2012	11:50	4	5	2	6	2	7	25.6	19.1	***	***	***	***	RR	***	road shoulder, disturbed, tracks, garbage
318	9	03/27/2012	11:55	2	3	3.5	2.5	3.5	2.5	25.6	19.1	***	***	***	***	RR	***	unpaved road, disturbed, tracks, garbage
319	9	03/27/2012	12:00	6	6	1.5	0.75	1.5	1	25.6	19.1	***	***	***	***	RR	***	unpaved road, disturbed, tracks, garbage
320	9	03/27/2012	10:00	12	13	2.5	5	2.5	5	12.8	12.8	***	***	***	***	RR	***	unpaved road/road shoulder, disturbed, tracks, garbage
325	9	03/27/2012	3:28	32	32	5.2	7.6	5.2	7.6	25.6	20.4	***	***	***	***	artificial pool	***	disturbed, plastic-lined artifical drainage with unlined collection pool
325	10	4/101/12	9:42	21	32	4	6	5.2	7.6	13	17	***	***	***	***	artificial pool	Pacific tree frog adults, tadpoles; mosquito & mayfly larvae; midge larvae?	disturbed, plastic-lined artifical drainage with unlined collection pool

Appendix D. Pool Sampling Information for the Proposed Valley-Ivyglen Transmission Line Project

Pool	Week	Date	Time of Sample	Actual Depth (cm)	Max Depth (cm)	Actual Length (m)	Actual Width (m)	Max Length (m)	Max Width (m)	Water Temp (°C)	Air Temp (°C)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
325	11	04/24/2012	11:30	22	32	8	5	5.2	8	18.3	17.1	***	***	***	***	artificial pool	Pacific tree frog tadpoles, water boatmen, mosquito larvae, water beetles, seed shrimp, midge larvae	disturbed, plastic-lined artifical drainage with unlined collection pool
325	12	05/08/2012	10:35	16	32	6	5	5.2	8	21.1	29.2	***	***	***	***	artificial pool	Pacific tree frog adults, tadpoles; beetles & larvae, water boatmen, water striders	disturbed, plastic-lined artifical drainage with unlined collection pool

< = less than; F = Female; M = Male; RR = Road Rut(s); Const. = associated with construction project; VFS = Versatile Fairy Shrimp

DRAFT
RESULTS OF FOCUSED SURVEYS FOR LISTED FAIRY SHRIMP SPECIES FOR THE VALLEY-IVYGLEN TRANSMISSION LINE PROJECT PHASE 2 RIVERSIDE COUNTY, CALIFORNIA

Submitted to:
Southern California Edison
Corporate Environmental Health and Safety
1218 South Fifth Avenue
Monrovia, California 91016

Submitted by:
AMEC Environment & Infrastructure, Inc.
3120 Chicago Avenue, Suite 110
Riverside, California 92507

July 2013

AMEC Project No. 1255400499

EXECUTIVE SUMMARY

At the request of Southern California Edison (SCE), AMEC Environment & Infrastructure, Inc. (AMEC) delineated and assessed potential habitat for listed fairy shrimp species in support of the proposed Valley-Ivyglen Transmission Line Project, Phase 2 (project). Identified potential habitat was sampled following U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 1996) for two federally listed fairy shrimp species known from the region: Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) and Riverside Fairy Shrimp (*Streptocephalus wootonii*).

The proposed project is designed to improve reliability and meet projected electrical load requirements in western Riverside County, and involves the eventual construction of a new 115 kilovolt (kV) transmission line between the Valley and Ivyglen substations. The project is located in western Riverside County, California and the proposed Phase 2 transmission line route traverses portions of unincorporated county and the cities of Corona and Lake Elsinore.

The purpose of this report is to summarize the results of fairy shrimp and vernal depression studies that have been conducted within the Phase 2 project area during the 2012-2013 wet season. Surveys were also conducted at the south end of this area during the 2008-2009 and 2009-2010 wet seasons and over most of Phase 2 during the 2011-2012 wet season.

Of 65 depressions which were sampled during the 2012-2013 wet season, none were found to support federally listed fairy shrimp species. The non-sensitive Versatile Fairy Shrimp (*Branchinecta lindahli*) was identified in nine depressions this season. No other fairy shrimp species were found, and no fairy shrimp were found in any other depression during the 2012-2013 Phase 2 surveys. No listed fairy shrimp have ever been detected in the survey area for the proposed Valley-Ivyglen Transmission Line Project.

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ACRONYMS AND ABBREVIATIONS

AMEC	AMEC Environment & Infrastructure, Inc.
CDFG/CDFW	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
°C	degrees Celsius
cm	centimeter
°F	degrees Fahrenheit
in	inches
kV	kilovolt
m	meter
MSHCP	Multiple Species Habitat Conservation Plan
project	Valley-Ivyglen Transmission Line Project
ROW	right-of-way
SCE	Southern California Edison
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 INTRODUCTION

At the request of Southern California Edison (SCE), AMEC Environment & Infrastructure, Inc. (AMEC) assessed potential habitat for listed fairy shrimp species in support of the proposed Valley-Ivyglen Transmission Line Project (project). Identified potential habitat was sampled following U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 1996) for fairy shrimp, especially for the two federally listed fairy shrimp species known from the region: Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) and Riverside Fairy Shrimp (*Streptocephalus wootonii*).

The proposed project is designed to improve reliability and meet projected electrical load requirements in western Riverside County, and involves the eventual construction of a new 115 kilovolt (kV) transmission line between the Valley and Ivyglen substations.

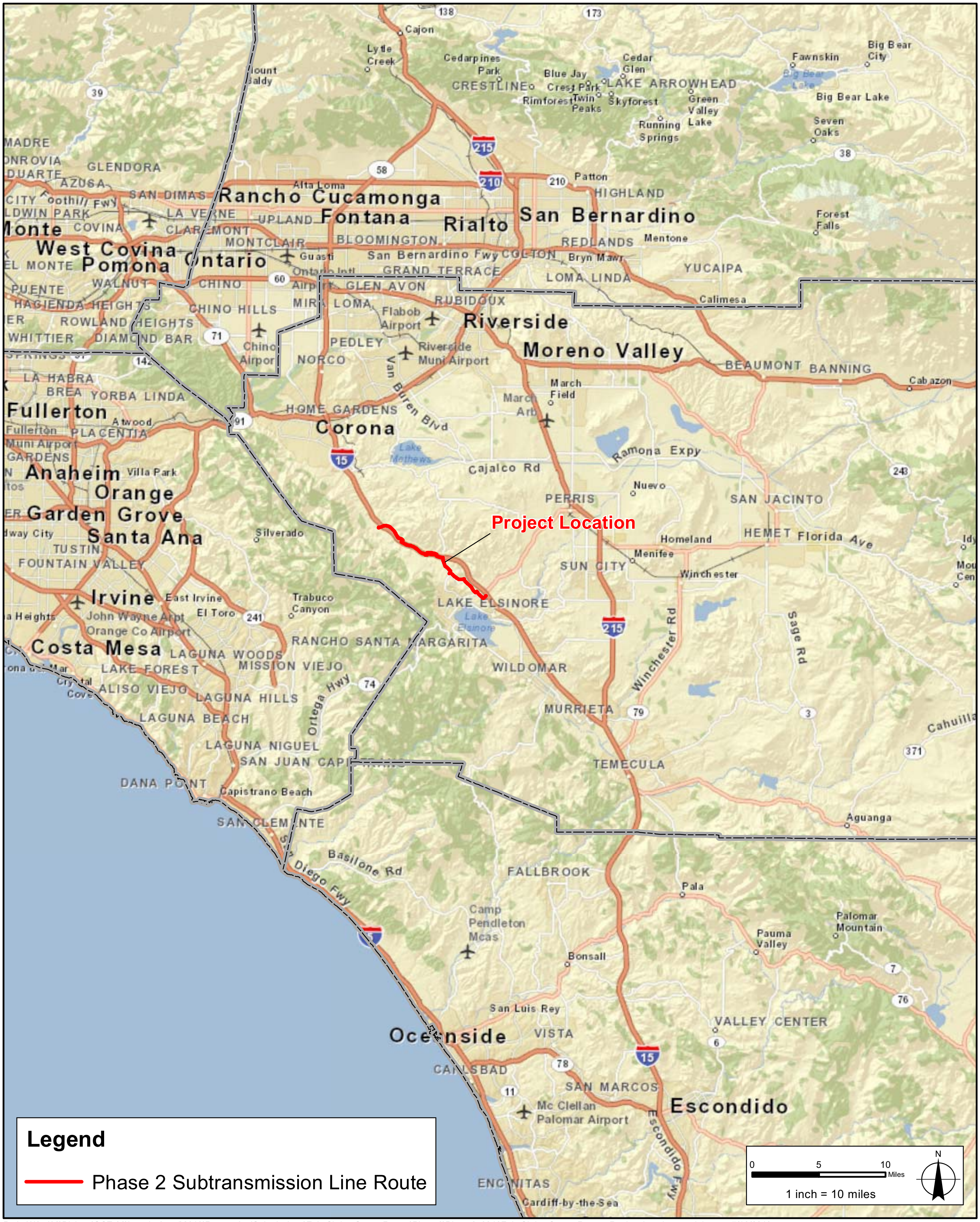
1.1 Project Location and Study Area

The project is located in western Riverside County, California and the proposed Phase 2 transmission line route traverses portions of unincorporated county and the cities of Corona and Lake Elsinore (See Figures 1 and 2). The route traverses portions of the Lake Elsinore, Lake Mathews, and Alberhill United States Geological Survey (USGS) 7.5-minute series topographic quadrangles.

The project has been divided into two portions: eastern (Phase 1) and western (Phase 2). Phase 1 extends from the Valley Substation on the west side of Menifee Road between McLaughlin and Ethanac Roads in the City of Menifee southwest to the corner of Collier Avenue and Third Street in the City of Lake Elsinore. Phase 2 extends from that corner northwest to the Ivyglen Substation in the City of Corona.

The purpose of this report is to summarize the results of fairy shrimp and vernal depression studies that were conducted within the Phase 2 portion of the project area (study area) during the 2012-2013 wet season. Phase 1 will not be discussed further. Fairy Shrimp surveys were also conducted along Phase 2 in the 2011-2012 wet season (AMEC 2012a, 2012b) and at the south end (Depressions 4-5, 134-144, and Y2-1, see Appendix A) of Phase 2 during the 2008-2009 and 2009-2010 wet seasons (AMEC 2009, 2010). Areas surveyed included a 500-foot to 250-foot buffer area from the ROW centerline depending on parcel access.

The study area is located within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP is a comprehensive, multi-jurisdictional Habitat Conservation Plan, which focuses on conservation of species and their associated habitats in western Riverside County (Riverside County 2003). Section 6.1.2 of the MSHCP requires site surveys of riparian, riverine, and vernal pool resources in order to conserve these resources and the species that use them. The MSHCP does not replace existing federal and state regulations covering lakes, streams, vernal pools, and other wetland areas. Thus, projects must comply with existing regulations for these resources.



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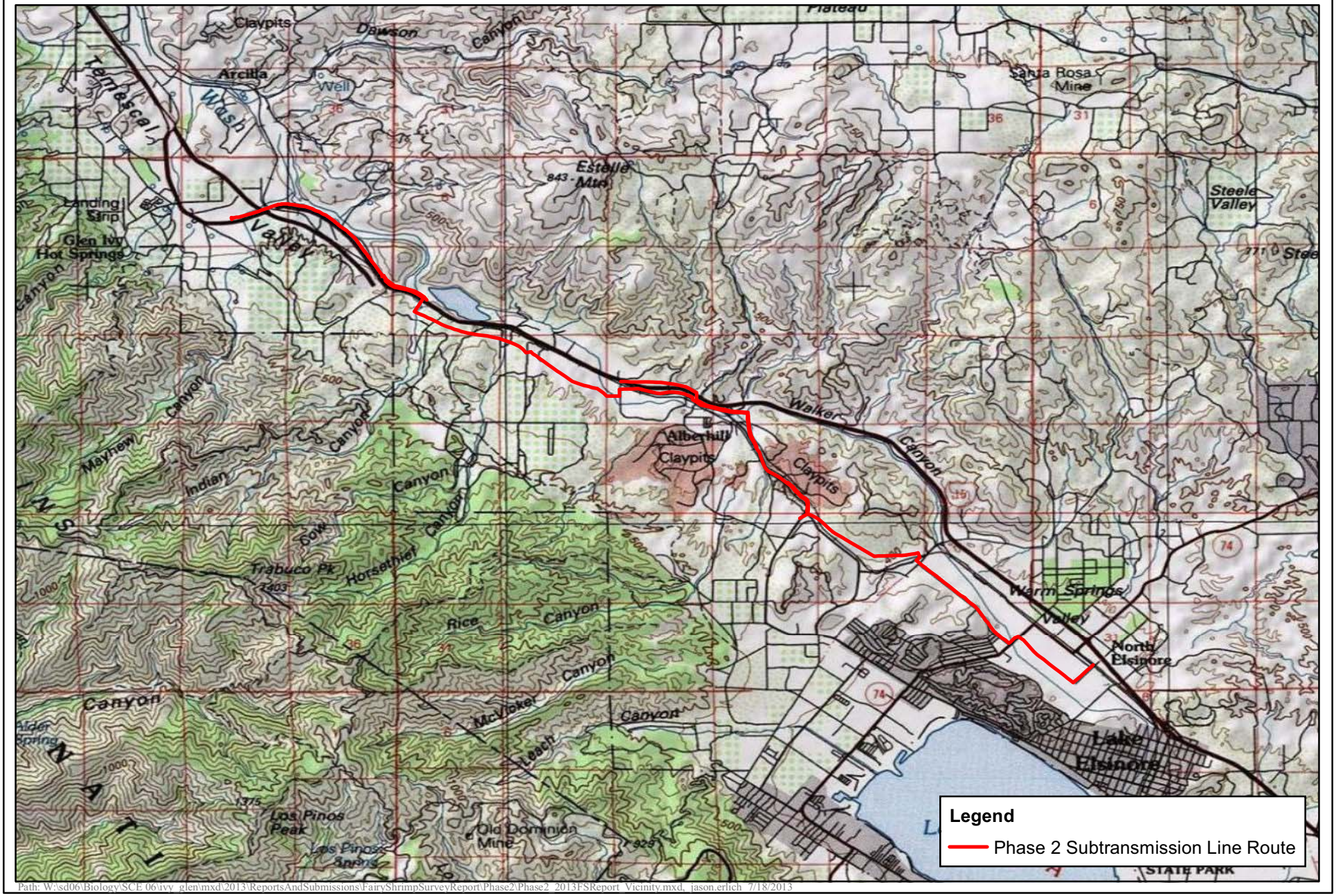
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, METI, TomTom, 2012

Regional Location
2013 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

FIGURE
1



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Project Location
2013 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

1 inch = 1.5 miles
0 0.75 1.5 Miles

N

FIGURE
2

2.0 SPECIES DESCRIPTION

2.1 Listing Status and Critical Habitat

Several species of fairy shrimp are considered sensitive by the USFWS and the California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game, CDFG) (resource agencies) because of their rarity and/or association with sensitive aquatic habitats such as vernal pools (CDFG 1990). Two federally listed fairy shrimp species are known to occur within Riverside County: Riverside County Vernal Pool Fairy Shrimp and Riverside Fairy Shrimp. A third species, Santa Rosa Plateau Fairy Shrimp (*Linderiella santarosae*) is an unlisted sensitive species that occurs only on the Santa Rosa Plateau of Riverside County.

Vernal Pool Fairy Shrimp is a federally listed as threatened species (USFWS 1994). Critical Habitat was designated for this species in the Central Valley of California in 2006 (USFWS 2006). Critical Habitat for Vernal Pool Fairy Shrimp has not been designated in western Riverside County.

Riverside Fairy Shrimp was listed as federally endangered in 1993 (USFWS 1993). Critical Habitat was designated in 2001 (USFWS 2001), and a revised Critical Habitat was proposed in 2004 (USFWS 2004); the final designation of Critical Habitat was announced on 12 April 2005 (USFWS 2005). The proposed project is approximately 9.5 miles northeast of the nearest Riverside Fairy Shrimp Critical Habitat unit, Critical Habitat Unit 2, near Trabuco (USFWS 2005) (see Figure 3).

Western Riverside County, wherein the study area occurs, has historically harbored relatively large populations of fairy shrimp due to natural environmental conditions (e.g., soils, hydrology, and topography) that make much of its habitats conducive to vernal pool formation. These vernal pools, and the fairy shrimp populations they support, have been reduced and fragmented over the years due pressure from human development, such as housing and agriculture. The area however, is still designated as an important vernal pool management area by the USFWS within the larger USFWS Riverside Management Area (USFWS 1998).

2.1.1 Life History

Fairy shrimp (Class: Crustacea; Order: Anostraca) are conspicuous members of the fauna of ephemeral ponds and vernal pools. California has at least 25 known species of fairy shrimp belonging to six genera (Eriksen and Belk 1999). Fairy shrimp have the ability to produce resting eggs (cysts), which allows them to survive from year to year in ephemeral aquatic habitats, as they can withstand desiccation and freezing. This allows fairy shrimp to avoid many potential aquatic predators that require a year-round water source to survive, such as predatory fish and many frog species. The continued survival of a fairy shrimp population in a particular location requires water to be ponded for a length of time sufficient for the completion of their life cycle. The length of time for fairy shrimp from hatching to sexual maturity and egg-laying is variable depending on environmental conditions and the specific species. In general, a minimum of one to two weeks is required. As such, the presence of fairy shrimp (either free swimming or as cysts in the soil) can be considered an indication of an ephemeral pond or vernal pool that holds water for at least one to two weeks every few years.

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Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, METI, TomTom, 2012

Fairy Shrimp Critical Habitat
2013 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

FIGURE
3

Fairy shrimp cysts tend to hatch in pools with relatively cool temperatures, with species-specific differences in responses that are related to temperature regime (USFWS 1998). Lack of hatching at higher temperatures (greater than 77° Fahrenheit [F] or 25° Celsius [C]) protects fairy shrimp from the infrequent summer storms that might otherwise be sufficient to stimulate development, but inadequate for the organisms to complete their life cycles. Also, often less than ten percent of the dormant cyst bank hatches with any one hydration (Hathaway and Simovich 1996). This appears to be an ecological bet-hedging strategy, which helps protect the species from hatching the entire cyst bank during years where rainfall and pooling is insufficient to allow the fairy shrimp to reach sexual maturity and breed. In addition, laboratory studies have shown that many fairy shrimp cysts can hatch after 15 years of dormancy when given the proper environmental conditions (Eriksen and Belk 1999). Four species of fairy shrimp are known to occur in Riverside County: Vernal Pool Fairy Shrimp, Riverside Fairy Shrimp, Versatile Fairy Shrimp (*Branchinecta lindahli*), and Santa Rosa Plateau Fairy Shrimp.

Vernal Pool Fairy Shrimp has three disjunct populations in western Riverside County (see Figure 4), but is more widely distributed within California's Central Valley. Typically, this species is found in sandstone puddles surrounded by foothill grassland. Other habitats include small swale, earth slump, or basalt-flow depression basin with a grassy or sometimes muddy bottom within unplowed grassland. It is found in water ranging from 46.1º F to 73.4º F. Vernal Pool Fairy Shrimp have been observed between December and early May. This species hatches soon after pools fill with water of temperatures less than or equal to 50º F, reaching maturity as quickly as 18 days. However, if water temperatures remain at approximately 59º F, then at least 41 days are required for maturity. This species is known from some of the shortest-lived pools (e.g., six to seven weeks for winter pools or three weeks for spring pools). Although Vernal Pool Fairy Shrimp co-occur with several different fairy shrimp species throughout its range, only four of those have the potential to occur in western Riverside County, as noted above. Vernal Pool Fairy Shrimp is known to co-occur with all of them, but has been found in the same pools as Riverside Fairy Shrimp only as cysts, not swimming together. The primary threats to Vernal Pool Fairy Shrimp are urban and agricultural development of its habitat. The closest known occurrence of Vernal Pool Fairy Shrimp is on the Santa Rosa Plateau, approximately 13 miles south-southeast of the south project terminus of the Valley Substation. The species is also known to occur in Riverside County in Hemet and Skunk Hollow which are each approximately 16 miles from the study area (USFWS 2006, CDFG 2009, Riverside County 2003) (Figure 4). The Hemet location is east of the Phase 2 south terminus and Skunk Hollow is southeast of the Phase 2 south terminus.

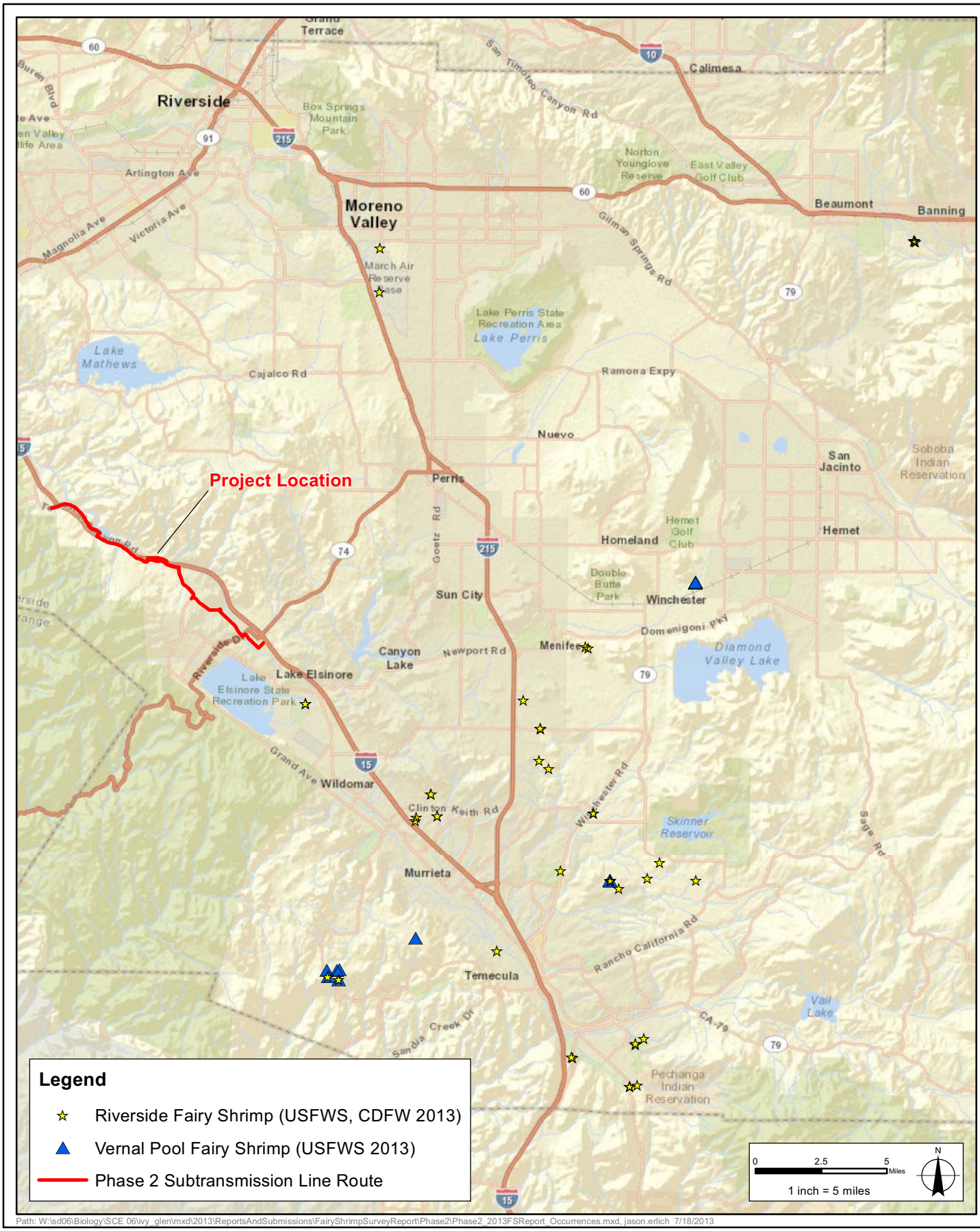
Riverside Fairy Shrimp has a very restricted and scattered distribution. In Riverside County this species has been detected in vernal pools and temporary ponds at the Santa Rosa Plateau, Menifee, Lake Elsinore, Skunk Hollow and other Murrieta locations, and in the vicinity of Temecula (Riverside County 2003, CDFG 2012), see Figure 4. Elsewhere, it occurs in locations such as Otay Mesa, Marine Corps Base Camp Pendleton, and Miramar Naval Air Station in San Diego County (Simovich and Fugate 1992). It also has been collected in a few places in Orange County and Baja California Norte, Mexico (Eriksen and Belk 1999). The nearest documented population occurrences are near Lake Elsinore, approximately 3 miles southeast of the south end of the study area. This species typically is found in longer-lived pools that often support spikerush (*Eleocharis* sp.). These pools tend to occur in seasonal grasslands sometimes

interspersed with chaparral or coastal sage scrub vegetation. Riverside Fairy Shrimp appears to be a relatively warm-water species (i.e., hatching between 50 °F to 77 °F [10 °Cand 25 °C]) (Eriksen and Belk 1999), typically not appearing until late in the season although it has been observed as early as late January (Eng et al. 1990). In Riverside County it is known to co-occur with two other species of fairy shrimp, including the Versatile Fairy Shrimp and the Vernal Pool Fairy Shrimp, but it has been found swimming together with the Versatile Fairy Shrimp Only. Co-occurrence of the Vernal Pool Fairy Shrimp has been in the form of cysts in the same pool only. It typically occupies long-lasting pools in which the water persists into April or May, and which reach an average minimum depth of 11.8 inches (in) (30 centimeters [cm]) at filling (Eng et al. 1990). Riverside Fairy Shrimp requires approximately two months to reach reproductive age after hatching (USFWS 1998). Like Vernal Pool Fairy Shrimp, the main threats to this species are urban and agricultural development.

For comparison, Vernal Pool Fairy Shrimp generally hatch earlier in the rainy season, mature more quickly, and use shallower, cooler pools (typical of early season pools) than Riverside Fairy Shrimp. In contrast, Riverside Fairy Shrimp usually hatch later in the season in pools that are warmer and deeper than Vernal Pool Fairy Shrimp, and they are slower to reach sexual maturity. These different ecological niches likely minimize competition between the species for food and other resources, even when they occupy the same pools.

Santa Rosa Plateau Fairy Shrimp is endemic to grassland cool-water vernal pools which are formed on Southern Basalt Flows located at Santa Rosa Plateau. Therefore, it is not expected to occur within the study area (Eriksen and Belk 1999). It is not state or federally listed as Threatened or Endangered.

Versatile Fairy Shrimp commonly occurs in Riverside County and throughout California and may occupy the same pools as Vernal Pool Fairy Shrimp and the Riverside Fairy Shrimp. This species is common and is not considered to be sensitive by the resource agencies.



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Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, METI, TomTom, 2012

Known Locations of Listed Fairy Shrimp
2013 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

FIGURE

4

3.0 SITE CHARACTERIZATION

The topography within the study area is generally flat or with gentle rolling hills. The approximately 13.2 miles of study area contains a combination of agricultural, municipal, private, and reserve land, most with previous disturbances of some kind.

3.1 Climate

The study area is located within a Mediterranean climate region consisting of warm, dry summers and mild, wet winters. In summer, temperatures often reach 100º F and winter temperatures fall as low as 30º F, with an occasional freeze. Average annual temperature ranges are fairly moderate for the area, ranging from 49.3º F to 79.5º F. Average total precipitation for the area is approximately 10 to 15 inches per year (Desert Research Institute [DRI] 2013).

3.1.1 2012-2013 Wet Season

Most precipitation in coastal Southern California occurs from approximately October through May, but annual precipitation records generally include precipitation events from July 1st through June 30th. The Elsinore station, near Lake Elsinore, is the closest weather station to the study area. The total rainfall for the 2012-2013 season was 10.76 inches. Although this is only 0.9 inch less than the yearly average of 11.66 from DRI (2013), most of the rainfall was in December (6.67 inches) with drier than normal conditions otherwise. For comparison, the total rainfall for the 2011-2012 season was 6.68 inches, the 2010-2011 season had a total of 22.38 inches (11.67 of which fell in December 2010) and the 2009-2010 season had a total of 16.55 inches (8.88 of which fell in January 2010). The high rainfall totals of those two seasons reflect those two extraordinarily wet months. The four seasons previous to 2009-2010 had rainfall totals of less than nine inches each.

3.2 Topography, Land Use, and Soils

The study area begins in the relatively flat Warm Springs Valley in the south, and then travels northwest, crossing Alberhill Creek/Temescal Wash and continuing through valleys and low rolling hills in the Terra Cotta and Alberhill areas. It then crosses Temescal Wash again, twice in the space of about 1.5 miles. As it continues northwest it parallels and then enters the Temescal Valley, between the Santa Ana Mountains to the southwest and the Gavilan Hills to the northeast, before terminating at the Ivy Glen Substation in Corona. west and then southwest across a series of low, rolling hills.

The study area is located primarily along relatively flat areas that have historically been used for grazing, agriculture, an old railroad, and rural residential development. Much of the proposed ROW is adjacent to existing transmission lines and paved and dirt roads, although there is one unroaded stretch which crosses several canyons southwest of the Temescal Valley.

Soils in the study area are primarily in the Monserate-Arlington-Exeter and Traver-Domino-Willows associations. These soils are characterized as level to moderately steep soils that have a surface layer of sandy loam often with a hardpan. The soils can range from very shallow to relatively deep (USDA 1971). Soils in the study area do not generally have a high clay component; however, there are "lenses" of clay soils in the study area, and several mapped soil types which are considered sensitive. Phase 2 travels through several mapped soil types which are considered sensitive by the MSHCP (Riverside County 2003). In the south these include Travers series sandy loams, Altamont series clays, and Willows silty clay. Some of these soils are associated with the Alberhill Creek/Temescal Wash drainage. In the northern portion of Phase 2, the alignment passes through additional areas of Altamont clays.

3.3 Weather Conditions and Pool Formation

Vernal pool/ponding formation is typically affected by precipitation levels and general rainfall patterns specifically wherein precipitation is delivered by relatively few, large storm systems. Large but widely spaced precipitation events may result in saturated soil conditions and temporary inundations, but greater precipitation levels and/or more closely spaced storms may be required for longer inundation periods.

Although the precipitation level during the 2012-2013 wet season appeared to be higher than the previous wet season, the temporal and physical distribution of the rainfall was such that inundations actually decreased.

Many of the depressions that were sampled during the protocol wet season surveys occurred within areas that are extremely dynamic, as most are continually altered by human activities. Such activities included: an active junkyard, road construction, and vehicular traffic on unpaved roads, including off-road vehicles. Of the 68 depressions inundated & sampled during the 2012-2013 wet season surveys, 55 would fall into the above categories (Appendix B: Photograph 1). Other depressions were constructed basins, or formed on topography created by past construction, agricultural, or commercial activities (Appendix B: Photographs 2 & 4) on sites that are now inactive. Thirteen depressions fell into this category, most of which were not subject to any disturbance during the 2012-2013 season. None of the 68 depressions sampled in the 2012-2013 season were natural vernal pools in an undisturbed location. Table 1 summarizes the number of inundated depressions that were formed as a result of construction related, roadside, and drainage conditions.

Table 1.
Depression Types for the Proposed Valley-Ivyglen Transmission Line Project

Depression Type	Depression Identification Number	How Many?
Road/Road Shoulder	Y2-1, 240, 247a, 247h, 247k, 247l, 251, 255-256, 257a-257d, 258a, 259, 261-263, 265, 267a-267c, 268, 269a, 275-277, 317-320, 334-335, 338, 339b, 342-343, 347, 350-352, 431, 435, 445, 448-450, 469, 471, 479-481, 488, 490-491	55
Related to Past Disturbance	308, 311-312, 315, 356, 489	6
Located in created basin	264, 325, 340, 452-453, 470, 477	7
Grand Total:		68

Per the USFWS wet season protocol, all inundated depressions were noted at their initial ponding; however, only depressions with continuing inundation at the two-week follow-up visit(s), were subsequently surveyed per the USFWS protocol. Depressions with numbers ≤144 were first documented in 2008-2009 (primarily Phase 1); depressions with a y2 prefix were first documented in 2009-2010 (primarily Phase 1), depressions first documented in 2011-2012 were numbered ≥234, and depressions first documented in 2012-2013 are numbered ≥431. A total of 19 new depressions were identified during the 2012-2013 wet season which had not been documented during the previous year's survey.

3.4 Vegetation Communities

The vegetation communities and land cover types in the study area are varied, but most depressions occur on developed disturbed land, mainly roadsides and unpaved roads. (ruderal habitat), and grasslands. Vegetation communities and land cover types recorded along the Phase 2 alignment are briefly described below. These communities are classified per the Western Riverside County MSHCP, which is based on the vegetation communities presented in the *Preliminary Descriptions of Terrestrial Natural Communities of California* (Holland 1986; Riverside County 2003).

3.4.1 Agriculture

Agricultural lands within the study area include areas occupied by dairies and livestock feed yards or areas that have been tilled for use as croplands or groves/orchards. The Phase 2 alignment crosses areas which were in agricultural production in the past, but little, if any, of these lands were in active production this season.

3.4.2 Chaparral

Chaparral is a shrub-dominated vegetation community that is composed largely of evergreen species that range from 3 to 12 feet in height (Riverside County 2003). The most common and widespread species within chaparral is chamise (*Adenostoma fasciculatum*). Other common shrub species include manzanita (*Arctostaphylos* spp.), wild-lilac (*Ceanothus* spp.), oak (*Quercus* spp.), redberry (*Rhamnus* spp.), laurel sumac (*Malosma laurina*), mountain-mahogany

(*Cercocarpus betuloides*), toyon (*Heteromeles arbutifolia*), and mission manzanita (*Xylococcus bicolor*). Soft-leaved subshrubs are less common in chaparral than in coastal sage scrub (see below) but occur within canopy gaps of mature stands. Common species include California buckwheat (*Eriogonum fasciculatum*), sages (*Salvia* spp.), California sagebrush (*Artemisia californica*), and monkeyflower (*Mimulus* spp.). In addition, herbaceous species, including deerweed (*Lotus scoparius*), nightshade (*Solanum* spp.), Spanish bayonet (*Yucca whipplei*), rock-rose (*Helianthemum scoparium*), onion (*Allium* spp.), soap plant (*Chlorogalum* spp.), bunch grasses (*Nassella* spp., and *Melica* spp.), wild cucumber (*Marah* spp.), bedstraw (*Galium* spp.), and lupine (*Lupinus* spp.) are also present. Chaparral occurs along the Phase 2 alignment west of the Temescal Valley floor, in places where the alignment touches on the foot of the Santa Ana Mountains.

3.4.3 Coastal Sage Scrub

In western Riverside County, coastal sage scrub is found both in large contiguous blocks scattered throughout the county, as well as integrated with chaparral and grasslands. Coastal sage scrub is dominated by a characteristic suite of low-statured, aromatic, drought-deciduous shrubs, and subshrub species. Composition varies substantially depending on physical circumstances and the successional status of the vegetation community; however, characteristic species include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), California encelia (*Encelia californica*), and several species of sage (e.g., *Salvia mellifera*, *S. apiana*). Other common species include brittlebush (*Encelia farinosa*), lemonadeberry (*Rhus integrifolia*), sugarbush (*R. ovata*), yellow bush penstemon (*Keckiella antirrhinoides*), Mexican elderberry (*Sambucus mexicana*), sweetbush (*Bebbia juncea*), boxthorn (*Lycium* spp.), coastal prickly pear (*Opuntia littoralis*), coastal cholla (*Cylindropuntia prolifera*), tall prickly-pear (*O. oricola*), and species of dudleya (*Dudleya* spp). Within the study area, coastal sage scrub also occurs in various disturbed phases, as a result of mechanical disturbances such as agriculture, grading, or grazing, characterized by a sparse, open shrub habitat separated by grasses or bare ground.

3.4.4 Developed or Disturbed Land

Developed or disturbed land consists of disced, cleared, or otherwise altered areas. Developed lands may include roadways, existing buildings, and structures. Disturbed lands may include ornamental plantings for landscaping, exotics, or ruderal vegetation dominated by nonnative, weedy species such as mustard (*Brassica* sp.), fennel (*Foeniculum vulgare*), tocalote (*Centaurea melitensis*), and Russian thistle (*Salsola tragus*). The majority of the identified depressions occur within developed habitat, along dirt roads, building pads, or other manmade features that result in soil compaction or exposure of hardpan soils suitable for ponding.

3.4.5 Grasslands

Two general types of grasslands occur in western Riverside County: native dominated perennial grassland (valley and foothill grassland); and nonnative dominated, primarily annual grassland (nonnative grassland), which is the dominat grassland on the project alignment.

Valley and foothill grasslands typically contain the perennial bunch grasses, such as purple needlegrass (*Nassella pulchra)* and foothill needlegrass (*N. lepida*). Lesser amounts of other native grasses, such as onion grass (*Melica* spp.), wild rye (*Leymus* spp.), muhly (*Muhlenbergia* spp.), and cane bluestem (*Bothriochloa barbinodis*), also may be present. In addition, nonnative grasses or forbs may be present to varying degrees. Native herbaceous plants commonly found within valley and foothill grasslands include yellow fiddleneck (*Amsinckia menziesii*), common calyptridium (*Calyptridium monardum*), suncup (*Camissonia* spp.), Chinese houses (*Collinsia heterophylla*), California poppy (*Eschscholzia californica*), tarweed (*Hemizonia* spp.), coast goldfields (*Lasthenia californica*), common tidy-tips (*Layia platyglossa*), lupine (*Lupinus* spp.), popcornflower (*Plagiobothrys* spp.), blue dicks (*Dichelostemma capitata*), muilla (*Muilla* spp.), blue-eyed grass (*Sisyrinchium bellum*), and dudleya (*Dudleya* spp.). Little of this vegetation type occurs on Phase 2.

Where grasslands occur on Phase 2, they are nonnative grasslands are likely to be dominated by several species of grasses that have evolved to persist in concert with human agricultural practices: slender oat (*Avena barbata*), wild oat (*A. fatua*), fox tail chess (*Bromus madritensis*), soft chess (*B. hordeaceus*), ripgut grass (*B. diandrus*), barley (*Hordeum* spp.), rye grass (*Lolium multiflorum*), English ryegrass (*L. perenne*), rat-tail fescue (*Vulpia myuros*), and Mediterranean schismus (*Schismus barbatus*).

3.4.6 Meadows and Marshes

Meadow and marsh vegetation communities occur in both flowing and still water. This vegetation community includes cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), sedges (*Cyperus* spp.), smartweed (*Polygonum* spp.), watercress (*Rorippa* spp.), and yerba mansa (*Anemopsis californica*). It also contains perennial and biennial herbs (e.g., *Oenothera* spp., *Lupinus* spp., *Potentilla* spp., and *Sidalcea* spp.) and grasses (e.g., *Agrostis* spp., *Deschampsia* spp., and *Muhlenbergia* spp.). Rooted aquatic plant species with floating stems and leaves, such as pennywort (*Hydrocotyle* spp.), water smartweed (*Polygonum amphibium*), pondweeds (*Potamogeton* spp.), and water-parsley (*Oenanthe sarmentosa*) may also be present. Meadows are not present on Phase 2, but the alignment skirts some marshland, primarily in the south.

3.4.7 Riparian Forest, Woodland, and Scrub

Riparian vegetation, including forest, woodland, and scrub subtypes, is distributed in waterways and drainages throughout much of western Riverside County. Depending on community type, a riparian community may be dominated by any of several trees or shrubs, including box elder (*Acer negundo*), bigleaf maple (*A. macrophyllum*), coast live oak (*Quercus agrifolia*), white alder (*Alnus rhombifolia*), sycamore (*Platanus racemosa*), Fremont's cottonwood (*Populus fremontii*), California walnut (*Juglans californica*), Mexican elderberry (*Sambucus mexicana*), wild grape (*Vitis girdiana*), giant reed (*Arundo donax*), mule fat (*Baccharis salicifolia*), tamarisk (*Tamarix* spp.), or any of several species of willow (*Salix* spp.). In addition, various understory herbs may be present, such as saltgrass (*Distichlis spicata*), wild cucumber (*Marah macrocarpus*), mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica*), and poison-oak (*Toxicodendron*

diversilobum) (Riverside County 2003). Subcategories of these habitat types within the study area include mule fat scrub, southern cottonwood-willow riparian forest, and southern sycamore-alder riparian woodland. Within the study area, riparian habitats occur primarily along stream courses, floodplains, and riverbanks.

3.4.8 Riversidean Alluvial Fan Sage Scrub

Riversidean alluvial fan sage scrub generally occurs on alluvial fans and benches along the floodplains of larger waterways in the Riverside County. Alluvial scrub is made up predominantly of drought-deciduous soft-leaved shrubs, but with significant cover of larger perennial species typically found in chaparral. Scalebroom (*Lepidospartum squamatum*) generally is regarded as an indicator of Riversidean alluvial fan sage scrub. In addition to scalebroom, alluvial scrub typically is composed of white sage (*Salvia apiana*), redberry (*Rhamnus crocea*), California buckwheat, Spanish bayonet (*Hesperoyucca whipplei*), California croton (*Croton californicus*), cholla (*Cylindropuntia* spp.), tarragon (*Artemisia dracunculus*), yerba santa (*Eriodictyon* spp.), broom baccharis (*Baccharis sarothroides*), and mountain-mahogany (*Cercocarpus betuloides*). Annual species composition has not been studied, but is probably similar to that found in understories of neighboring shrubland vegetation. The alignment skirts this vegetation community in several locations.

3.4.9 Woodlands and Forests

Woodland and forest vegetation communities in western Riverside County are dominated by Engelmann oak (*Quercus engelmannii*), coast live oak, canyon live oak (*Q. chrysolepis*), interior live oak (*Q. wislizenii*), and black oak (*Q. kelloggii*) in the canopy, which may be continuous to intermittent or savannah-like. Four-needle pinyon pine (*Pinus quadrifolia*), single-leaf pinyon pine (*P. monophylla*), and California juniper (*Juniperus californica*) are the canopy species of peninsular juniper woodland, which most commonly occur in southern California, forming a scattered canopy from 10 to 49 feet (ft) (3 to 15 meters [m]) tall. Phase 2 skirts some individual oaks and some limited oak woodlands.

3.4.10 Open Water

Open water habitat typically is unvegetated due to a lack of light penetration. However, open water may contain suspended organisms such as filamentous green algae, phytoplankton (including diatoms), and desmids. Floating plants such as duckweed (*Lemna* spp.), water buttercup (*Ranunculus aquatilis*), and mosquito fern (*Azolla filiculoides*) also may be present. Open water includes inland depressions, ponds, lakes, reservoirs, and stream channels containing standing water and often occur in conjunction with riparian and upland vegetation communities. Depth may vary from hundreds of feet to a few inches (Riverside County 2003). The Phase 2 alignment skirts permanent open water only in the south.

4.0 SURVEY METHODOLOGY

Focused surveys for listed fairy shrimp species were conducted by John F. Green under the authority of USFWS Permit TE-054011-5. A notification letter, dated 1 November 2012, was submitted to the USFWS prior to sampling inundated depressions (Appendix C). Surveys were conducted according to USFWS survey guidelines for wet season surveys (USFWS 1996). Once the depressions were inundated with at least 1.2 in (3.0 cm) of water following a storm event, depressions were sampled once every two weeks until the depressions were no longer inundated. In cases where the depressions dry and then refill within the same wet season, the depression sampling is reinitiated every time they reach the 1.2 in (3.0 cm) of standing water criterion. Depressions were sampled using a net with a mesh size smaller than (0.1 in) 3.2 millimeters.

All fairy shrimp netted were identified to species, when maturity level allowed. If only immature fairy shrimp were encountered in the depression, which did not yet exhibit the adult characteristics needed for identification, their life history status was noted and identification was planned for the next survey visit. Table 2 summarizes sampling visits for the study area. Appendix A depicts depression locations, and Appendix D summarizes depression sampling information.

Table 2.
Sampling Visits for the Proposed Valley-Ivyglen Transmission Line Phase 2 Project Fairy Shrimp Surveys

Date	Survey #	Activity
3 December 2012	0	Checked for ponding after rain event; ponding observed. Began sampling inundated depressions in two weeks.
17 December 2012	1	Sampled inundated depressions.
27-28 December 2012	2	Continued to sample inundated depressions. Rain event had occurred which refilled/inundated many depressions.
9 January 2013	3	Sampled inundated depressions.
23 January 2013	4	Continued to sample inundated depressions.
29 January 2013	5	Continued to sample inundated depressions. Rain event had occurred which refilled/inundated some depressions.
12 February 2013	6	Continued to sample inundated depressions. Rain event had occurred which refilled/inundated many depressions.
26 February 2013	7	Continued to sample inundated depressions.
12 March 2013	8	Continued to sample inundated depressions. Rain event had occurred which refilled/inundated many depressions.
26 March 2013	9	Continued to sample inundated depressions.
9 April 2013	10	All depressions dry, season over.

5.0 SURVEY RESULTS

Sixty-three depressions were sampled in 2012-2013. Other depressions identified in previous years or this year failed to inundate, or were not inundated long enough for sampling this season. The locations of all identified depressions are included in Appendix A and detailed depression sampling information is included as Appendix D.

The study area is highly dynamic, as the local residents utilize the unpaved access roads daily and the majority of the depressions are in or adjacent to the existing access roads. Residents drive vehicles, hike, walk their dogs, as well as other recreational activities, which alter the depressions. As such, inundation depths, boundaries, and length of inundation are continually changing. Construction sites with graded lots, roads, and pads are currently inactive, or are influenced by runoff and storm drain flows. These depressions remained relatively untouched at the time of the surveys. These depression types (active access roads and inactive construction sites) typically are not considered vernal pools, but they can support fairy shrimp, particularly Versatile Fairy Shrimp, a ubiquitous, non-sensitive species.

Depressions within the study area not only changed at the beginning and the end of the wet season, but between sampling visits. A depression would be inundated at the beginning of the season and would not refill even with sufficient rain because vehicular activity or a flood event had reconfigured the depression. Conversely, a depression would be formed in the middle of the season that was not present upon initiation of surveys). Therefore, several depressions were only sampled once. Although they fit the criteria of fairy shrimp habitat, they were altered by recreational activity or dried up prior to the next sampling visit.

No listed fairy shrimp species were identified in any of the depressions. Versatile Fairy Shrimp, not considered sensitive by resource agencies, was detected in nine depressions (Appendix B: Photograph 3). Other depressions did not support any fairy shrimp species during the 2012-2013 season. Table 3 provides information relating to Versatile Fairy Shrimp occupancy and Appendix D provides depression sampling information.

Table 3.
Depressions with Versatile Fairy Shrimp Occupancy during Surveys

Survey Week	Number of Depressions Occupied*/Inundated	Survey Week (continued)	Number of Depressions Occupied*/Inundated
1	0 / 5	6	8 / 29
2	0 / 46	7	3 / 13
3	3 / 19	8	0 / 50
4	1 / 3	9	1 / 1
5	1 / 14		

Notes:
*Occupied by Versatile Fairy Shrimp or *Branchinecta* sp. (too small to identify)

The 2012-2013 season had several rain events which filled, maintained, or refilled depressions, but was also interspersed with dry periods and unseasonably high temperatures which sometimes caused rapid drying of depressions. This resulted in one depression, with *Branchinecta* shrimp which were too small to confidently identify, drying prior to the next survey visit, thus preventing positive identification. This depression, however, had adult Versatile Fairy Shrimp in it in past years, so it is likely that this year's juveniles were Versatile Fairy Shrimp as well.

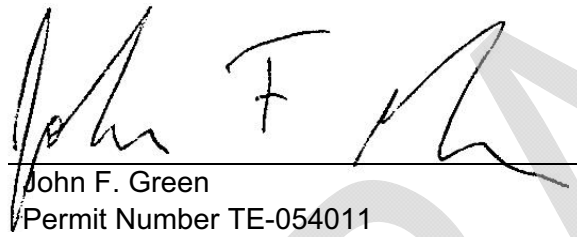
6.0 CONCLUSION

Pooling in the study area was associated with depressions in disturbed and developed areas. Most of these depressions are associated with existing access roads and shoulders.

Only Versatile Fairy Shrimp were positively identified during 2012-2013 focused wet season surveys. This is also the only species of fairy shrimp found in the study area during three previous years of surveys (some years only at Phase 2's south end). No listed fairy shrimp were detected (i.e., Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp). Versatile Fairy Shrimp is a ubiquitous species, distributed throughout the study area, and not considered sensitive by resource agencies.

This survey result confirms that listed fairy shrimp were not detected within potentially suitable habitat during AMEC's 2012-2013 wet season survey.

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.



19 July 2013

John F. Green
Permit Number TE-054011

Date

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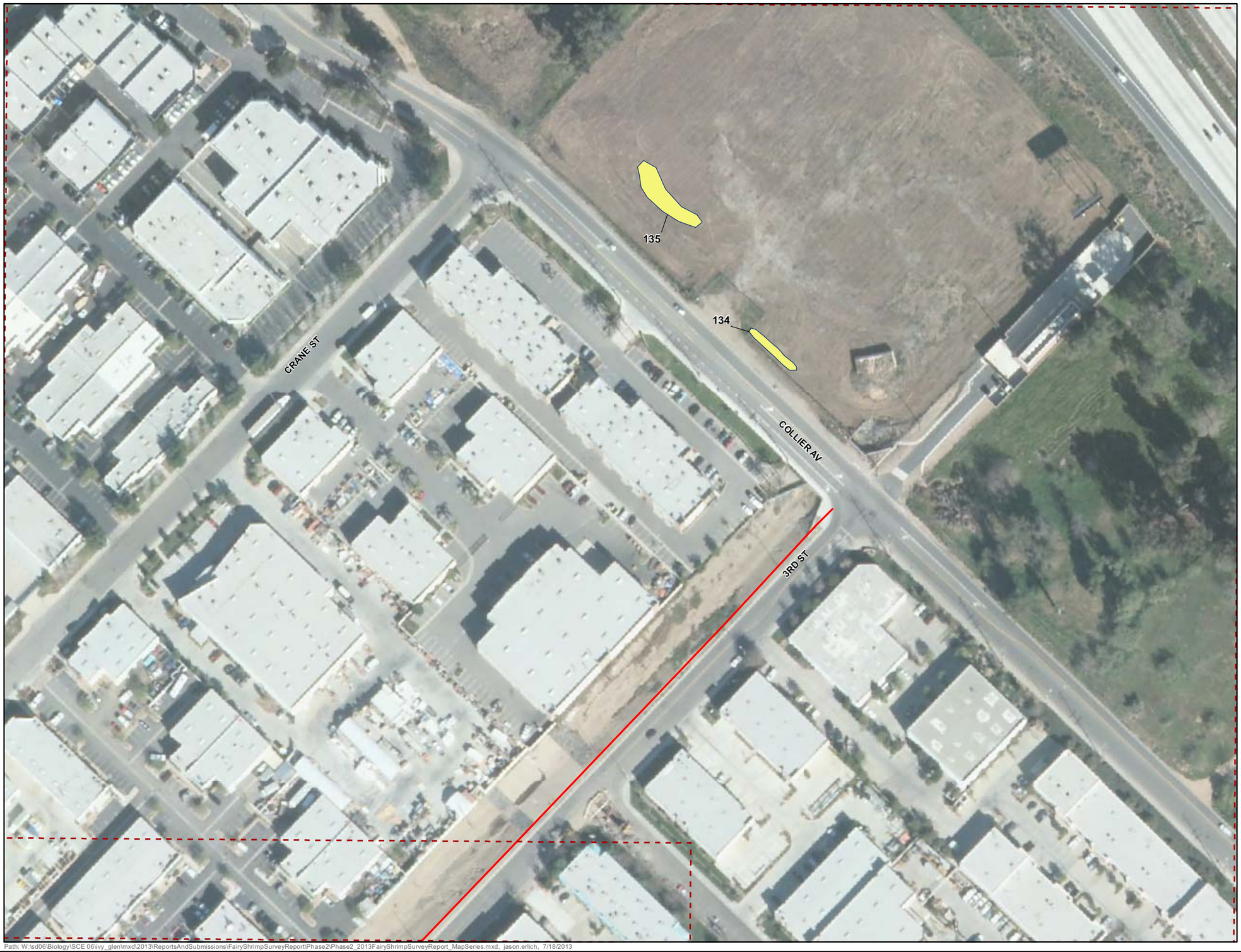
APPENDIX A

DEPRESSION MAPS



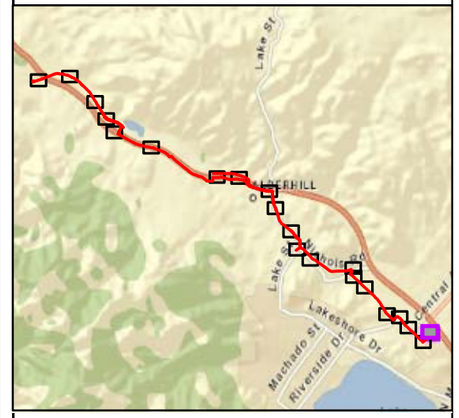
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-1

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Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool

Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-2

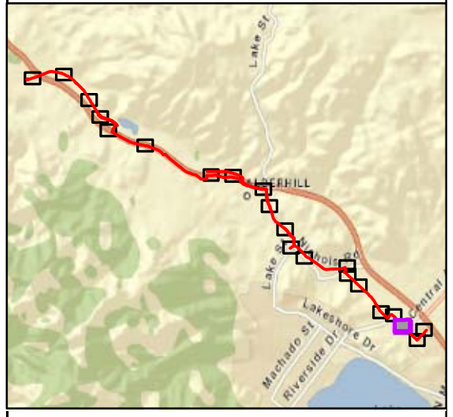
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-3

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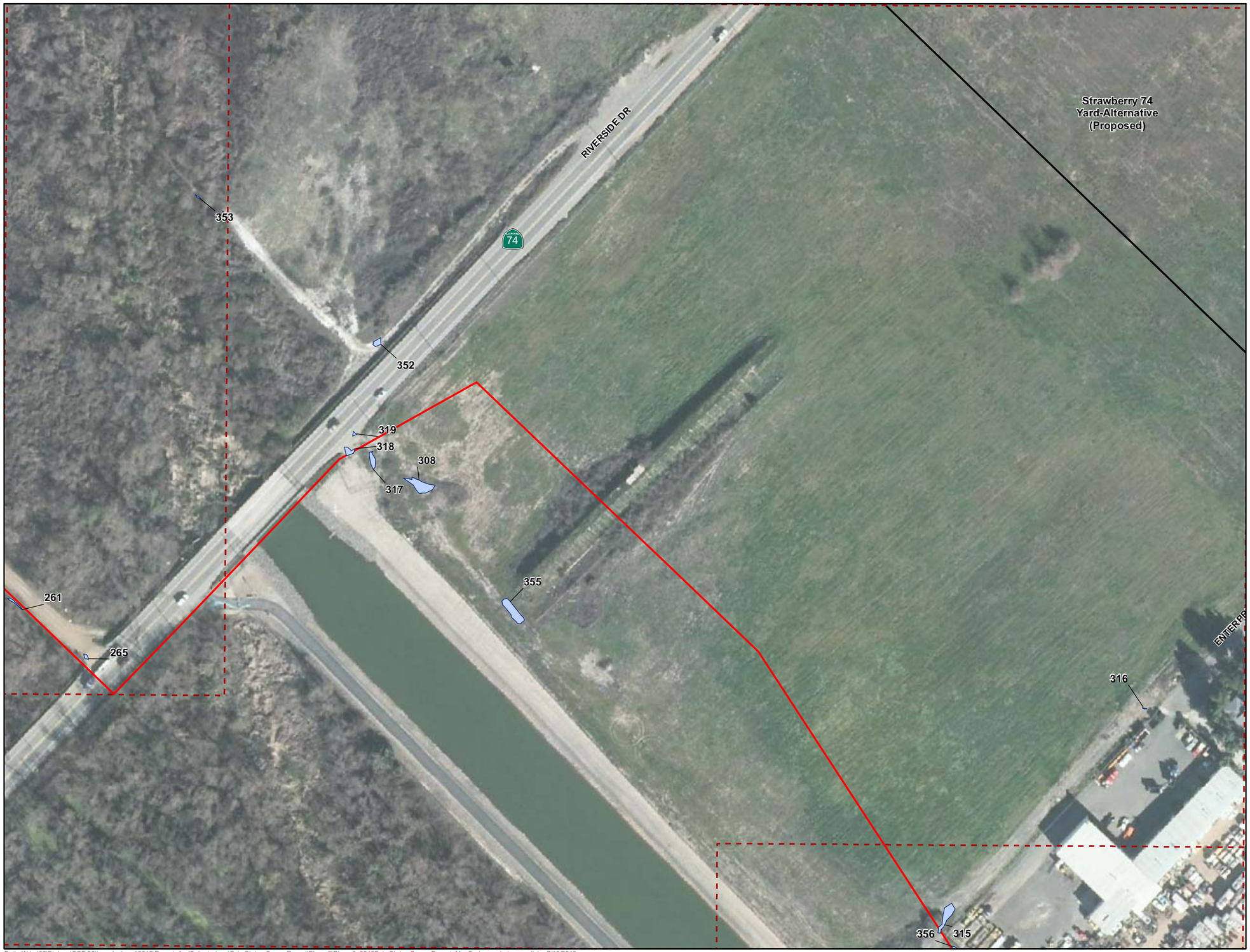

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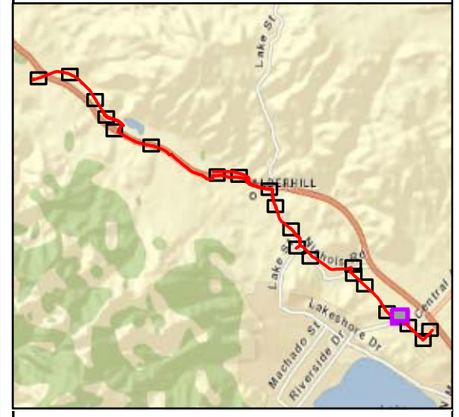
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-4

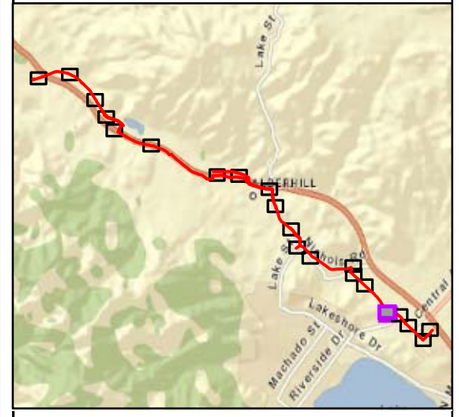
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-5

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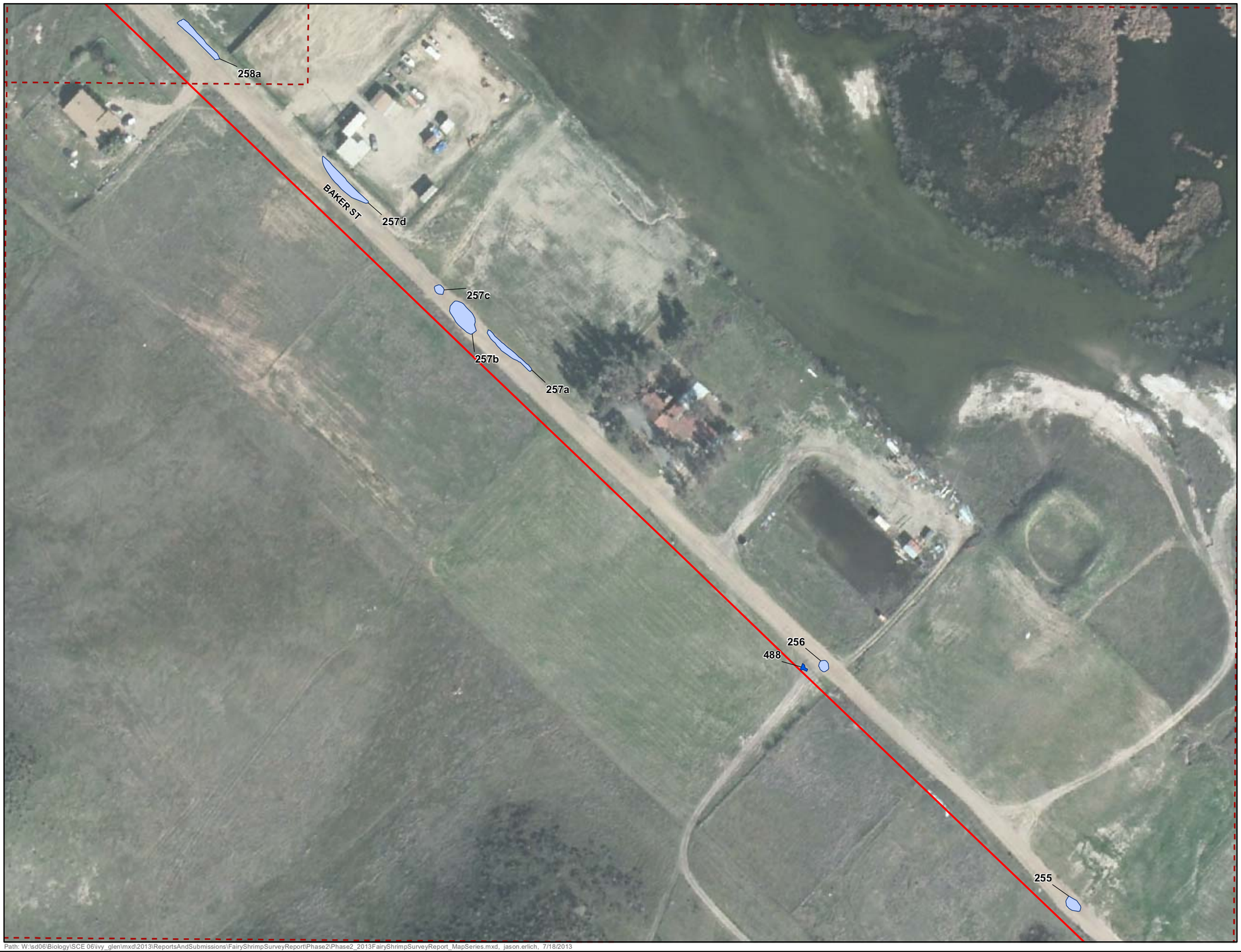


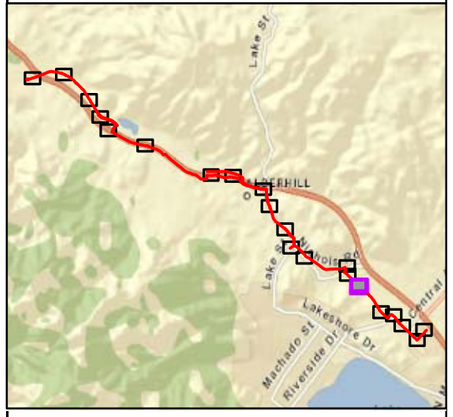
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-6

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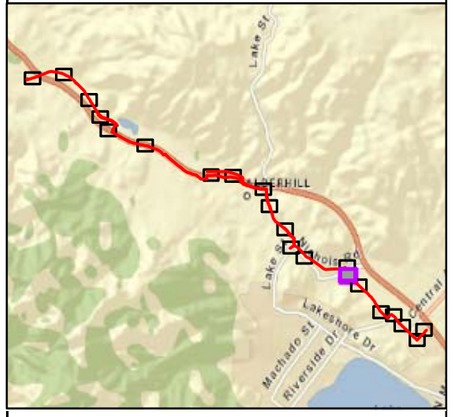
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-7

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

NICHOLS RD

452

453

275

277

276

489

465

473

NICHOLS RD

472

471

PIERCE ST

490

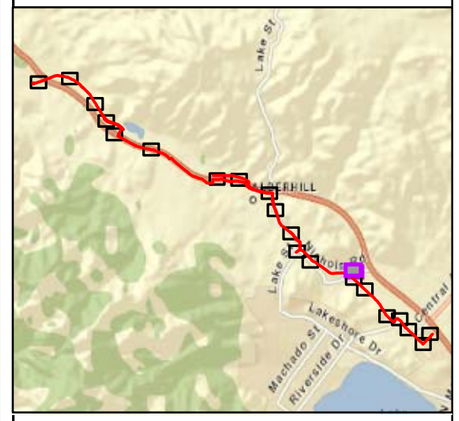
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

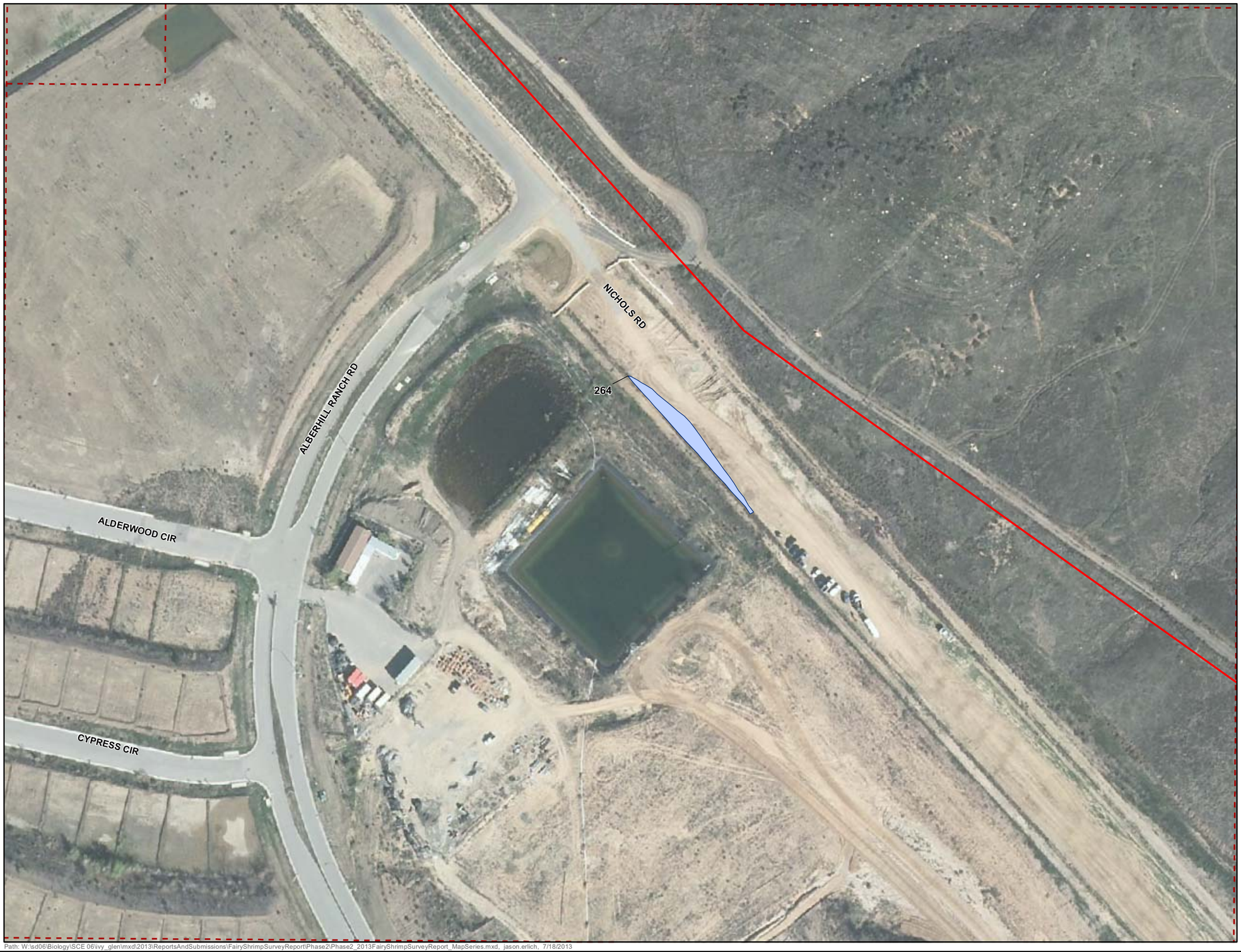
Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-8

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013



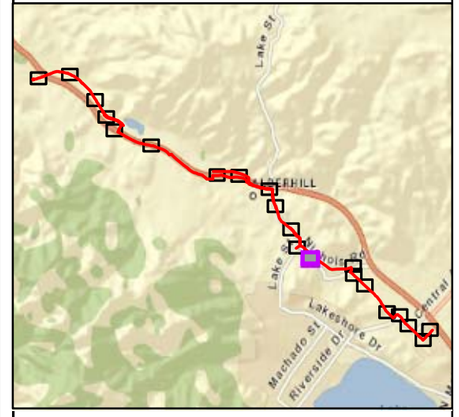
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

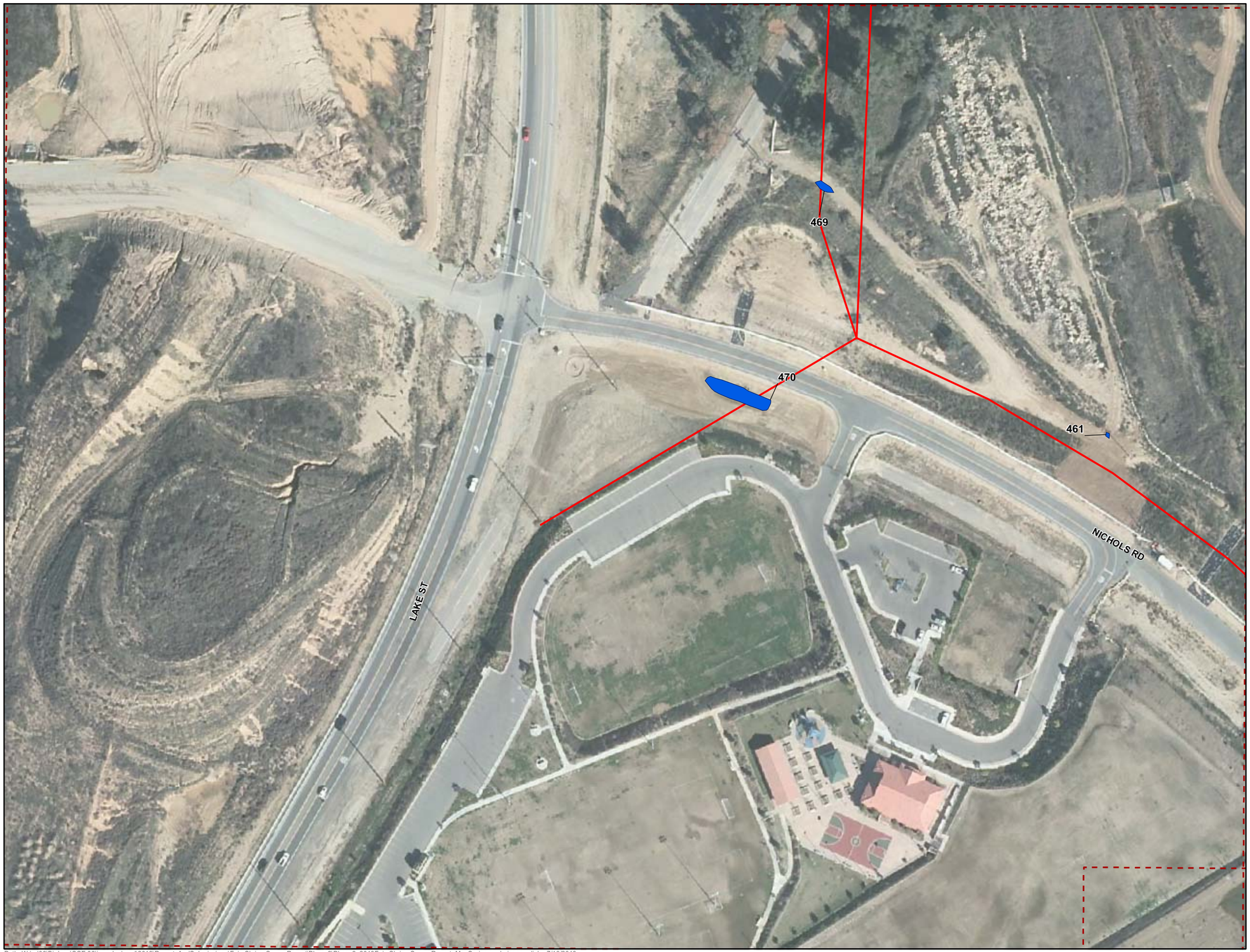
Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-9

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013



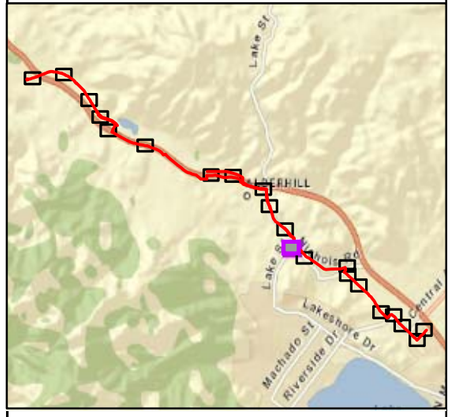
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

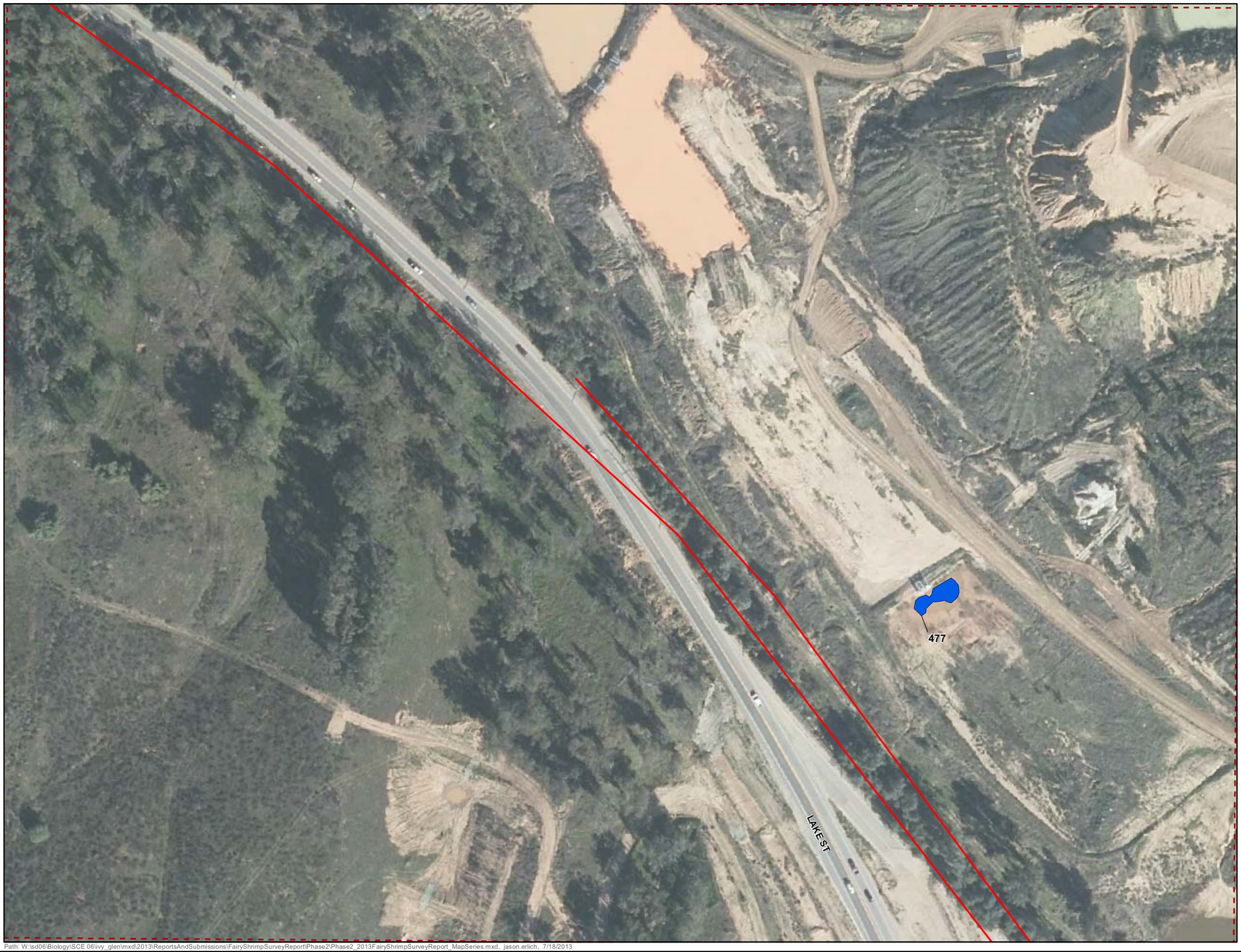
Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-10

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013



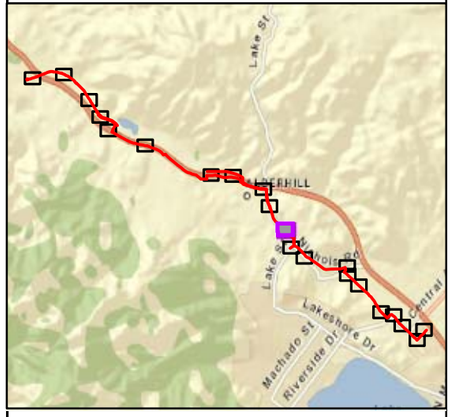
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-11

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

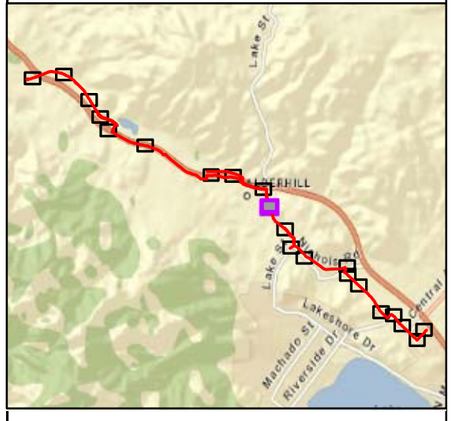
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

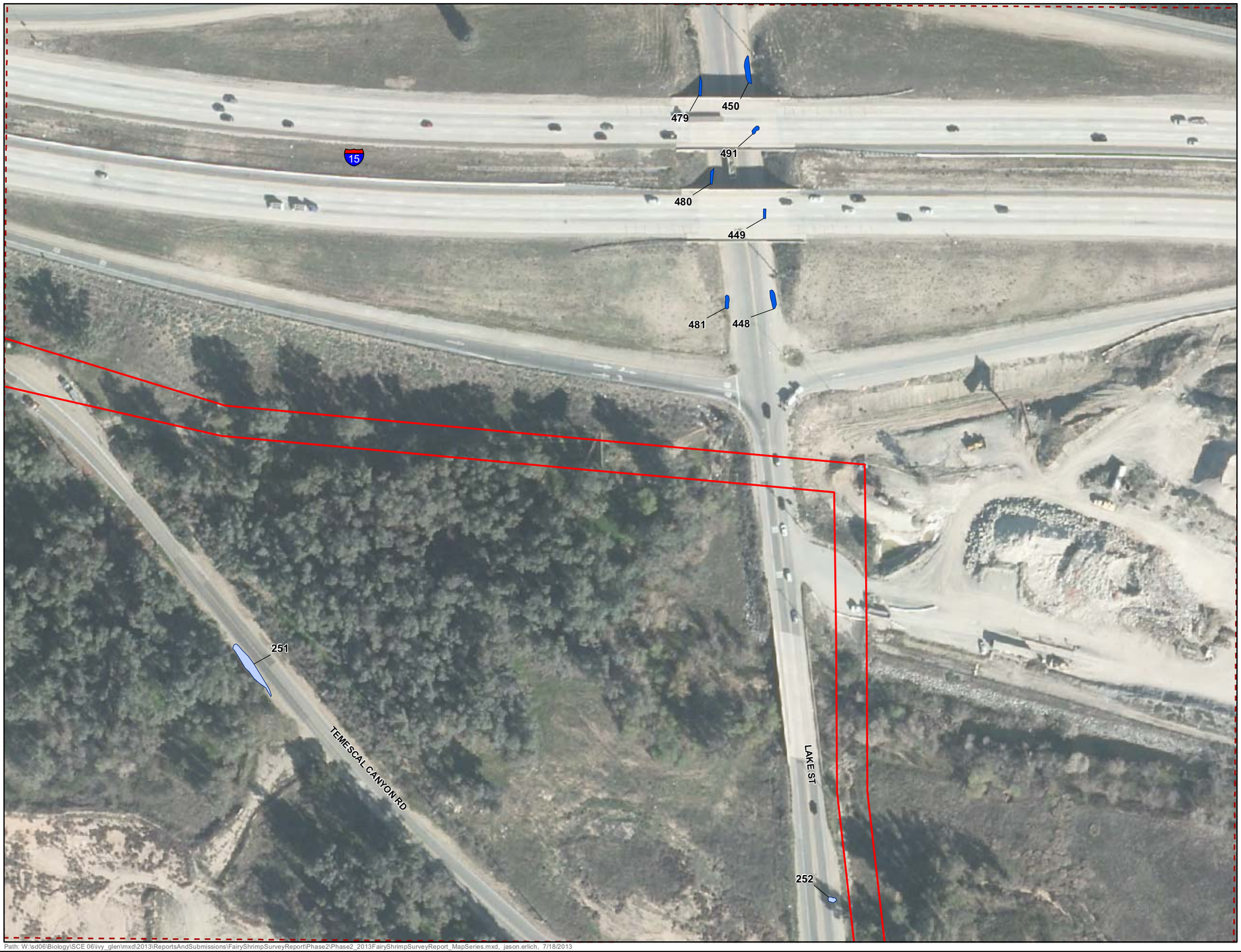
Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-12

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013



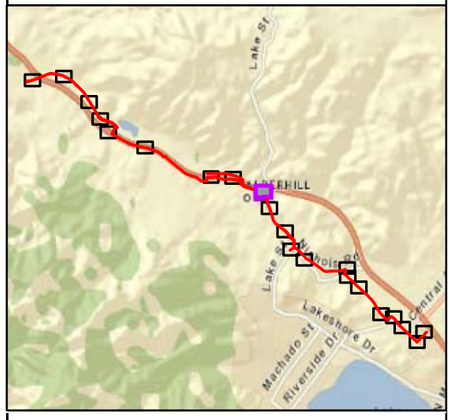
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

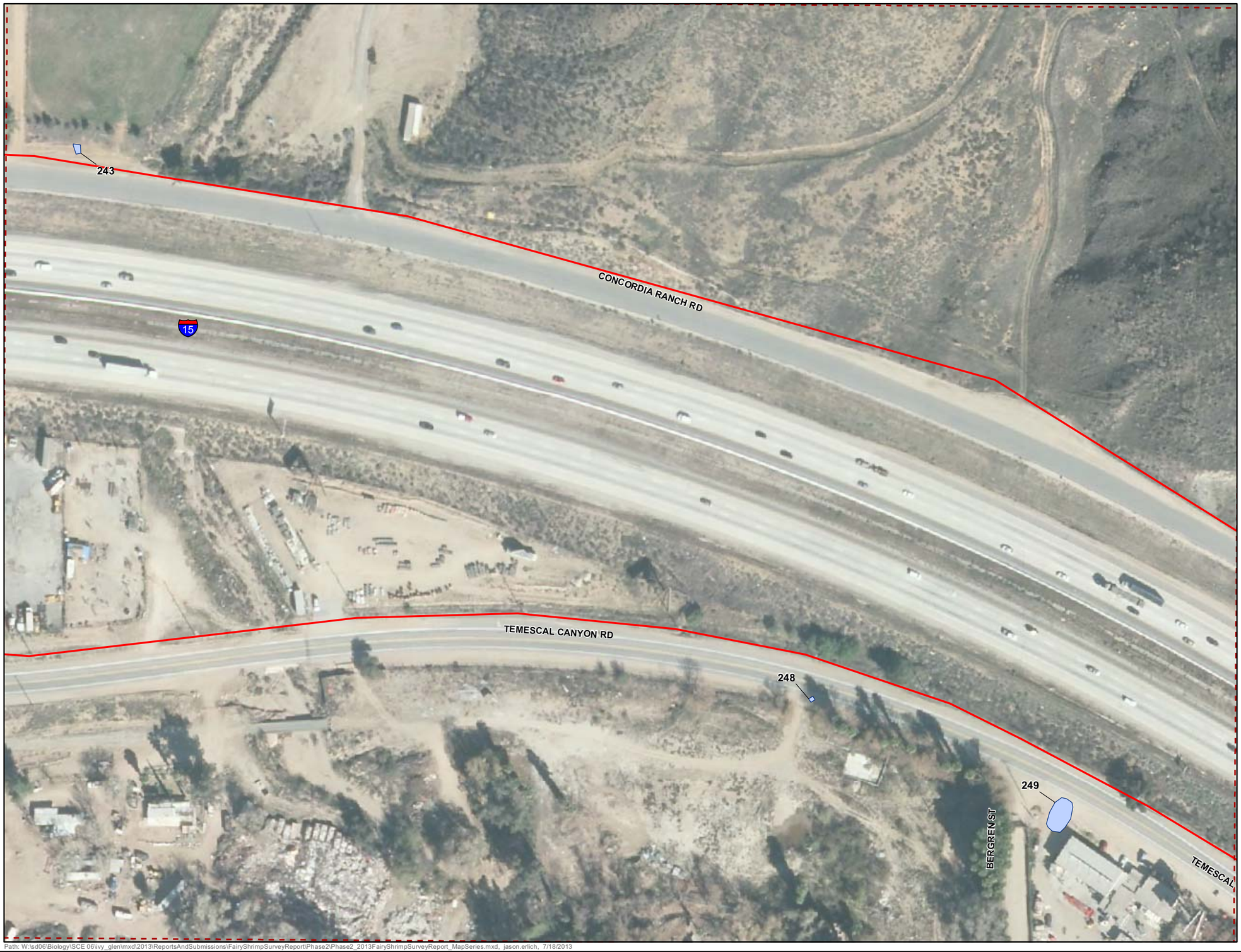
Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-13

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013



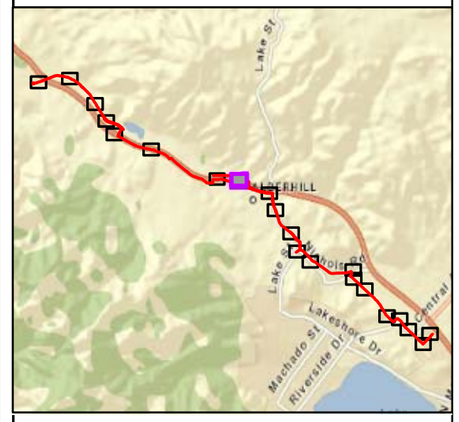
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-14

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

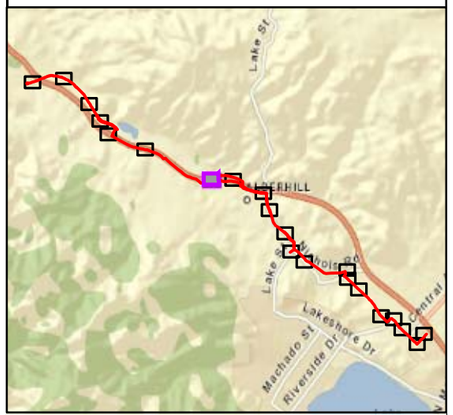
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-15

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

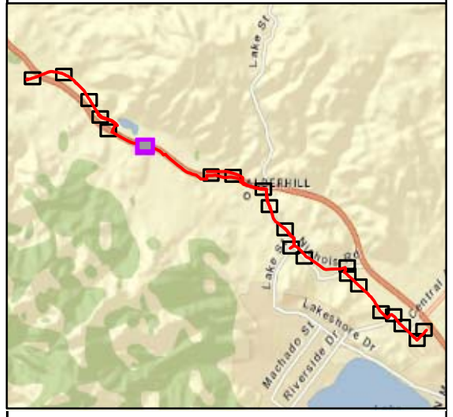
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

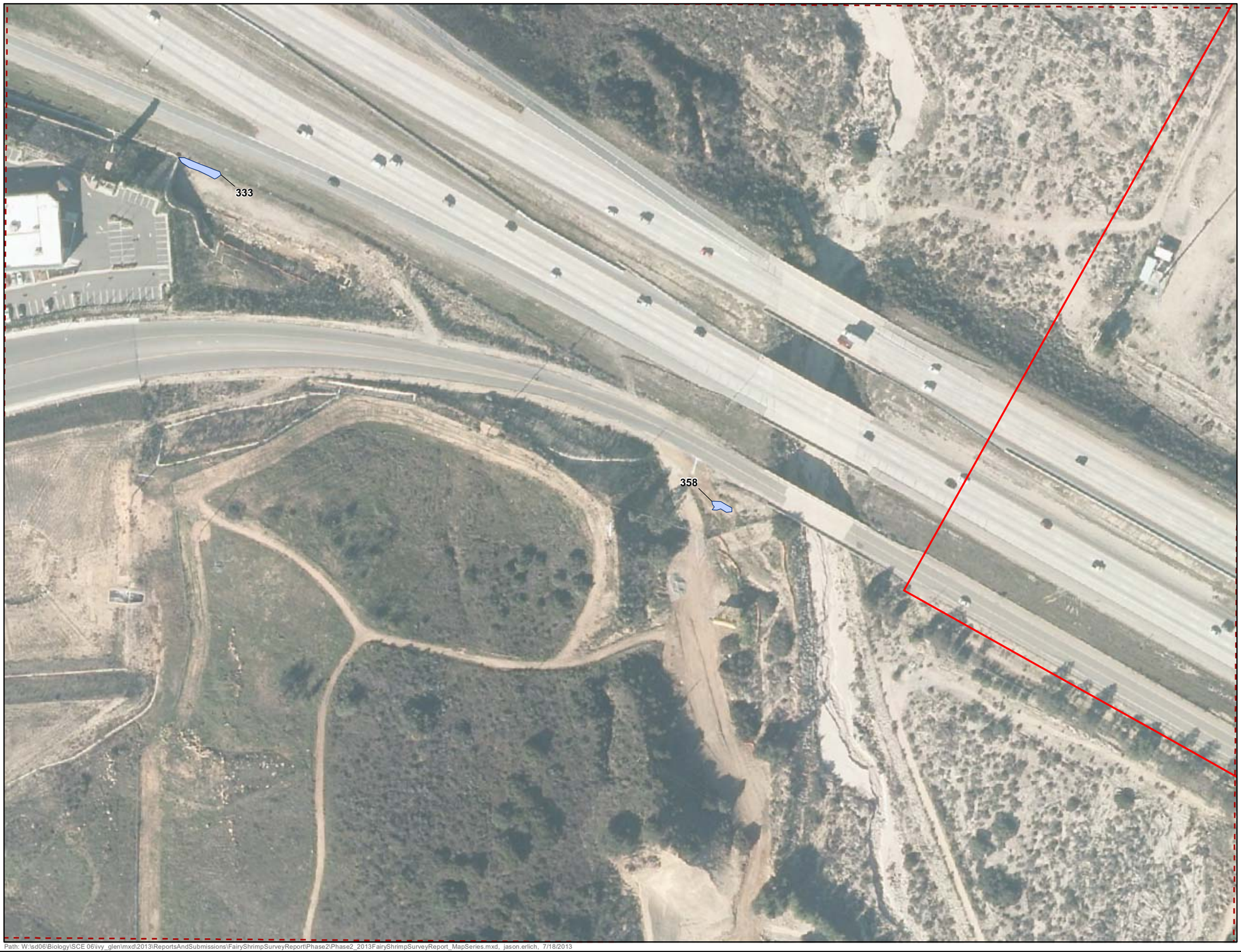
0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-16



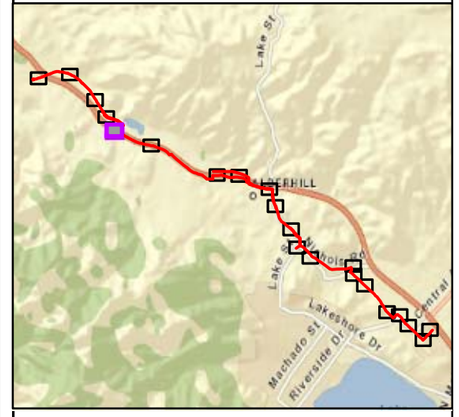
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

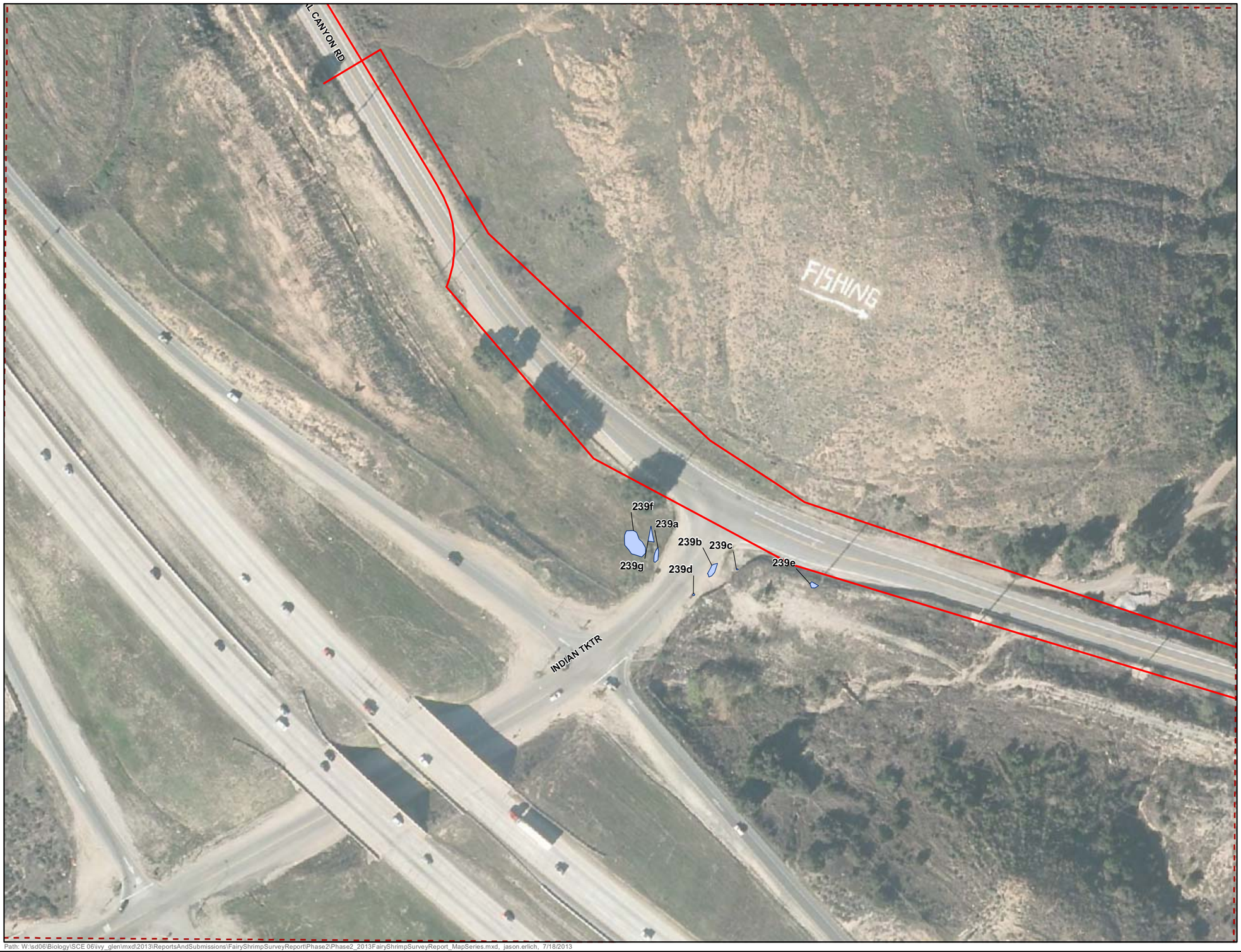
Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-17

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013



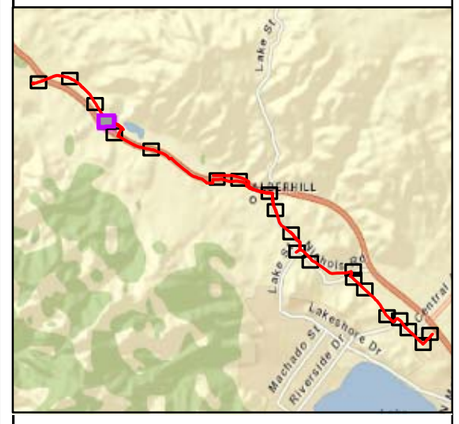
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

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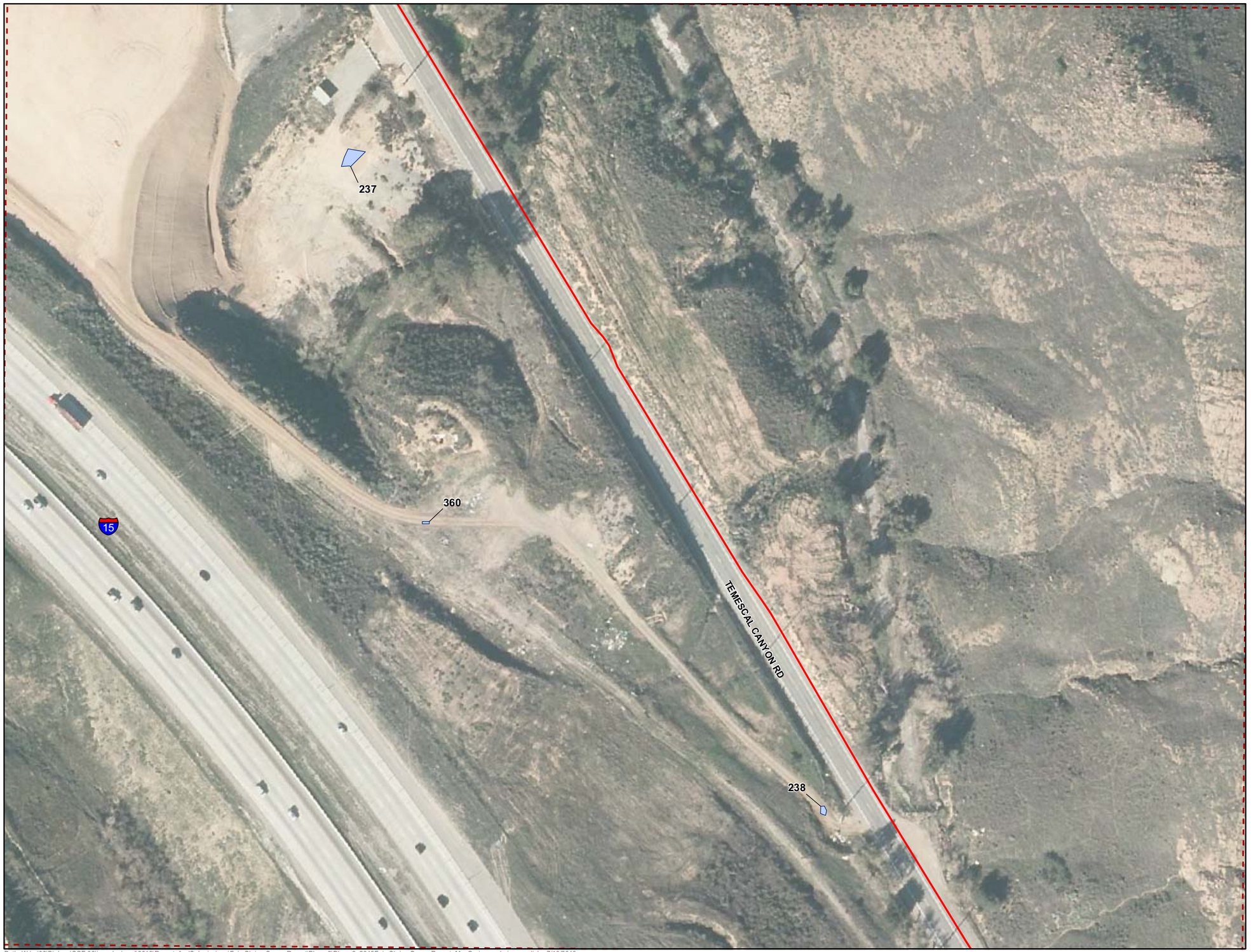
Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-18

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013



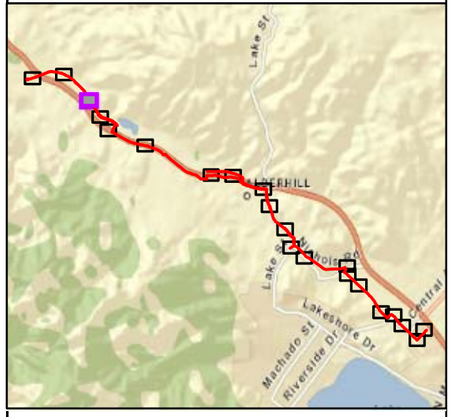
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-19

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

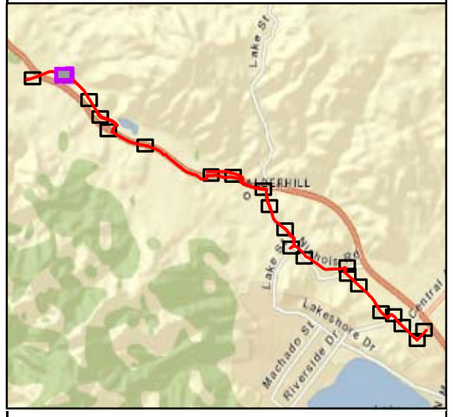
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

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Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-20

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

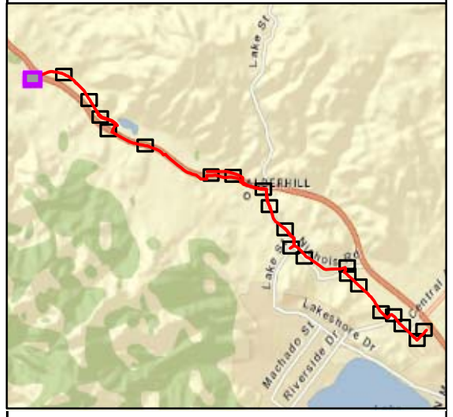
Legend

Project Features

- Phase 2 Subtransmission Line Route
- Material Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2008/2009 Season
- First Identified in 2009/2010 Season
- First Identified in 2011/2012 Season
- First Identified in 2012/2013 Season
- Vernal Pool



Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

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Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-21

Path: W:\sd06\Biology\SCE 06\ivy_glen\mxd\2013\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2013FairyShrimpSurveyReport_MapSeries.mxd, jason.erlich, 7/18/2013

APPENDIX B

STUDY AREA PHOTOGRAPHS

Photograph 1: Depression 434 in SCE storage yard south of Valley Substation.

Photograph 2: Depression 444 in private storage yard.

Study Area Photographs
Proposed Valley - Ivyglen Transmission Line Project,
Phase 2

FIGURE

B-1

Photograph 3: Depression 433 in SCE storage yard north of Valley Substation. This depression remained inundated & supporting Versatile Fairy Shrimp for most of the season.

Photograph 4: Depression 433 dry on 9 April 2013, ending the fairy shrimp survey season.

FIGURE

B-2

Study Area Photographs
Proposed Valley - Ivyglen Transmission Line Project,
Phase I

APPENDIX C

USFWS NOTIFICATION LETTER

To	Ms. Susie Tharratt Recovery Permit Coordinator U.S. Fish and Wildlife Service 6010 Hidden Valley Road Suite 100 Carlsbad, California 92011	File no	1255400495
From	Halleh Paymard	cc	John Green Wendy Worthey
Tel	619-838-4034		
Fax	858-300-4301		
Date	1 November 2012		

Subject Notification of Initiation of Surveys for Federally-listed Vernal Pool Branchiopods for the Valley-Ivyglen Subtransmission Line Project - Phase II, Riverside County, California.

Dear Ms. Tharratt,

This letter is to inform the U.S. Fish and Wildlife Service (USFWS) that AMEC Environment & Infrastructure, Inc. (AMEC) is proposing to conduct wet-season surveys for federally-listed vernal pool Branchiopods in accordance with USFWS *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* in support of Phase II of the proposed Southern California Edison (SCE) Valley-Ivyglen Subtransmission Line Project, located in western Riverside County, California.

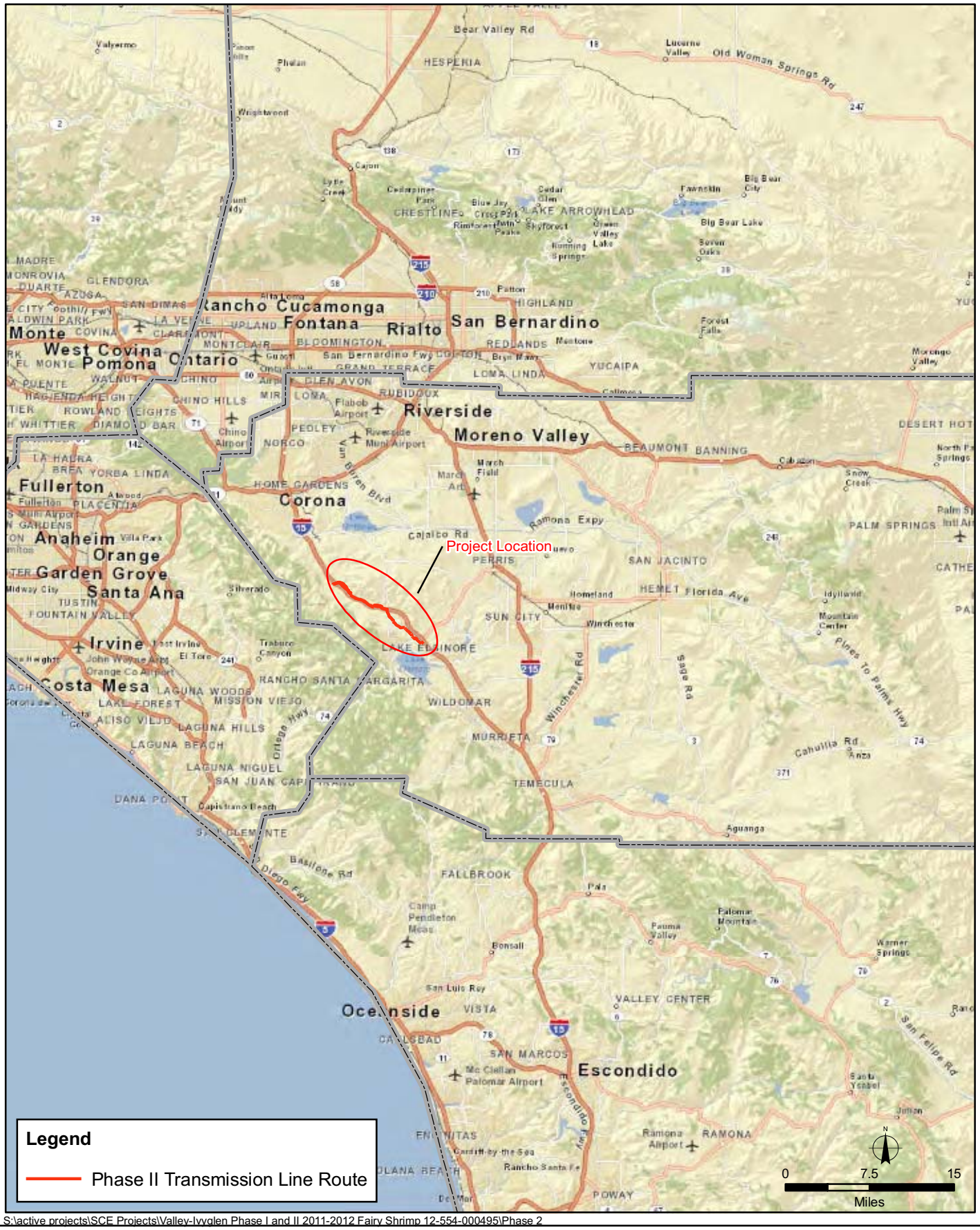
Phase II of the project involves eventual construction of a new 115 kilovolt (kV) transmission line between the corner of Collier Avenue and Third Street in the City of Lake Elsinore and extends northwest to the Ivyglen Substation in the City of Corona (Figure 1). The project traverses portions of the Lake Elsinore, Lake Mathews, and Alberhill United States Geological Survey (USGS) 7.5-minute series topographic quadrangles.

All surveys will be conducted by John Green under recovery permit number TE-054011-5. It is anticipated that the vernal pool surveys will begin after the next significant rain event.

Please contact me at (619) 838-4034 if you have any questions regarding this notification.
Sincerely,

Halleh Paymard
Project Manager
E-mail: halleh.paymard@amec.com

AMEC Environmental & Infrastructure, Inc.
9210 Sky Park Court
San Diego, CA 92123
Tel (858) 300-4300
Fax (858) 300-4301
www.amec.com



S:\active projects\SCE Projects\Valley-Ivyglen Phase I and II 2011-2012 Fairy Shrimp 12-554-000495\Phase 2

amec

Regional Location
Fairy Shrimp Surveys
Valley-Ivyglen Transmission Line Project: Phase II

FIGURE
1

APPENDIX D

DEPRESSION SAMPLING DATA

Depression Sampling Data for 2012-2013 along the Proposed Valley-Ivyglen Transmission Line Project, Phase 2

Depression	Sample Visit	Date	Time of Sample	Actual Depth (inches)	Max Depth (inches)	Actual Length (feet)	Actual Width (feet)	Max Length (feet)	Max Width (feet)	Water Temp (°F)	Air Temp (°F)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
Y2-1	2	12/27/2012	11:38	5	8.5 in.	100	40	100	40	55	55					dirt road	gel, algae	grading
Y2-1	3	1/9/2013	11:05	6.2	8.5 in.	70	30	100	40	58	64					dirt road	water beetle	grading
Y2-1	4	1/23/2013	14:38	2.4	8.5 in.	40	3	100	40	56	75					dirt road		grading
Y2-1	5	1/29/2013	13:30	7.9	8.5 in.	100	35	100	40	68	65					dirt road	boatmen, algae	grading
Y2-1	6	2/12/2013	9:00	7.2	8.5 in.	100	40	100	40	44	46					dirt road	algae, Killdeer	grading
Y2-1	7	2/26/2013	10:10	7	8.5 in.	100	40	100	40	56	63	*Branchinecta* sp., too small to confidently ID	10s	No adult males	F	dirt road	copepod, mosquito	abandoned project, depression enlarged by grading
Y2-1	8	3/12/2013	10:01	8.5	8.5 in.	80	30	100	40	58	62					dirt road	mosquito, algae, gel, water beetle	abandoned project, depression enlarged by grading
Y2-1	9	3/26/2013	10:55	3.2	8.5 in.	40	8	100	40	66	72	*Branchinecta* sp., too small to confidently ID	100s	No adults	M, F	dirt road	clam shrimp, beetles, boatmen, larvae	abandoned project, depression enlarged by grading
Y2-1	10	4/9/2013		Dry-Ending Season				100	40									abandoned project, depression enlarged by grading
239a-239g																		Destroyed by road construction
240	2	12/28/2012	12:05	1.5	4.1	20	2	20	6	47	61					RR		road shoulder, disturbed, garbage, tracks
240	3	1/9/2013	13:45	2.1	4.1	4	4.5	20	6	52	75					RR		road shoulder, disturbed, garbage, tracks
240	6	2/12/2013	14:05	4.1	4.1	8	6	20	6	62	70	VFS	1s	juvenile/adult	M, F	RR	water beetles	road shoulder, disturbed, garbage, tracks
240	8	3/12/2013	16:05	1.5	4.1	17	1.5	20	6	74	86					RR	algae	road shoulder, disturbed, garbage, tracks
247a	2	12/28/2012	12:30	3	3.8	20	8	20	10	57	61					RR		road shoulder, disturbed, garbage, tracks
247a	3	1/9/2013	13:35	3	3.8	16	6	20	10	64	74	VFS	100s	juvenile/adult	M, F	RR	surface flies	road shoulder, disturbed, garbage, tracks
247a	6	2/12/2013	13:30	3.8	3.8	15	10	20	10	68	70	VFS	1000s	juvenile/adult	M, F	RR		Small, but consistent with *lindahli*
247a	8	3/12/2013	16:45	3.8	3.8	18	9	20	10	80	84					RR	algae	road shoulder, disturbed, garbage, tracks
247b																		Not fairy shrimp habitat
247e																		Not fairy shrimp habitat
247f																		Not fairy shrimp habitat
247h	8	3/12/2013	14:50	2	2	5	3	5	3	84	84					RR	algae	road shoulder, disturbed, garbage, tracks
247k	2	12/28/2012	12:43	1	1.8	6	1.5	6	2	58	61					RR		road shoulder, disturbed, garbage, tracks
247k	8	3/12/2013	14:53	1.8	1.8	6	2	6	2	82	84					RR		road shoulder, disturbed, garbage, tracks
247l	2	12/28/2012	12:50	0.5	4.2	3	2	6	6	58	61					RR		road shoulder, disturbed, garbage, tracks
247l	8	3/12/2013	14:55	4.2	4.2	6	6	6	6	80	84					RR		road shoulder, disturbed, garbage, tracks
251	6	2/12/2013	13:25	2	4	20	4	20	4	54	70					RR		road shoulder, disturbed, garbage, tracks
251	8	3/12/2013	14:33	4	4	18	4	20	4	64	84					RR		road shoulder, disturbed, garbage, tracks
255	2	12/27/2012	14:10	2.2	7	35	12	40	15	58	61					RR		road shoulder, disturbed, garbage, tracks

Depression Sampling Data for 2012-2013 along the Proposed Valley-Ivyglen Transmission Line Project, Phase 2

Depression	Sample Visit	Date	Time of Sample	Actual Depth (inches)	Max Depth (inches)	Actual Length (feet)	Actual Width (feet)	Max Length (feet)	Max Width (feet)	Water Temp (°F)	Air Temp (°F)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
255	3	1/9/2013	12:20	1	7	20	10	40	15	62	71					RR	algae	road shoulder, disturbed, garbage, tracks
255	4	1/23/2013	14:20	1.1	7	15	3	40	15	56	79					RR	boatmen	road shoulder, disturbed, garbage, tracks
255	5	1/29/2013	13:15	3.3	7	40	12	40	15	60	65					RR	boatmen	road shoulder, disturbed, garbage, tracks
255	6	2/12/2013	9:50	2.8	7	20	8	40	15	42	53					RR		road shoulder, disturbed, garbage, tracks
255	7	2/26/2013	11:20	2.8	7	30	10	40	15	62	70					RR	algae, water fleas	road shoulder, disturbed, garbage, tracks
255	8	3/12/2013	11:30	7	7	25	15	40	15	64	79					RR	algae, water beetles	road shoulder, disturbed, garbage, tracks
256	2	12/27/2012	14:16	1.2	1.2	22	5	22	5	60	61					RR	springtails	unpaved road, disturbed, garbage, tracks
256	8	3/12/2013	11:35	0.6	1.2	4	1.5	22	5	80	79					RR	silty	unpaved road, disturbed, garbage, tracks
257a	2	12/27/2012	14:32	2.2	2.2	21	4	21	4	60	61					RR		unpaved road, disturbed, garbage, tracks
257a	8	3/12/2013	13:02	0.4	2.2	10	4	21	4	80	80					RR		unpaved road, disturbed, garbage, tracks
257b	2	12/27/2012	14:28	1.2	1.2	16	8	16	8	60	61					RR		unpaved road, disturbed, garbage, tracks
257b	8	3/12/2013	12:58	1	1.2	15	5	16	8	80	80					RR		unpaved road, disturbed, garbage, tracks
257c	2	12/27/2012	14:24	0.8	0.8	4	4	4	4	61	61					RR	springtails	unpaved road, disturbed, garbage, tracks
257c	8	3/12/2013	12:55	0.8	0.8	3	4	4	4	80	80					RR		unpaved road, disturbed, garbage, tracks
257d	2	12/27/2012	14:33	1	1	15	3	15	3	61	61					RR	springtails	unpaved road, disturbed, garbage, tracks
258a	2	12/27/2012	14:34	3.5	3.5	20	8	20	8	59	60					RR	algae, springtails	unpaved road, disturbed, garbage, tracks
258a	3	1/9/2013	12:25	1	3.5	5	3	20	8	62	71					RR	algae	unpaved road, disturbed, garbage, tracks
258a	6	2/12/2013	10:00	1.5	3.5	3	2	20	8	52	53					RR		unpaved road, disturbed, garbage, tracks
258a	7	2/26/2013	11:30	0.8	3.5	5	2	20	8	66	70					RR	mosquito larvae	unpaved road, disturbed, garbage, tracks
258a	8	3/12/2013	12:50	2.4	3.5	6	4	20	8	80	80					RR	algae	unpaved road, disturbed, garbage, tracks
259	2	12/27/2012	14:40	2	2	15	8	15	8	60	61					RR	springtails	unpaved road, disturbed, garbage, tracks
259	8	3/12/2013	12:45	1.3	2	12	8	15	8	80	80					RR		unpaved road, disturbed, garbage, tracks
260																		Not fairy shrimp habitat
261	2	12/27/2012	13:54	2	2	50	8	50	8	54	61					RR		unpaved road, disturbed, garbage, tracks
261	3	1/9/2013	11:57	1.3	2	6	2.5	50	8	59	71					RR	ants, surface flies	unpaved road, disturbed, garbage, tracks
261	6	2/12/2013	9:25	0.5	2	3.5	3.5	50	8	48	46					RR	silty	unpaved road, disturbed, garbage, tracks
261	7	2/26/2013	10:50	0.3	2	10	5	50	8	shallow	63					RR		unpaved road, disturbed, garbage, tracks
261	8	3/12/2013	11:15	0.8	2	8	8	50	8	72	79					RR	silty	unpaved road, disturbed, garbage, tracks
262	2	12/27/2012	15:21	1	1	12	2.5	12	2.5	59	61					RR	springtails	unpaved road, disturbed, garbage, tracks
263	2	12/27/2012	15:18	3.5	3.5	35	10	35	10	59	61					RR	algae	road shoulder, disturbed, garbage, tracks
263	3	1/9/2013	12:07	2.9	3.5	16	8	35	10	62	71					RR	algae	road shoulder, disturbed, garbage, tracks
264	2	12/27/2012	15:40	3	9	90	10	150	15	52	61					basin	algae, springtails	road shoulder, disturbed, garbage, tracks
264	3	1/9/2013	12:50	9	9	125	15	150	15	60	74					basin		road shoulder, disturbed, garbage, tracks
264	4	1/23/2013	13:30	4.5	9	100	10	150	15	54	78	VFS	10s	adult	M, F	basin	water beetles	road shoulder, disturbed, garbage, tracks
264	5	1/29/2013	9:00	6.6	9	150	12	150	15	42	44	VFS	10s	adults, juveniles	M, F	basin	beetle larvae	road shoulder, disturbed, garbage, tracks

Depression Sampling Data for 2012-2013 along the Proposed Valley-Ivyglen Transmission Line Project, Phase 2

Depression	Sample Visit	Date	Time of Sample	Actual Depth (inches)	Max Depth (inches)	Actual Length (feet)	Actual Width (feet)	Max Length (feet)	Max Width (feet)	Water Temp (°F)	Air Temp (°F)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
264	6	2/12/2013	10:50	3.6	9	120	12	150	15	56	62	VFS	100s	adults, juveniles	M, F	basin	tadpoles, larvae	road shoulder, disturbed, garbage, tracks
264	7	2/26/2013	12:45	3.1	9	60	8	150	15	70	72	VFS	100s	adults	M, F	basin	tadpoles, larvae	road shoulder, disturbed, garbage, tracks
264	8	3/12/2013	13:30	4.5	9	70	10	150	15	80	80					basin	algae, boatmen, larvae	road shoulder, disturbed, garbage, tracks
265	2	12/27/2012	13:50	1.5	1.5	3	2	3	2	60	61					RR		unpaved road, disturbed, garbage, tracks
265	6	2/12/2013	9:20	0.5	1.5	2	1.5	3	2	44	46					RR	silty	unpaved road, disturbed, garbage, tracks
267a	2	12/27/2012	15:25	1	1	10	2	10	2	59	61					RR		unpaved road, disturbed, garbage, tracks
267a	3	1/9/2013	12:02	0.3	1	3	1	10	2	62	71					RR	ants	unpaved road, disturbed, garbage, tracks
267b	2	12/27/2012	15:26	1	1	5	2	5	2	59	61					RR		unpaved road, disturbed, garbage, tracks
267b	8	3/12/2013	11:20	0.9	1	3	2	5	2	74	79					RR	silty	unpaved road, disturbed, garbage, tracks
267c	2	12/27/2012	15:27	0.5	0.5	7	1.5	7	1.5	59	61					RR		unpaved road, disturbed, garbage, tracks
268	2	12/27/2012	15:24	0.5	0.5	8	2	8	2	59	61					RR		unpaved road, disturbed, garbage, tracks
269a	8	3/12/2013	11:23	0.5	0.5	3	2	3	2	76	79					RR	silty	unpaved road, disturbed, garbage, tracks
275	2	12/27/2012	15:04	2.75	2.75	30	10	30	10	57	61					RR	algae	road shoulder, disturbed, garbage, tracks
275	6	2/12/2013	10:20	0.5	2.75	12	2	30	10	56	53					RR	algae	road shoulder, disturbed, garbage, tracks
275	8	3/12/2013	12:18	1	2.75	20	3	30	10	80	80					RR		road shoulder, disturbed, garbage, tracks
276	2	12/27/2012	15:06	1	5.5	15	10	25	10	57	61					RR		unpaved road, disturbed, garbage, tracks
276	6	2/12/2013	10:15	5.5	5.5	25	8	25	10	46	53					RR	algae	unpaved road, disturbed, garbage, tracks
276	7	2/26/2013	11:40	4.3	5.5	20	8	25	10	66	70					RR	mosquito larvae	unpaved road, disturbed, garbage, tracks
276	8	3/12/2013	12:21	5.5	5.5	22	8	25	10	72	80					RR	algae, boatmen	unpaved road, disturbed, garbage, tracks
277	2	12/27/2012	14:58	3.2	3.2	25	17	25	17	57	61					RR		unpaved road, disturbed, garbage, tracks
277	6	2/12/2013	10:10	1.2	3.2	12	1.5	25	17	52	53					RR	algae	unpaved road, disturbed, garbage, tracks
308	2	12/27/2012	12:31	2.8	2.8	10	3	10	3	62	58					vacant lot	algae	depression in field, garbage, discing/plowing
308	8	3/12/2013	10:25	2	2.8	10	1.5	10	3	64	62					vacant lot	algae	depression in field, garbage, discing/plowing
311	2	12/27/2012	12:43	1	1	2	1	2	1	64	58					vacant lot	algae	depression in field
312	2	12/27/2012	12:41	3	3.8	7	6	8	6	62	58					vacant lot	algae	depression in field, disturbed, garbage
312	8	3/12/2013	10:35	3.8	3.8	8	3	8	6	46	62					vacant lot	algae	depression in field, disturbed, garbage
315	2	12/27/2012	12:55	2.8	2.8	35	10	35	10	58	58					vacant lot	algae	disturbed, garbage, discing/plowing
315	8	3/12/2013	10:41	2.2	2.8	20	8	35	10	64	62					vacant lot	algae, Killdeer	disturbed, garbage, discing/plowing
316																		Not fairy shrimp habitat
317	2	12/27/2012	12:21	1.2	1.2	10	5	10	5	63	58					RR		road shoulder, disturbed, tracks, garbage
318	2	12/27/2012	12:23	1.5	1.5	10	8	10	8	62	58					RR		road shoulder, disturbed, tracks, garbage
318	6	2/12/2013	9:15	0.8	1.5	6	2	10	8	46	46					RR	algae	road shoulder, disturbed, tracks, garbage
319	2	12/27/2012	12:25	2.2	2.2	4	3	4	3	61	58					RR	springtails	road shoulder, disturbed, tracks, garbage
320	2	12/27/2012	11:30	1	2.2	5	5	8	6	59	55					RR	springtails	unpaved road/road shoulder, disturbed, tracks, garbage

Depression Sampling Data for 2012-2013 along the Proposed Valley-Ivyglen Transmission Line Project, Phase 2

Depression	Sample Visit	Date	Time of Sample	Actual Depth (inches)	Max Depth (inches)	Actual Length (feet)	Actual Width (feet)	Max Length (feet)	Max Width (feet)	Water Temp (°F)	Air Temp (°F)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
320	3	1/9/2013	11:00	2.2	2.2	8	6	8	6	58	64					RR		unpaved road/road shoulder, disturbed, tracks, garbage
320	6	2/12/2013	8:55	1.5	2.2	3	3	8	6	40	46					RR		unpaved road/road shoulder, disturbed, tracks, garbage
320	8	3/12/2013	10:00	2.2	2.2	5	1	8	6	60	62					RR	algae	unpaved road/road shoulder, disturbed, tracks, garbage
325	6	2/12/2013	14:20	0.8	0.8	3	2	3	2	64	63					artificial depression	tadpoles, larvae, water beetles, clam shrimp	disturbed, plastic-lined artifical drainage with unlined collection depression
334	2	12/27/2012	11:22	1.2	1.6	2.5	0.5	12	2	56	55					RR	springtails, algae	unpaved road/road shoulder, disturbed, tracks, garbage
334	3	1/9/2013	10:50	1.6	1.6	12	2	12	2	58	64					RR	algae	unpaved road/road shoulder, disturbed, tracks, garbage
334	8	3/12/2013	9:35	1.5	1.6	3	1.5	12	2	58	62					RR	algae	unpaved road/road shoulder, disturbed, tracks, garbage
335	2	12/27/2012	11:19	1.2	1.6	3	2	5	3	59	55					RR	springtails, algae	unpaved road/road shoulder, disturbed, tracks, garbage
335	3	1/9/2013	10:55	0.2	1.6	1.5	0.3	5	3	60	64					RR	algae	unpaved road/road shoulder, disturbed, tracks, garbage
335	8	3/12/2013	9:37	1.6	1.6	5	3	5	3	58	62					RR	algae	unpaved road/road shoulder, disturbed, tracks, garbage
338	2	12/27/2012	11:13	1.2	1.2	6	0.8	6	0.8	60	55					RR	springtails, algae	unpaved road, disturbed, tracks, garbage
339b	8	3/12/2013	9:39	3.2	3.2	8	1.5	8	1.5	54	62					RR	algae	unpaved road, disturbed, tracks, garbage
340	2	12/27/2012	11:00	7.2	10.6	100	25	240	30	50	55					depression	larvae, gel	drainage terminus in vacant lot
340	3	1/9/2013	10:40	1.6	10.6	40	6	240	30	56	64					depression	algae, gel	drainage terminus in vacant lot
340	6	2/12/2013	8:45	6.8	10.6	240	20	240	30	40	46					depression	algae	drainage terminus in vacant lot
340	7	2/26/2013	9:55	7	10.6	240	20	240	30	50	63					depression	water fleas, copepods	drainage terminus in vacant lot
340	8	3/12/2013	9:41	10.6	10.6	105	30	240	30	54	62					depression	algae, gel	drainage terminus in vacant lot
342	2	12/27/2012	13:38	0.5	0.5	4	4	4	4	62	58					depression		depression in junkyard
343	2	12/27/2012	13:30	0.5	0.8	20	6	20	6	62	58					depression	algae	depression in junkyard
343	8	3/12/2013	10:54	0.8	0.8	4	3	20	6	74	62					depression	algae	depression in junkyard
347	8	3/12/2013	11:00	2	2	12	8	12	8	70	62					depression		depression in junkyard
350	2	12/27/2012	13:25	1	2.8	35	15	35	15	52	58					depression	algae	depression in junkyard
350	3	1/9/2013	11:45	2.8	2.8	8	4	35	15	62	64					depression		depression in junkyard
350	8	3/12/2013	10:58	2.8	2.8	30	10	35	15	70	62					depression	algae	depression in junkyard
351	2	12/27/2012	13:28	1.5	1.5	25	12	25	12	62	58					depression	algae	depression in junkyard
351	8	3/12/2013	10:56	1.1	1.5	6	4	25	12	70	62					depression	algae	depression in junkyard

Depression Sampling Data for 2012-2013 along the Proposed Valley-Ivyglen Transmission Line Project, Phase 2

Depression	Sample Visit	Date	Time of Sample	Actual Depth (inches)	Max Depth (inches)	Actual Length (feet)	Actual Width (feet)	Max Length (feet)	Max Width (feet)	Water Temp (°F)	Air Temp (°F)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
352	2	12/27/2012	11:55	3	3	12	6	12	6	52	61					RR	algae	unpaved road, disturbed, tracks, garbage
352	3	1/9/2013	11:15	2	3	5	4	12	6	58	64					RR	surface flies	unpaved road, disturbed, tracks, garbage
352	6	2/12/2013	9:10	0.5	3	3	2	12	6	44	46					RR		unpaved road, disturbed, tracks, garbage
352	8	3/12/2013	10:15	1.5	3	3	1.5	12	6	58	62					RR	gel	unpaved road, disturbed, tracks, garbage
356	2	12/27/2012	12:58	6.2	6.2	5	4	5	4	54	58					vacant lot		depression at edge of fence
356	8	3/12/2013	10:38	2.8	6.2	4	3	5	4	50	62					vacant lot	algae	depression at edge of fence
431	1	12/17/2012	11:00	3	5	16	6	20	6		59					RR		unpaved road, disturbed, tracks, garbage
431	2	12/27/2012	14:50	5	5	20	5	20	6	58	61					RR	springtails, algae, boatmen	unpaved road, disturbed, tracks, garbage
431	3	1/9/2013	12:12	2.8	5	12	2	20	6	53	71					RR	algae	unpaved road, disturbed, tracks, garbage
431	6	2/12/2013	9:45	1.2	5	10	2	20	6	48	53					RR		unpaved road, disturbed, tracks, garbage
431	8	3/12/2013	11:26	3.1	5	20	4	20	6	66	79					RR	algae	unpaved road, disturbed, tracks, garbage
435	2	12/27/2012	14:00	1.5	1.5	20	5	20	5	60	61					RR		unpaved road, disturbed, tracks, garbage
445	2	12/27/2012	15:02	2.2	2.2	15	10	15	10	57	61					RR	algae	unpaved road, disturbed, tracks, garbage
448	3	1/9/2013	13:00	2.5	5.3	20	3	20	8	64	74	*Branchinecta* sp.	1	adult	F	RR	algae	road shoulder, disturbed, tracks, garbage
448	6	2/12/2013	13:05	3	5.3	15	6	20	8	58	70	VFS	1s	adult	M, F	RR		road shoulder, disturbed, tracks, garbage
448	7	2/26/2013	14:05	3.1	5.3	15	4	20	8	72	78					RR		road shoulder, disturbed, tracks, garbage
448	8	3/12/2013	14:15	5.3	5.3	20	8	20	8	84	84					RR	algae	road shoulder, disturbed, tracks, garbage
449	3	1/9/2013	13:05	2.5	5	16	8	25	10	50	74					RR		road shoulder, disturbed, tracks, garbage
449	6	2/12/2013	13:10	2.5	5	10	6	25	10	42	70	VFS	1s	adult, juvenile	M, F	RR		road shoulder, disturbed, tracks, garbage
449	7	2/26/2013	14:10	1	5	8	5	25	10	46	78					RR		road shoulder, disturbed, tracks, garbage
449	8	3/12/2013	14:20	5	5	25	10	25	10	58	84					RR		road shoulder, disturbed, tracks, garbage
450	3	1/9/2013	13:10	2.2	4.2	20	4	30	10	46	74	VFS	10s	adult, juvenile	M, F	RR		road shoulder, disturbed, tracks, garbage
450	6	2/12/2013	13:15	3.8	4.2	25	10	30	10	58	70					RR		road shoulder, disturbed, tracks, garbage
450	7	2/26/2013	14:15	1.8	4.2	12	4	30	10	70	78	VFS	10s	adult, juvenile	M, F	RR	algae	road shoulder, disturbed, tracks, garbage
450	8	3/12/2013	14:25	4.2	4.2	30	8	30	10	80	84					RR		road shoulder, disturbed, tracks, garbage
452	8	3/12/2013	13:09	2.3	2.3	8	6	8	6	82	80					vacant lot	algae	roadside basin
453	5	1/29/2013	11:15	4.3	4.3	100	32	100	32	50	50					vacant lot		roadside basin, trash, tire tracks
453	6	2/12/2013	10:30	2.1	4.3	14	3	100	32	56	53	VFS	100s	adult, juvenile	M, F	vacant lot	boatmen, larvae	roadside basin, trash, tire tracks
469	6	2/12/2013	11:05	0.5	0.5	2	1	2	1	62	62					RR	algae	unpaved road
470	6	2/12/2013	11:00	3	8.5	35	15	60	15	56	62					shoulder	boatmen, algae	roadside basin, trash
470	7	2/26/2013	13:00	3.1	8.5	50	15	60	15	72	72					shoulder	ostracods, copepods, algae, mosquito larvae	roadside basin, trash
470	8	3/12/2013	13:36	8.5	8.5	60	15	60	15	74	80					shoulder	algae, mosquito larvae	roadside basin, trash

Depression Sampling Data for 2012-2013 along the Proposed Valley-Ivyglen Transmission Line Project, Phase 2

Depression	Sample Visit	Date	Time of Sample	Actual Depth (inches)	Max Depth (inches)	Actual Length (feet)	Actual Width (feet)	Max Length (feet)	Max Width (feet)	Water Temp (°F)	Air Temp (°F)	Shrimp sp.	No. of shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
471	6	2/12/2013	10:25	0.2	3	2	1	20	8		53					RR	algae	unpaved road
471	8	3/12/2013	12:40	3	3	20	8	20	8	77	80					RR	algae	unpaved road
477	6	2/12/2013	11:50	2.1	2.5	20	10	20	10	62	62	VFS	100s	adult, juvenile	M, F	basin		created detention basin
477	8	3/12/2013	14:00	2.5	2.5	15	8	20	10	80	84					basin		created detention basin
479	6	2/12/2013	13:20	1.3	1.3	20	4	20	4	40	70					RR		unpaved road
479	7	2/26/2013	14:25	0.9	1.3	10	3	20	4	42	78					RR	algae	unpaved road
479	8	3/12/2013	14:27	1.3	1.3	18	3	20	4	48	84					RR		unpaved road
480	6	2/12/2013	13:20	1.5	3.2	15	6	15	6	38	70					RR		unpaved road
480	8	3/12/2013	14:29	3.2	3.2	15	6	15	6	60	84					RR		unpaved road
481	6	2/12/2013	13:20	0.5	0.6	2	2	6	3	70	70					RR		unpaved road
481	8	3/12/2013	14:32	0.6	0.6	6	3	6	3	86	84					RR		unpaved road
488	8	3/12/2013	11:38	1.5	1.5	8	6	8	6	78	79					RR		unpaved road
489	8	3/12/2013	12:24	3.5	3.5	8	6	8	6	76	80					vacant lot	algae	trash, tire tracks
490	8	3/12/2013	12:30	0.8	0.8	8	4	8	4	66	80					RR		unpaved road
491	8	3/12/2013	14:23	1.8	1.8	8	4	8		52	84					RR		road shoulder, disturbed, tracks, garbage

< = less than; F = Female; M = Male; RR = Road Rut(s); Const. = associated with construction project; VFS = Versatile Fairy Shrimp

FINAL
RESULTS OF 2013–2014 WET SEASON FOCUSED SURVEYS FOR LISTED FAIRY SHRIMP SPECIES VALLEY-IVYGLEN SUBTRANSMISSION LINE PROJECT PHASE 2 RIVERSIDE COUNTY, CALIFORNIA

Submitted to:
Southern California Edison
Corporate Environmental Health and Safety
1218 South Fifth Avenue
Monrovia, California 91016

Submitted by:
AMEC Environment & Infrastructure, Inc.
3120 Chicago Avenue, Suite 110
Riverside, California 92507

July 2014

AMEC Project No. 1255400499

EXECUTIVE SUMMARY

At the request of Southern California Edison, AMEC Environment & Infrastructure, Inc. delineated and assessed potential habitat for listed fairy shrimp species in support of the proposed Valley-Ivyglen Subtransmission Line Project, Phase 2. Identified potential habitat was sampled following U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 1996) for two federally listed fairy shrimp species known from the region: Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) and Riverside Fairy Shrimp (*Streptocephalus woottoni*).

The proposed project is designed to improve reliability and meet projected electrical load requirements in western Riverside County, and involves the eventual construction of a new 115 kilovolt subtransmission line between the Valley and Ivyglen substations. The project is located in western Riverside County, California and the proposed Phase 2 subtransmission line route traverses portions of unincorporated county and the cities of Corona and Lake Elsinore, with some construction staging yards located within the cities of Menifee and Perris.

The purpose of this report is to summarize the results of fairy shrimp and vernal depression studies that were conducted within the Phase 2 route and construction staging yards during the 2013–2014 wet season. A minimum of two years of surveys have been conducted over most of the Phase 2 route during the 2011–2012 and 2012–2013 wet seasons. Surveys this year included only areas where two years of surveys had not yet been completed due to the addition of staging yards and access roads (i.e., the “Richland Communities”) or because of route changes and additions.

Of the 14 depressions sampled during the 2013–2014 wet season, none were found to support federally listed fairy shrimp species. The non-sensitive Versatile Fairy Shrimp (*Branchinecta lindahli*) was identified in four depressions this season. No other fairy shrimp species were found, and no fairy shrimp were found in any other depression during the 2013–2014 surveys. To date, no listed fairy shrimp species have been detected in the survey area for the proposed Valley-Ivyglen Subtransmission Line Project.

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ACRONYMS AND ABBREVIATIONS

AMEC	AMEC Environment & Infrastructure, Inc.
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
°C	degrees Celsius
cm	centimeter(s)
DRI	Desert Research Institute
°F	degrees Fahrenheit
ft	foot/feet
in	inch(es)
kV	kilovolt(s)
m	meter(s)
MSHCP	Multiple Species Habitat Conservation Plan
project	Valley-Ivyglen Subtransmission Line Project
resource agencies	CDFW and USFWS
ROW	right-of-way
SCE	Southern California Edison
study area	Phase 2 route and construction staging yards
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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1.0 INTRODUCTION

At the request of Southern California Edison (SCE), AMEC Environment & Infrastructure, Inc. (AMEC) assessed potential habitat for listed fairy shrimp species in support of the proposed Valley-Ivyglen Subtransmission Line Project, Phase 2 (project). Identified potential habitat was sampled following U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 1996) for fairy shrimp, especially for the two federally listed fairy shrimp species known from the region: Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) and Riverside Fairy Shrimp (*Streptocephalus woottoni*).

The proposed project is designed to improve reliability and meet projected electrical load requirements in western Riverside County, and involves the eventual construction of a new 115 kilovolt (kV) subtransmission line between the Valley and Ivyglen substations.

1.1 Project Location and Study Area

The project is located in western Riverside County, California and the proposed Phase 2 subtransmission line route traverses portions of unincorporated county and the cities of Corona, Lake Elsinore, Menifee, and Perris (Figures 1 and 2). The route traverses portions of the Lake Elsinore, Lake Mathews, and Alberhill U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangles. Some construction staging yards are located in portions of the Lake Elsinore and Romoland USGS 7.5-minute series topographic quadrangles.

The project has been divided into two portions: eastern (Phase 1) and western (Phase 2). Phase 1 extends from the Valley Substation on the west side of Menifee Road between McLaughlin and Ethanac Roads in the City of Menifee southwest to the corner of Collier Avenue and Third Street in the City of Lake Elsinore. Phase 2 extends from that corner northwest to the Ivyglen Substation in the City of Corona.

The purpose of this report is to summarize the results of fairy shrimp and vernal depression studies that were conducted within the Phase 2 project area (study area) during the 2013–2014 wet season. Fairy Shrimp surveys of the Phase 1 alignment were completed during the 2008–2009, 2009–2010, and 2011–2012 wet seasons (AMEC 2009, 2010, 2012a, 2012b, 2013a). Phase 1 areas assessed and surveyed during the 2012–2013 wet season included only the footprints of new construction staging yards that had not previously been part of the project. Those yards will also be used for Phase 2, so surveys were completed in 2013–2014 as part of that project. Because Phase 1 has been adequately surveyed for listed fairy shrimp species, it will not be discussed further in this report.

Fairy Shrimp surveys were also conducted along Phase 2 during the 2011–2012 and 2012–2013 wet season (AMEC 2012a, 2012b, and 2013b) and at the south end of Phase 2 during the 2008–2009 and 2009–2010 wet seasons (AMEC 2009, 2010). A minimum of two years of surveys have been conducted over most of the Phase 2 route during the 2011–2012 and 2012–2013 wet seasons. Surveys this year included only areas where two years of surveys had not yet been completed due to the addition of staging yards and access roads (i.e., the “Richland Communities”) or because of route changes and additions. Areas surveyed included the

proposed subtransmission line right-of-way (ROW) and a 500-foot buffer from the centerline of the proposed ROW. The exception is where the alignment crosses Castle & Cooke property. A 250-foot buffer was surveyed there in the 2012–2013 wet season. Access was not granted in any other wet season. In the 2013-2014 season only public road shoulders were checked for pools when passing Castle & Cooke owned lands.

The study area is located within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP is a comprehensive, multi-jurisdictional Habitat Conservation Plan, which focuses on conservation of species and their associated habitats in western Riverside County (Riverside County 2003). Section 6.1.2 of the MSHCP requires site surveys of riparian, riverine, and vernal pool resources in order to conserve these resources and the species that use them. The MSHCP does not replace existing federal and state regulations covering lakes, streams, vernal pools, and other wetland areas. Thus, projects must comply with existing regulations for these resources.

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Regional Location
2013-2014 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

FIGURE 1

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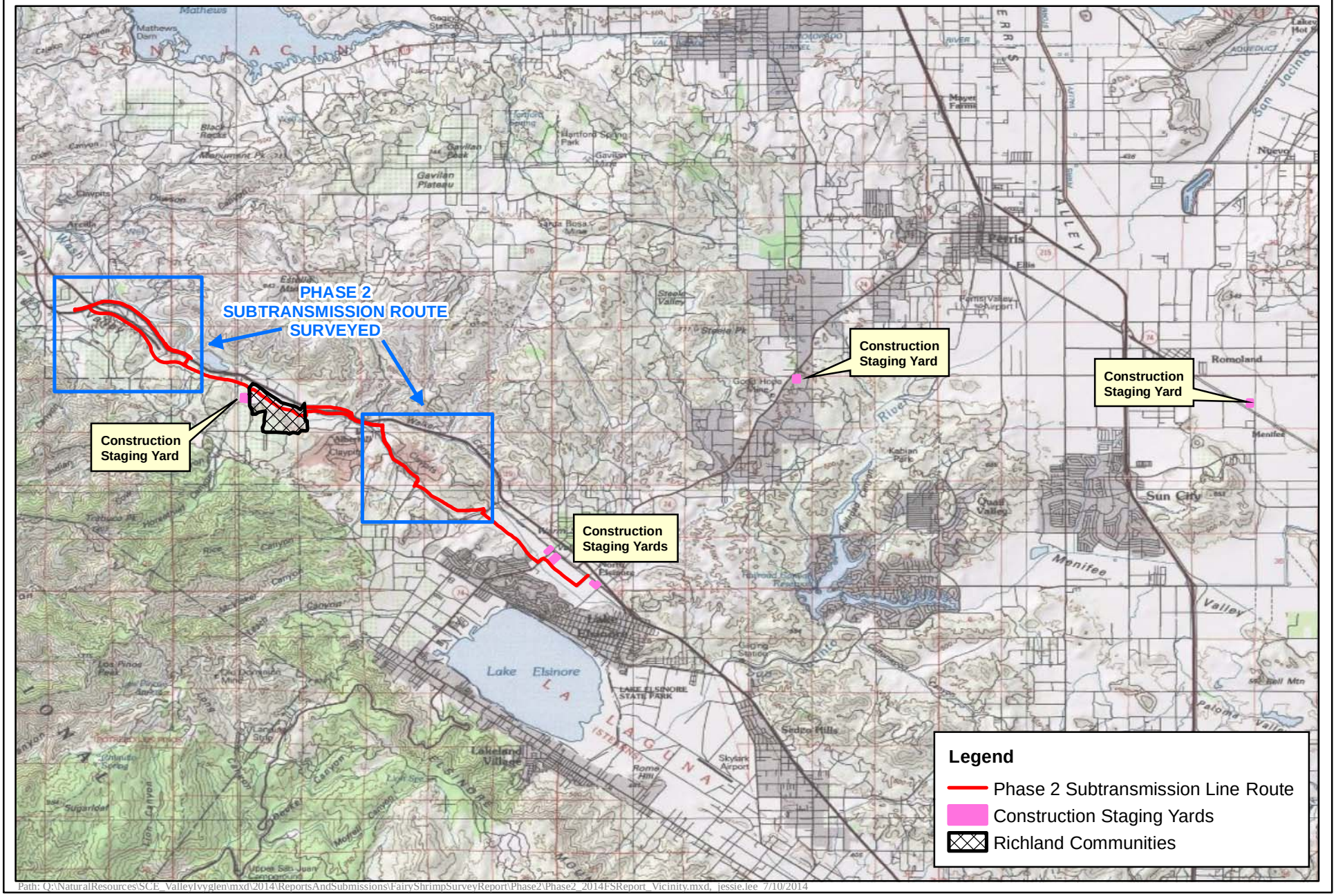

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Project Survey Area
2013-2014 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

FIGURE
2

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2.0 SPECIES DISCUSSION

2.1 Listing Status and Critical Habitat

Several species of fairy shrimp are considered sensitive by the USFWS and the California Department of Fish and Wildlife (CDFW 2013; formerly California Department of Fish and Game, CDFG) (resource agencies) because of their rarity and/or association with sensitive aquatic habitats such as vernal pools (CDFG 1990). Two federally listed fairy shrimp species are known to occur within Riverside County: Vernal Pool Fairy Shrimp and Riverside Fairy Shrimp. A third species, Santa Rosa Plateau Fairy Shrimp (*Linderiella santarosae*) is an unlisted sensitive species that occurs only on the Santa Rosa Plateau of Riverside County.

Vernal Pool Fairy Shrimp is a federally listed as threatened species (USFWS 1994). Critical Habitat was designated for this species in the Central Valley of California in 2006 (USFWS 2006). Critical Habitat for Vernal Pool Fairy Shrimp has not been designated in western Riverside County.

Riverside Fairy Shrimp was listed as federally endangered in 1993 (USFWS 1993). Critical Habitat was designated in 2001 (USFWS 2001). A revised Critical Habitat was proposed in 2004 (USFWS 2004) and the final designation of Critical Habitat was announced on 12 April 2005 (USFWS 2005). The proposed project is approximately 9.5 miles northeast of the nearest Riverside Fairy Shrimp Critical Habitat unit, Critical Habitat Unit 2, near Trabuco (USFWS 2005) (Figure 3).

Western Riverside County, wherein the study area occurs, has historically harbored relatively large populations of fairy shrimp due to natural environmental conditions (e.g., soils, hydrology, and topography) that make much of its habitats conducive to vernal pool formation. These vernal pools, and the fairy shrimp populations they support, have been reduced and fragmented over the years due to pressure from human development, such as housing and agriculture. The area however, is still designated as an important vernal pool management area by the USFWS within the larger USFWS Riverside Management Area (USFWS 1998).

2.1.1 Life History

Fairy shrimp (Class: Crustacea; Order: Anostraca) are conspicuous members of the fauna of ephemeral ponds and vernal pools. California has at least 25 known species of fairy shrimp belonging to six genera (Eriksen and Belk 1999). Fairy shrimp have the ability to produce resting eggs (cysts), which allows them to survive from year to year in ephemeral aquatic habitats, as they can withstand desiccation and freezing. This allows fairy shrimp to avoid many potential aquatic predators that require a year-round water source to survive, such as predatory fish and many frog species. The continued survival of a fairy shrimp population in a particular location requires water to be ponded for a length of time sufficient for the completion of their life cycle. The length of time for fairy shrimp from hatching to sexual maturity and egg-laying is variable depending on environmental conditions and the specific species. In general, a minimum of one to two weeks is required. As such, the presence of fairy shrimp (either free swimming or as cysts in the soil) can be considered an indication of an ephemeral pond or vernal pool that holds water for at least one to two weeks every few years.

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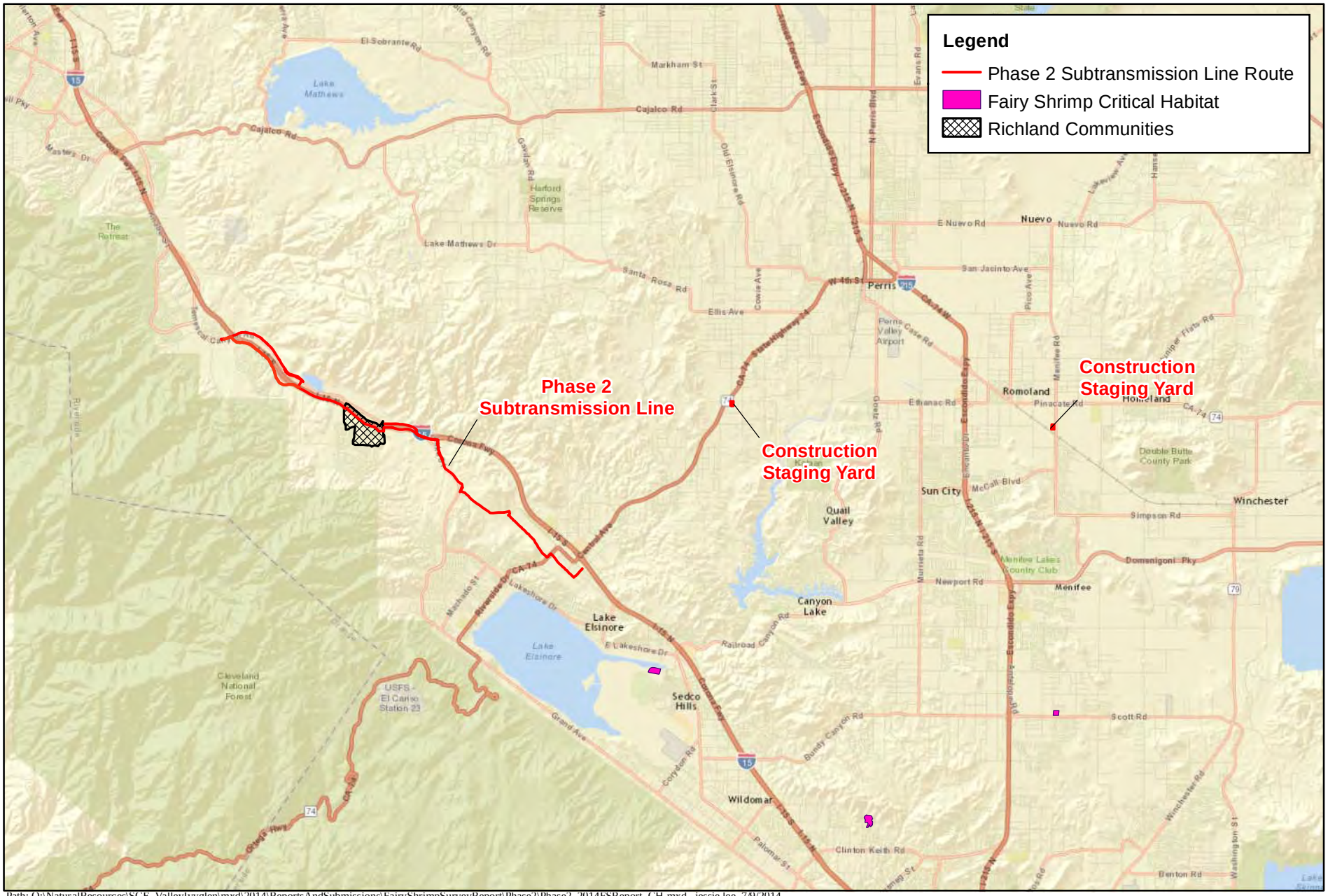

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Fairy Shrimp Critical Habitat
2013-2014 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

FIGURE
3

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Fairy shrimp cysts tend to hatch in pools with relatively cool temperatures, with species-specific differences in responses that are related to temperature regime (USFWS 1998). Lack of hatching at higher temperatures (greater than 77° Fahrenheit [F] or 25° Celsius [C]) protects fairy shrimp from the infrequent summer storms that might otherwise be sufficient to stimulate development, but inadequate for the organisms to complete their life cycles. Also, often less than ten percent of the dormant cyst bank hatches with any one hydration (Hathaway and Simovich 1996). This appears to be an ecological bet-hedging strategy, which helps protect the species from hatching the entire cyst bank during years where rainfall and pooling is insufficient to allow the fairy shrimp to reach sexual maturity and breed. In addition, laboratory studies have shown that many fairy shrimp cysts can hatch after 15 years of dormancy when given the proper environmental conditions (Eriksen and Belk 1999). Four species of fairy shrimp are known to occur in Riverside County: Vernal Pool Fairy Shrimp, Riverside Fairy Shrimp, Versatile Fairy Shrimp (*Branchinecta lindahli*), and Santa Rosa Plateau Fairy Shrimp.

Vernal Pool Fairy Shrimp has three disjunct populations in western Riverside County (Figure 4), but is more widely distributed within California's Central Valley. Typically, this species is found in sandstone puddles surrounded by foothill grassland. Other habitats include small swale, earth slump, or basalt-flow depression basin with a grassy or sometimes muddy bottom within unplowed grassland. It is found in water ranging from 46.1º F to 73.4º F (7.8º C to 23º C). Vernal Pool Fairy Shrimp have been observed between December and early May. This species hatches soon after pools fill with water of temperatures less than or equal to 50º F (10º C), reaching maturity as quickly as 18 days. However, if water temperatures remain at approximately 59º F (15º C), then at least 41 days are required for maturity. This species is known from some of the shortest-lived pools (e.g., six to seven weeks for winter pools or three weeks for spring pools). Although Vernal Pool Fairy Shrimp co-occur with several different fairy shrimp species throughout its range, only four of those have the potential to occur in western Riverside County, as noted above. Vernal Pool Fairy Shrimp is known to co-occur with all of them, but has been found in the same pools as Riverside Fairy Shrimp only as cysts, not swimming together. The primary threats to Vernal Pool Fairy Shrimp are urban and agricultural development of its habitat. The closest known occurrence of Vernal Pool Fairy Shrimp is on the Santa Rosa Plateau, approximately 13 miles south-southeast of the south project terminus of the Valley Substation. The species is also known to occur in Riverside County in Hemet and Skunk Hollow, which are each approximately 16 miles from the study area (USFWS 2006, CDFG 2012, Riverside County 2003) (Figure 4). The Hemet location is east of the Phase 2 south terminus and Skunk Hollow is southeast of the Phase 2 south terminus.

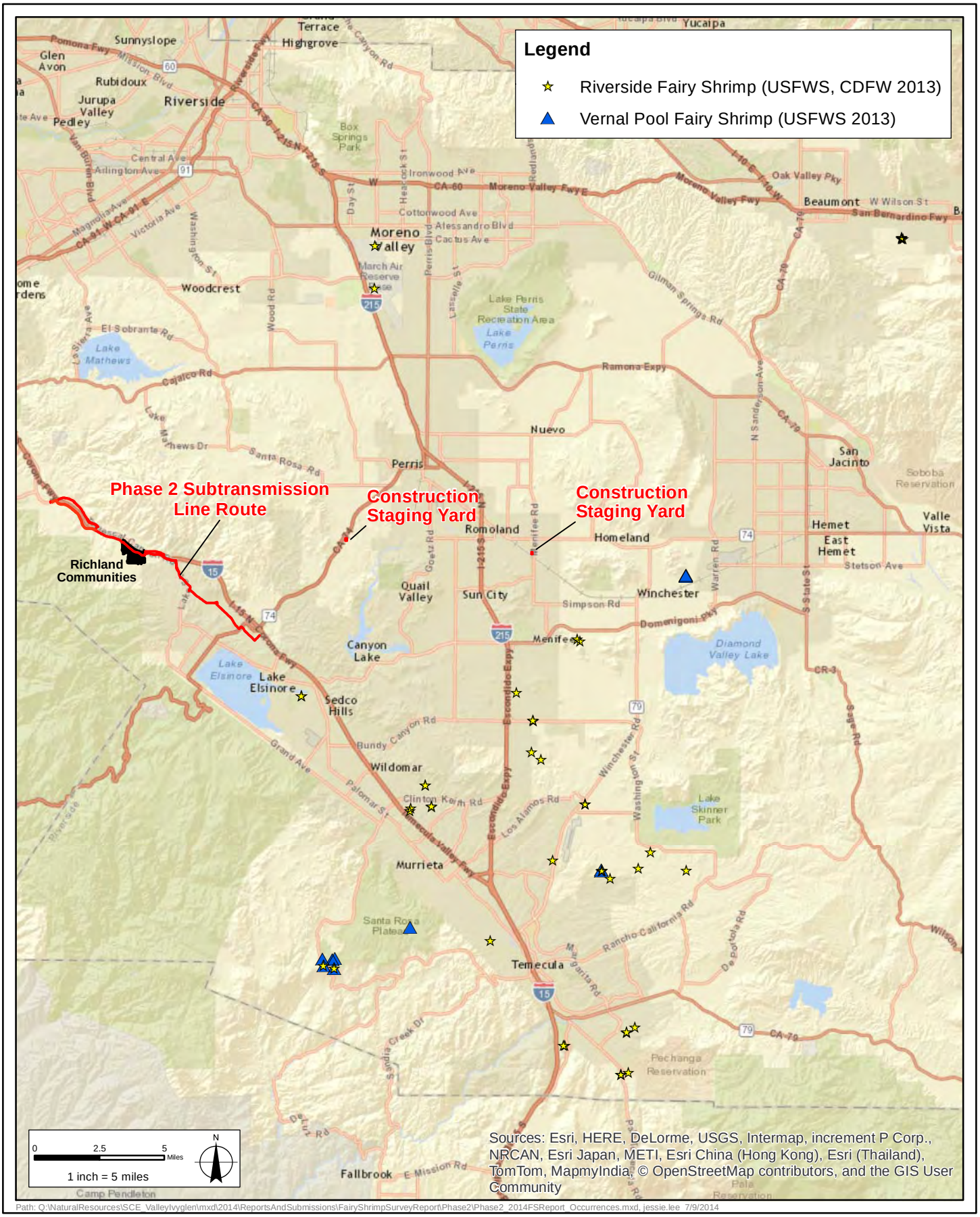
Riverside Fairy Shrimp has a very restricted and scattered distribution. In Riverside County, this species has been detected in vernal pools and temporary ponds at the Santa Rosa Plateau, Menifee, Lake Elsinore, Skunk Hollow and other Murrieta locations, and in the vicinity of Temecula (Riverside County 2003, CDFG 2012; Figure 4). Elsewhere, it occurs in locations such as Otay Mesa, Marine Corps Base Camp Pendleton, and Miramar Naval Air Station in San Diego County (Simovich and Fugate 1992). It also has been collected in a few places in Orange County and Baja California Norte, Mexico (Eriksen and Belk 1999). The nearest documented population occurrences are near Lake Elsinore, approximately 3 miles southeast of the south end of the study area. This species typically is found in longer-lived pools that often support

spikerush (*Eleocharis* sp.). These pools tend to occur in seasonal grasslands sometimes interspersed with chaparral or coastal sage scrub vegetation. Riverside Fairy Shrimp appears to be a relatively warm-water species (i.e., hatching between 50 °F and 77 °F [10 °C and 25 °C]) (Eriksen and Belk 1999), typically not appearing until late in the season, although it has been observed as early as late January (Eng et al. 1990). In Riverside County it is known to co-occur with two other species of fairy shrimp (Versatile Fairy Shrimp and the Vernal Pool Fairy Shrimp), but it has been found swimming together with the Versatile Fairy Shrimp only. Co-occurrence of the Vernal Pool Fairy Shrimp has been in the form of cysts in the same pool only. It typically occupies long-lasting pools in which the water persists into April or May, and which reach an average minimum depth of 11.8 inches (in) (30 centimeters [cm]) at filling (Eng et al. 1990). Riverside Fairy Shrimp requires approximately two months to reach reproductive age after hatching (USFWS 1998). Like Vernal Pool Fairy Shrimp, the main threats to this species are urban and agricultural development.

For comparison, Vernal Pool Fairy Shrimp generally hatch earlier in the rainy season, mature more quickly, and use shallower, cooler pools (typical of early season pools) than Riverside Fairy Shrimp. In contrast, Riverside Fairy Shrimp usually hatch later in the season in pools that are warmer and deeper than Vernal Pool Fairy Shrimp, and they are slower to reach sexual maturity. These different ecological niches likely minimize competition between the species for food and other resources, even when they occupy the same pools.

Santa Rosa Plateau Fairy Shrimp is endemic to grassland cool-water vernal pools which are formed on southern basalt flows located at Santa Rosa Plateau. Therefore, it is not expected to occur within the study area (Eriksen and Belk 1999). It is not state or federally listed as threatened or endangered.

Versatile Fairy Shrimp commonly occurs in Riverside County and throughout California and may occupy the same pools as Vernal Pool Fairy Shrimp and the Riverside Fairy Shrimp. This species is common and is not considered to be sensitive by the resource agencies.



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Known Locations of Listed Fairy Shrimp
2013-2014 Fairy Shrimp Surveys
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

FIGURE 4

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3.0 SITE CHARACTERIZATION

The topography within the study area is generally flat or with gentle rolling hills. The approximately 13.2 miles of study area contains a combination of agricultural, municipal, private, and reserve land, most with previous disturbances of some kind.

3.1 Climate

The study area is located within a Mediterranean climate region consisting of warm, dry summers and mild, wet winters. In summer, temperatures often reach 100º F (37.8º C) and winter temperatures fall as low as 30º F (–1.1º C), with an occasional freeze. Average annual temperature ranges are fairly moderate for the area, ranging from 49.3º F to 79.5º F (9.6º C to 26.4º C). Average total precipitation for the area is approximately 10 to 15 inches (2.54 to 38.1 cm) per year (Desert Research Institute [DRI] 2014).

3.1.1 2013–2014 Wet Season

Most precipitation in coastal Southern California occurs from approximately October through May, but annual precipitation records generally include precipitation events from July 1st through June 30th. The Elsinore station, near Lake Elsinore, is the closest weather station to the study area. The total rainfall for the 2013–2014 season was only 4.37 inches. This is 6.97 inches less than the yearly average of 11.34 from DRI (2014). A little over half of this year's rainfall occurred in February (1.28 inches) and March (1.27 inches), totaling 2.55 inches, with drier than normal conditions otherwise. For comparison, the total rainfall for the 2012–2013 season was 10.76 inches, the 2011–2012 season was 6.68 inches, the 2010–2011 season had a total of 22.38 inches (11.67 of which fell in December 2010), and the 2009–2010 season had a total of 16.55 inches (8.88 of which fell in January 2010). The high rainfall totals of those two seasons reflect those two extraordinarily wet months. The four seasons previous to 2009–2010 had rainfall totals of less than nine inches each.

3.2 Topography, Land Use, and Soils

Phase 2 of the study area begins in the relatively flat Warm Springs Valley in the south, and then travels northwest, crossing Alberhill Creek/Temescal Wash and continuing through valleys and low rolling hills in the Terra Cotta and Alberhill areas. It then crosses Temescal Wash again, twice in the space of about 1.5 miles. As it continues northwest it parallels and then enters the Temescal Valley, between the Santa Ana Mountains to the southwest and the Gavilan Hills to the northeast, before terminating at the Ivyglen Substation in Corona, west and then southwest across a series of low, rolling hills. The disjunct construction staging yards of the study area are located within the relatively flat Perris Valley in Menifee and low, rolling hills in Perris.

The study area is located primarily along relatively flat areas that have historically been used for grazing, agriculture, an old railroad, and rural residential development. Much of the proposed ROW is adjacent to existing power lines with paved and/or dirt access roads.

Soils in the study area are primarily in the Monserate-Arlington-Exeter and Traver-Domino-Willows associations. These soils are characterized as level to moderately steep soils that have a surface layer of sandy loam often with a hardpan. The soils can range from very shallow to relatively deep (United States Department of Agriculture [USDA] 1971). Soils in the study area do not generally have a high clay component; however, there are "lenses" of clay soils in the study area, and several mapped soil types which are considered sensitive. The study area travels through several mapped soil types which are considered sensitive by the MSHCP (Riverside County 2003). In the south these include Travers series sandy loams, Altamont series clays, and Willows silty clay. Some of these soils are associated with the Alberhill Creek/Temescal Wash drainage. In the northern portion of the study area, the alignment passes through additional areas of Altamont clays.

3.3 Weather Conditions and Pool Formation

Vernal pool/ponding formation is typically affected by precipitation levels and general rainfall patterns specifically wherein precipitation is delivered by relatively few, large storm systems. Large but widely spaced precipitation events may result in saturated soil conditions and temporary inundations, but greater precipitation levels and/or more closely spaced storms may be required for longer inundation periods.

Although the precipitation level during the 2013–2014 wet season was significantly less than the previous wet season, some depressions did become inundated. One depression (Depression 433) was sampled during each viable sampling visit, while other depressions could only be sampled once or twice during the 2013–2014 wet season.

Many of the depressions sampled during the protocol wet season surveys occurred within areas that are extremely dynamic, as most are continually altered by human activities. Such activities included: an active storage yard, road construction, detention basin, and vehicular traffic at the edge of pavement or on unpaved roads, including off-road vehicles. Of the 14 depressions inundated and sampled during the 2013–2014 wet season surveys, 7 would fall into the above categories (Appendix B: Photograph 1). Four depressions were located within construction staging yards (Appendix B: Photograph 2). The remaining 3 depressions were in detention basins (Appendix B: Photographs 3 and 4) and were not subject to any disturbance during the 2013–2014 season. None of the 14 depressions sampled during the 2013–2014 season were natural vernal pools in an undisturbed location. Table 1 summarizes the number of inundated depressions that were formed as a result of construction related, roadside, detention basin, and drainage conditions.

Table 1.
Depression Types for the Proposed Valley-Ivyglen Subtransmission Line Project

Depression Type	Depression Identification Number	Number of Depressions
Road/Road Shoulder	448, 449, 450, 479, 480, 481, 491	7
Detention Basin	470, 2014A, 2014B	3
Construction Staging Yard	433, 434, 444, 487	4
	Grand Total:	**14**

Per the USFWS wet season protocol, all inundated depressions were noted at their initial ponding; however, only depressions with continuing inundation at the follow-up visit(s), were subsequently surveyed per the USFWS protocol. Depressions first documented in 2012–2013 are numbered ≥431. Two new depressions were identified during the 2013–2014 wet season (Depressions 2014A and 2014B), which had not been documented in 2012–2013 (Appendix B: Photographs 3 and 4).

3.4 Vegetation Communities

Vegetation communities and land cover types within the study area are varied, but most depressions occur on developed disturbed land (ruderal habitat), mainly roadsides and unpaved roads, and grasslands. Vegetation communities and land cover types recorded within the study area are briefly described below. These communities are classified per the Western Riverside County MSHCP, which is based on the vegetation communities presented in the *Preliminary Descriptions of Terrestrial Natural Communities of California* (Holland 1986; Riverside County 2003).

3.4.1 Agricultural Lands

Agricultural lands within the study area include areas occupied by dairies and livestock feed yards or areas that have been tilled for use as croplands or groves/orchards. The study area crosses areas, which were in agricultural production in the past, but none of these lands appeared to be in active production this season.

3.4.2 Chaparral

Chaparral is a shrub-dominated vegetation community that is composed largely of evergreen species that range from 3 to 12 feet (ft) (0.9 to 3.7 meters [m]) in height (Riverside County 2003). The most common and widespread species within chaparral is chamise (*Adenostoma fasciculatum*). Other common shrub species include manzanita (*Arctostaphylos* spp.), wild-lilac (*Ceanothus* spp.), oak (*Quercus* spp.), redberry (*Rhamnus* spp.), laurel sumac (*Malosma laurina*), mountain-mahogany (*Cercocarpus betuloides*), toyon (*Heteromeles arbutifolia*), and mission-manzanita (*Xylococcus bicolor*). Soft-leaved subshrubs are less common in chaparral than in coastal sage scrub, which is briefly described below. However, several subshrub species may occur within canopy gaps of mature stands. Common species include California buckwheat (*Eriogonum fasciculatum*), sages (*Salvia* spp.), California sagebrush (*Artemisia californica*), and monkeyflower (*Mimulus* spp.). In addition, herbaceous species, including deerweed (*Acmispon glaber*), nightshade (*Solanum* spp.), Spanish bayonet (*Hesperoyucca whipplei*), rock-rose (*Crocanthemum scoparium*), onion (*Allium* spp.), soap plant (*Chlorogalum* spp.), bunch grasses (*Nassella* spp. and *Stipa* spp.), wild cucumber (*Marah* spp.), bedstraw (*Galium* spp.), and lupine (*Lupinus* spp.) are also present. Chaparral occurs within the study area west of the Temescal Valley floor, in places where the alignment touches on the foot of the Santa Ana Mountains.

3.4.3 Coastal Sage Scrub

In western Riverside County, coastal sage scrub is found both in large contiguous blocks scattered throughout the county, as well as integrated with chaparral and grasslands. Coastal sage scrub is dominated by a characteristic suite of low-statured, aromatic, drought-deciduous shrubs, and subshrub species. Composition varies substantially depending on physical circumstances and the successional status of the vegetation community. However, characteristic species include California sagebrush, California buckwheat, laurel sumac, California encelia (*Encelia californica*), and several species of sage (e.g., *Salvia mellifera* or *S. apiana*). Other common species include brittlebush (*Encelia farinosa*), lemonadeberry (*Rhus integrifolia*), sugarbush (*R. ovata*), yellow bush penstemon (*Keckiella antirrhinoides*), Mexican elderberry (*Sambucus nigra* subsp. *canadensis*), sweetbush (*Bebbia juncea*), boxthorn (*Lycium* spp.), coastal prickly pear (*Opuntia littoralis*), coastal cholla (*Cylindropuntia prolifera*), tall prickly-pear (*O. oricola*), and species of dudleya (*Dudleya* spp). Within the study area, coastal sage scrub also occurs in various disturbed phases, as a result of mechanical disturbances such as agriculture, grading, or grazing, characterized by a sparse, open shrub habitat separated by grasses or bare ground.

3.4.4 Developed or Disturbed Land

Developed or disturbed land consists of disced, cleared, or otherwise altered areas. Developed lands may include roadways, existing buildings, and structures. Disturbed lands may include ornamental plantings for landscaping, exotics, or ruderal vegetation dominated by nonnative, weedy species such as mustard (*Brassica* sp.), fennel (*Foeniculum vulgare*), tocalote (*Centaurea melitensis*), and Russian thistle (*Salsola tragus*). The majority of the identified depressions occur within developed habitat, along dirt roads, building pads, or other manmade features that result in soil compaction or exposure of hardpan soils suitable for ponding.

3.4.5 Grasslands

Two general types of grasslands occur in western Riverside County: native dominated perennial grassland (valley and foothill grassland); and nonnative dominated, primarily annual grassland (nonnative grassland), which is the dominant grassland within the study area.

Valley and foothill grasslands typically contain the perennial bunch grasses, such as purple needlegrass (*Stipa pulchra)* and foothill needlegrass (*Nassella lepida*). Lesser amounts of other native grasses, such as onion grass (*Melica* spp.), wild rye (*Leymus* spp.), muhly (*Muhlenbergia* spp.), and cane bluestem (*Bothriochloa barbinodis*), also may be present. In addition, nonnative grasses or forbs may be present to varying degrees. Native herbaceous plants commonly found within valley and foothill grasslands include yellow fiddleneck (*Amsinckia menziesii*), common calyptridium (*Calyptridium monandrum*), suncup (*Camissonia* spp.), Chinese houses (*Collinsia heterophylla*), California poppy (*Eschscholzia californica*), tarweed (*Hemizonia* spp.), coast goldfields (*Lasthenia californica*), common tidy-tips (*Layia platyglossa*), lupine, popcornflower (*Plagiobothrys* spp.), blue dicks (*Dichelostemma capitatum*), muilla (*Muilla* spp.), blue-eyed grass (*Sisyrinchium bellum*), and dudleya. Little of this vegetation community occurs within the study area.

Majority of the grasslands present within the study area are nonnative grasslands. They are dominated by several species of grasses that have evolved to persist in concert with human agricultural practices: slender oat (*Avena barbata*), wild oat (*A. fatua*), foxtail chess (*Bromus madritensis*), soft chess (*B. hordeaceus*), ripgut grass (*B. diandrus*), barley (*Hordeum* spp.), rye grass (*Festuca perennis*), rat-tail fescue (*F. myuros*), and Mediterranean schismus (*Schismus barbatus*).

3.4.6 Meadows and Marshes

Meadow and marsh vegetation communities occur in both flowing and still water. This vegetation community includes cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), sedges (*Cyperus* spp.), smartweed (*Polygonum* spp.), watercress (*Rorippa* spp.), and yerba mansa (*Anemopsis californica*). It also contains perennial and biennial herbs (e.g., *Oenothera* spp., *Lupinus* spp., *Potentilla* spp., and *Sidalcea* spp.) and grasses (e.g., *Agrostis* spp., *Deschampsia* spp., and *Muhlenbergia* spp.). Rooted aquatic plant species with floating stems and leaves, such as pennywort (*Hydrocotyle* spp.), water smartweed (*Persicaria amphibia*), pondweeds (*Potamogeton* spp.), and water-parsley (*Oenanthe sarmentosa*) may also be present. Meadows are not present within the study area, but the alignment skirts some marshland, primarily in the south.

3.4.7 Riparian Forest, Woodland, and Scrub

Riparian vegetation, including forest, woodland, and scrub subtypes, is distributed in waterways and drainages throughout much of western Riverside County. Depending on community type, a riparian community may be dominated by any of several trees or shrubs, including box elder (*Acer negundo*), bigleaf maple (*A. macrophyllum*), coast live oak (*Quercus agrifolia*), white alder (*Alnus rhombifolia*), sycamore (*Platanus racemosa*), Fremont's cottonwood (*Populus fremontii*), California walnut (*Juglans californica*), Mexican elderberry, wild grape (*Vitis girdiana*), giant reed (*Arundo donax*), mule fat (*Baccharis salicifolia*), tamarisk (*Tamarix* spp.), or any of several species of willow (*Salix* spp.). In addition, various understory herbs may be present, such as saltgrass (*Distichlis spicata*), wild cucumber (*Marah macrocarpa*), mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica*), and poison-oak (*Toxicodendron diversilobum*) (Riverside County 2003). Subcategories of these habitat types within the study area include mule fat scrub, southern cottonwood-willow riparian forest, and southern sycamore-alder riparian woodland. Within the study area, riparian habitats occur primarily along stream courses, floodplains, and riverbanks.

3.4.8 Riversidean Alluvial Fan Sage Scrub

Riversidean alluvial fan sage scrub generally occurs on alluvial fans and benches along the floodplains of larger waterways in the Riverside County. Alluvial scrub is made up predominantly of drought-deciduous soft-leaved shrubs, but with significant cover of larger perennial species typically found in chaparral. Scalebroom (*Lepidospartum squamatum*) generally is regarded as an indicator of Riversidean alluvial fan sage scrub. In addition to scalebroom, alluvial scrub typically is composed of white sage, redberry, California buckwheat, Spanish bayonet, California croton (*Croton californicus*), cholla (*Cylindropuntia* spp.), tarragon (*Artemisia dracunculus*),

yerba-santa (*Eriodictyon crassifolium*), broom baccharis (*Baccharis sarothroides*), and mountain-mahogany. Annual species composition has not been studied, but is probably similar to that found in understories of neighboring shrubland vegetation. The study area skirts this vegetation community in several locations.

3.4.9 Woodlands and Forests

Woodland and forest vegetation communities in western Riverside County are dominated by Engelmann oak (*Quercus engelmannii*), coast live oak, canyon live oak (*Q. chrysolepis*), interior live oak (*Q. wislizeni*), and black oak (*Q. kelloggii*) in the canopy, which may be continuous to intermittent or savannah-like. Four-needle pinyon pine (*Pinus quadrifolia*), single-leaf pinyon pine (*P. monophylla*), and California juniper (*Juniperus californica*) are the canopy species of peninsular juniper woodland, which most commonly occur in southern California, forming a scattered canopy from 10 to 49 ft (3 to 15 m) tall. The study area skirts some individual oaks and some marginal oak woodlands.

3.4.10 Open Water

Open water habitat typically is unvegetated due to a lack of light penetration. However, open water may contain suspended organisms such as filamentous green algae, phytoplankton (including diatoms), and desmids. Floating plants such as duckweed (*Lemna* spp.), water buttercup (*Ranunculus aquatilis*), and mosquito fern (*Azolla filiculoides*) also may be present. Open water includes inland depressions, ponds, lakes, reservoirs, and stream channels containing standing water and often occur in conjunction with riparian and upland vegetation communities. Depth may vary from hundreds of feet to a few inches (Riverside County 2003). The study area skirts permanent open water only in the south.

4.0 SURVEY METHODOLOGY

Focused surveys for listed fairy shrimp species were conducted by John F. Green under the authority of USFWS Permit TE-054011-5 and Nicole Kimball under the authority of USFWS Permit TE-053598-4. Tim Chumley was a supervised individual during wet season surveys, working closely with Mr. Green and Ms. Kimball. A notification letter, dated 22 November 2013, was submitted to the USFWS prior to sampling inundated depressions (Appendix C). Surveys were conducted according to USFWS survey guidelines for wet season surveys (USFWS 1996). Once the depressions were initially inundated with at least 1.2 in (3.0 cm) of water following a storm event, depressions were sampled once every two weeks until the depressions were no longer inundated. In cases where the depressions dried and then refilled within the season, depression sampling was reinitiated every time they reached the 1.2 in (3.0 cm) of standing water criterion. Depressions were sampled using a net with a mesh size smaller than (0.1 in) 3.2 millimeters.

All fairy shrimp netted were identified to species, when maturity level allowed. If only immature fairy shrimp were encountered in the depression, which did not yet exhibit the adult characteristics needed for identification, their life history status was noted and identification was planned for the next survey visit. Table 2 summarizes sampling visits for the study area. Appendix A depicts depression locations, and Appendix D summarizes depression sampling information.

Table 2.
Sampling Visits for the Proposed Valley-Ivyglen Subtransmission Line Phase 2 Project Fairy Shrimp Surveys

Date	Surveyors*	Survey Number	Activity
22 November 2013	JFG	0	Checked for ponding after rain event; ponding observed.
06 December 2013	JFG; TWC	1	Sampled inundated depressions.
20 December 2013	JFG; TWC	2	Continued to sample inundated depressions. Rain event had occurred which refilled/inundated many depressions.
03 January 2014	JFG	3	Sampled inundated depressions.
17 January 2014	JFG; TWC	4	All depressions dry.
07 February 2014	JFG	5	Checked for ponding after rain event; minimal ponding observed.
21 February 2014	JFG	6	All depressions dry.
03 March 2014	JFG	7	Checked for ponding after rain event; ponding observed.
11 March 2014	JFG; NMK	8	Sampled inundated depressions.
25 March 2014	NMK; TWC	9	All depressions dry.
27 March 2014	NMK; TWC	10	Checked for ponding after rain event; no ponding observed.
03 April 2014	JFG	11	Checked for ponding after rain event; ponding observed.
11 April 2014	JFG	12	All depressions dry, season over.

Notes:
* JFG = John F. Green; NMK = Nicole Kimball; TWC = Tim Chumley (supervised individual)

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5.0 SURVEY RESULTS

Four depressions were sampled in 2013–2014. The remaining ten depressions identified failed to inundate, or were not inundated long enough for sampling this season. The locations of all identified depressions are included in Appendix A and detailed depression sampling information is included in Appendix D.

The study area is highly dynamic, with the majority of the depressions are in or adjacent to existing roads. Residents drive vehicles, hike, walk their dogs, as well as other recreational activities, which can alter the depressions. Depressions in locations such as graded lots, unpaved roads, detention basins, and staging yards, are subject to disturbance and can be influenced by runoff and storm drain flows. As such, inundation depths, boundaries, and length of inundation are continually changing at some depression sites. The depressions at the actively used southern and northern staging yards adjacent to the Valley Substation in Menifee and those on the road shoulders of Lake Street were particularly subject to impacts this season, while the others remained relatively untouched at the time of the surveys. These disturbed depression types are not typically considered vernal pools, but they can support fairy shrimp, particularly Versatile Fairy Shrimp, a ubiquitous, non-sensitive species.

Depressions within the study area are not only subject to change at the beginning and end of the wet season, but between sampling visits. A depression could be inundated at the beginning of the season and would not refill even with sufficient rain because vehicular activity or a flood event had reconfigured the depression. Conversely, a depression could be formed in the middle of the season that was not present upon initiation of surveys. Several depressions that were only sampled once, or that had dried when the sampling visit occurred may have been affected by these factors.

No listed fairy shrimp species were identified in any of the depressions. Versatile Fairy Shrimp, not considered sensitive by resource agencies, was detected in four depressions (Appendix B: Photograph 3). Other depressions did not support any fairy shrimp species during the 2013–2014 season. Table 3 provides information relating to Versatile Fairy Shrimp occupancy and Appendix D provides depression sampling information.

Table 3.
Depressions with Versatile Fairy Shrimp Occupancy during Surveys

Survey Week	Number of Depressions Occupied*/Inundated	Survey Week	Number of Depressions Occupied*/Inundated
1	1 / 1	3	2 / 2
2	0 / 1	8	4 / 7

Notes:
*Occupied by Versatile Fairy Shrimp or *Branchinecta* sp. (too small to identify)

The 2013–2014 season had several rain events which filled, maintained, or refilled depressions, but was also interspersed with dry periods and unseasonably high temperatures, which sometimes caused rapid drying of depressions. This resulted in two depressions with *Branchinecta* shrimp which were too small to confidently identify. The depressions dried prior to the next survey visit, preventing positive identification. These depressions; however, have had adult Versatile Fairy Shrimp during the previous sampling and/or in past years, and no listed fairy shrimp species have been documented during any wet season surveys related to this project. Therefore, it is likely that this year's juveniles were Versatile Fairy Shrimp as well.

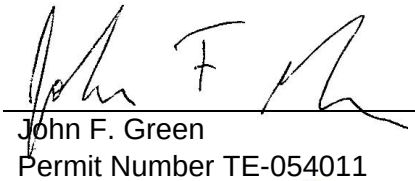
6.0 CONCLUSION

Pooling within the study area was associated with depressions in disturbed and developed areas. Most of these depressions are associated with road shoulders, created detention basins, and construction staging yards.

Only Versatile Fairy Shrimp was positively identified during 2013–2014 focused wet season surveys. This is also the only species of fairy shrimp found within the study area during four previous years of surveys (some years only at Phase 2's south end). No listed fairy shrimp were detected (i.e., Riverside Fairy Shrimp or Vernal Pool Fairy Shrimp). Versatile Fairy Shrimp is a ubiquitous species, distributed throughout the study area, and not considered sensitive by resource agencies.

This survey result confirms that listed fairy shrimp were not detected within potentially suitable habitat during AMEC's 2013–2014 wet season survey.

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.



John F. Green — 9 July 2014
Permit Number TE-054011 — Date

Nicole Kimball — 9 July 2014
Permit Number TE-053598 — Date

Tim Chumley — 9 July 2014
Supervised Individual — Date

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APPENDIX A

DEPRESSION MAPS

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Legend

Project Features

- Phase 2 Subtransmission Line Route
- Construction Staging Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season
- First Identified in 2013/2014 Season

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 62.5 125

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-1

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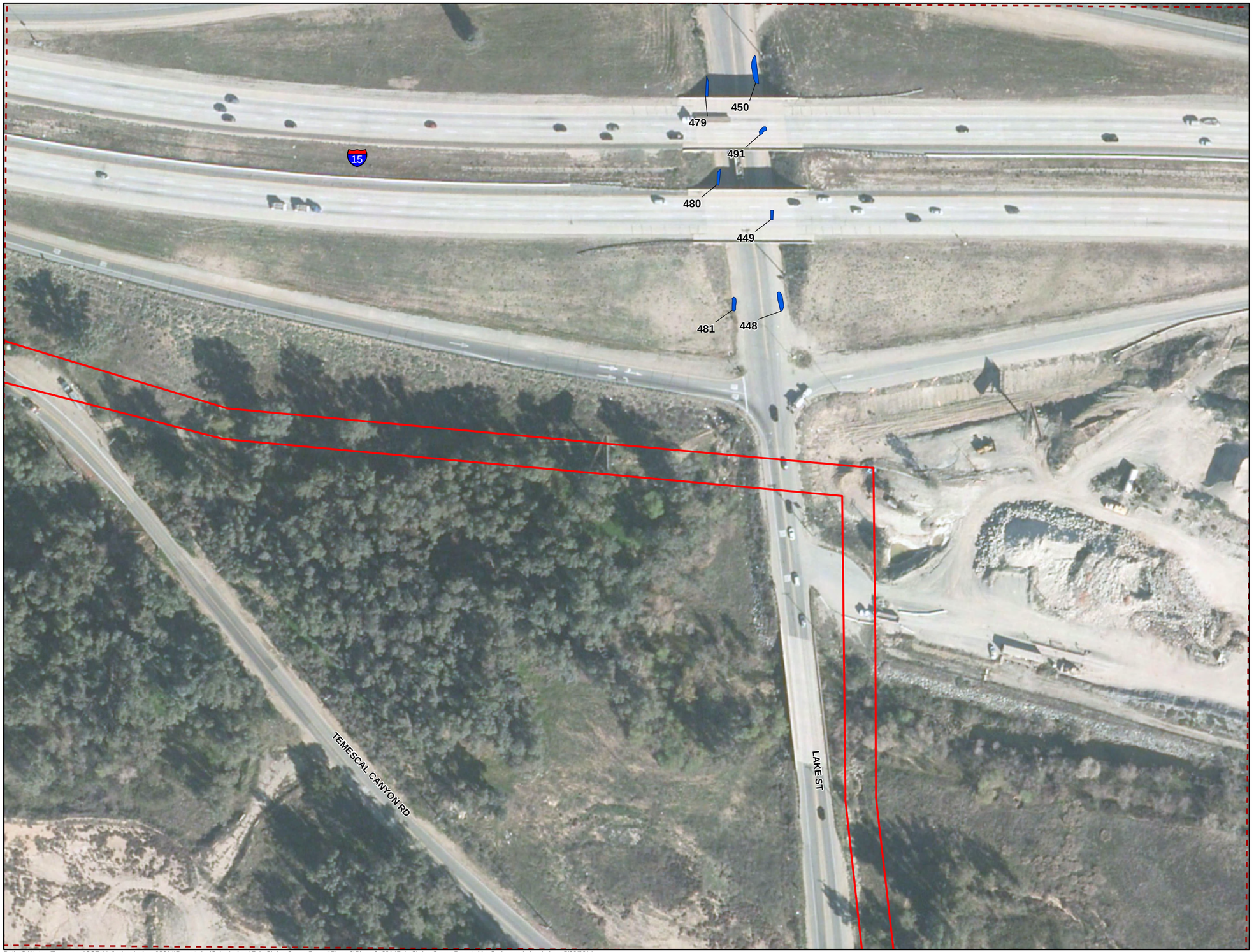


Legend

Project Features

- Phase 2 Subtransmission Line Route
- Construction Staging Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season
- First Identified in 2013/2014 Season

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 62.5 125

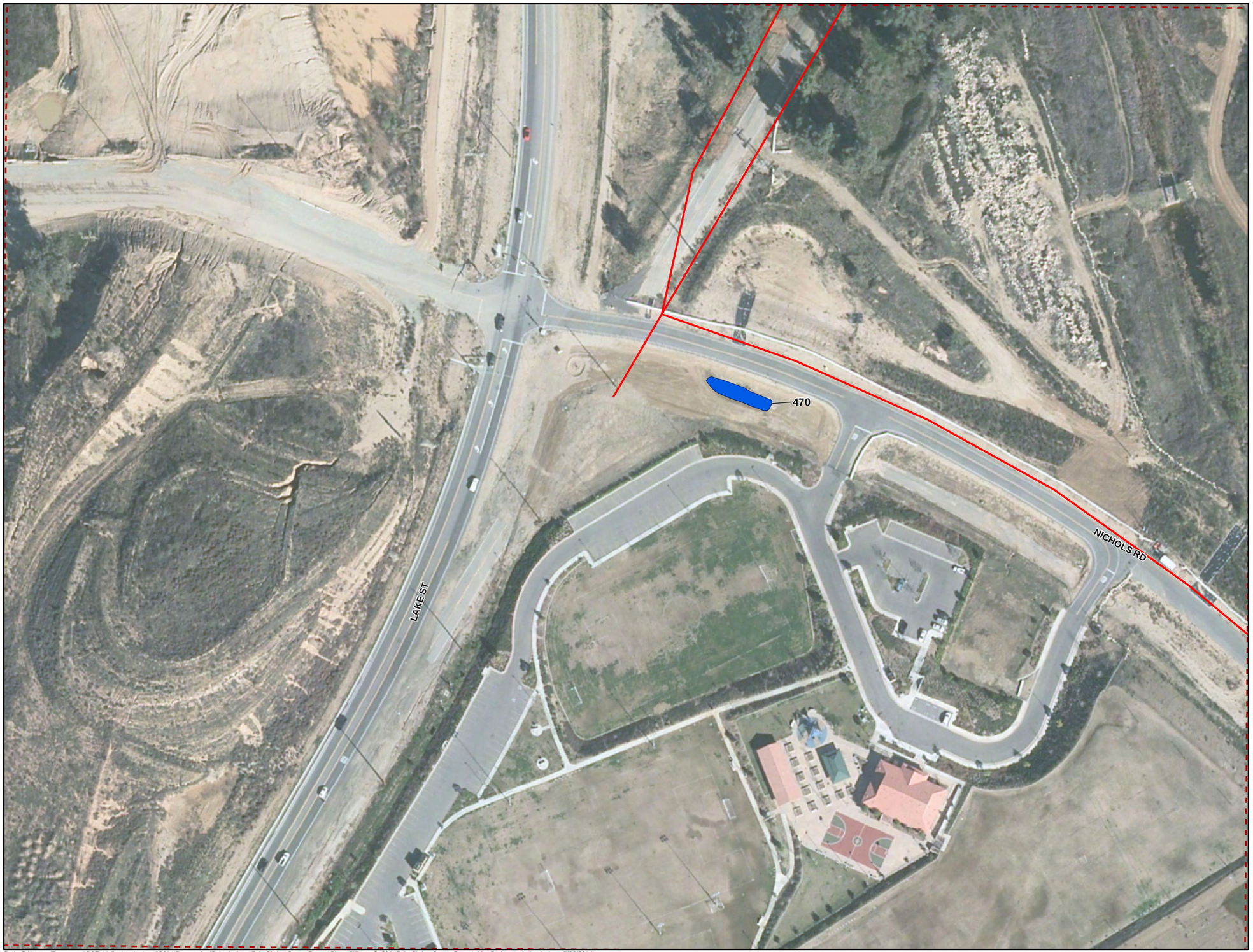
Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-2

Path: Q:\NaturalResources\SCE_ValleyIvyglen\mxd\2014\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2014FairyShrimpSurveyReport_MapSeries.mxd, jessie.lee, 5/30/2014



Legend

Project Features

- Phase 2 Subtransmission Line Route
- Construction Staging Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season
- First Identified in 2013/2014 Season

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 62.5 125

Feet

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Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-3

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Legend

Project Features

- Phase 2 Subtransmission Line Route
- Construction Staging Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season
- First Identified in 2013/2014 Season

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 62.5 125

Feet

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Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-4

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Legend

Project Features

- Phase 2 Subtransmission Line Route
- Construction Staging Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season
- First Identified in 2013/2014 Season

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 62.5 125

Feet

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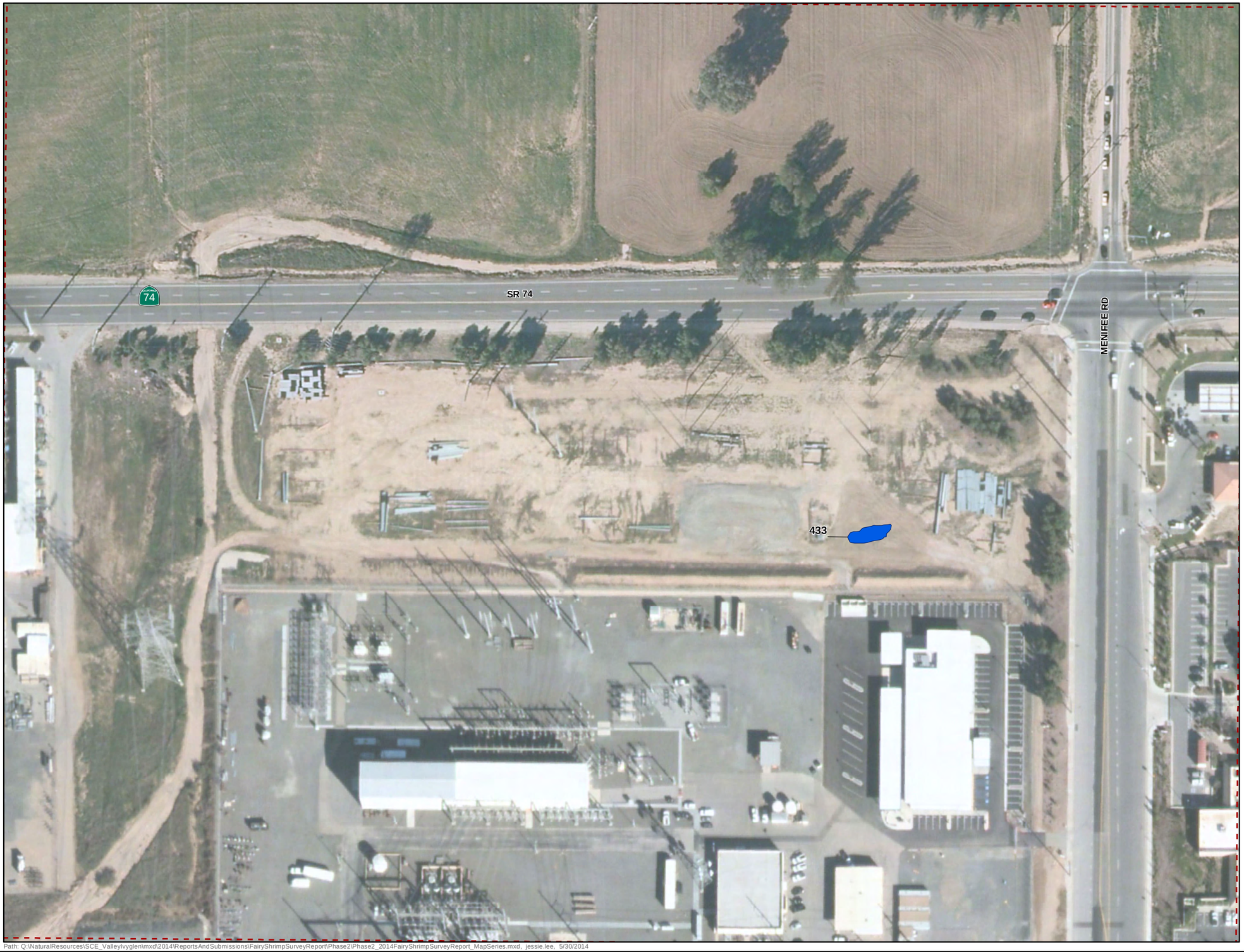
Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-5

Path: Q:\NaturalResources\SCE_ValleyIvyglen\mxd\2014\ReportsAndSubmissions\FairyShrimpSurveyReport\Phase2\Phase2_2014FairyShrimpSurveyReport_MapSeries.mxd, jessie.lee, 5/30/2014



Legend

Project Features

- Phase 2 Subtransmission Line Route
- Construction Staging Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season
- First Identified in 2013/2014 Season

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 62.5 125

Feet

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Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-6

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Legend

Project Features

- Phase 2 Subtransmission Line Route
- Construction Staging Yards
- Map Grid Boundaries

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season
- First Identified in 2013/2014 Season

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 62.5 125

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Subtransmission Line Project: Phase 2
Riverside County, CA

Map A-7

APPENDIX B

STUDY AREA PHOTOGRAPHS

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Photograph 1: Depression 450 at the edge of pavement along Lake Street, under Interstate-15.

Photograph 2: Depression 433 within the construction staging yard, located north of the Valley Substation.

Study Area Photographs
Proposed Valley-Ivyglen Subtransmission Line Project
Phase 2

Photograph 3: Depression 2014A within a detention basin, northeast of Nichols Road. A new depression for the 2013-2014 wet season, located in the mid-ground at the right.

Photograph 4: Depression 2014B within a detention basin, west of Campbell Ranch Road. A new depression for the 2013-2014 wet season, located in the foreground (water is very turbid).

Study Area Photographs
Proposed Valley-Ivyglen Subtransmission Line Project
Phase 2

APPENDIX C

USFWS NOTIFICATION LETTER

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To	Ms. Susie Tharratt Recovery Permit Coordinator U.S. Fish and Wildlife Service 6010 Hidden Valley Road Suite 100 Carlsbad, California 92011	File no	1255400499
From	John F. Green	cc	Nick Ricono Wendy Worthey
Tel	951-369-8060		
Fax	951-369-8035		
Date	22 November 2013		

Subject Notification of Initiation of Surveys for Federally-listed Vernal Pool Branchiopods for the Valley-Ivyglen Subtransmission Line Project, Riverside County, California.

Dear Ms. Tharratt,

This letter is to inform the U.S. Fish and Wildlife Service (USFWS) that AMEC Environment & Infrastructure, Inc. (AMEC) is proposing to conduct wet-season surveys for federally-listed vernal pool Branchiopods in accordance with USFWS *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* in support of the proposed Southern California Edison (SCE) Valley - Ivyglen Subtransmission Line Project, located in western Riverside County, California. Phase 1 surveys were completed in 2012, so surveys this season will be conducted primarily on Phase II (see attached map). Three construction yards that were added to Phase 1 in 2012 are included, however (see attached maps). This is the second season of surveys for all of these areas, Phase 2 and 1.

The project involves eventual construction of a new 115 kilovolt (kV) transmission line between the Valley Substation in the City of Menifee to the Ivyglen Substation in the City of Corona. The project traverses portions of the Romoland, Lake Elsinore, Lake Mathews, and Alberhill United States Geological Survey (USGS) 7.5-minute series topographic quadrangles.

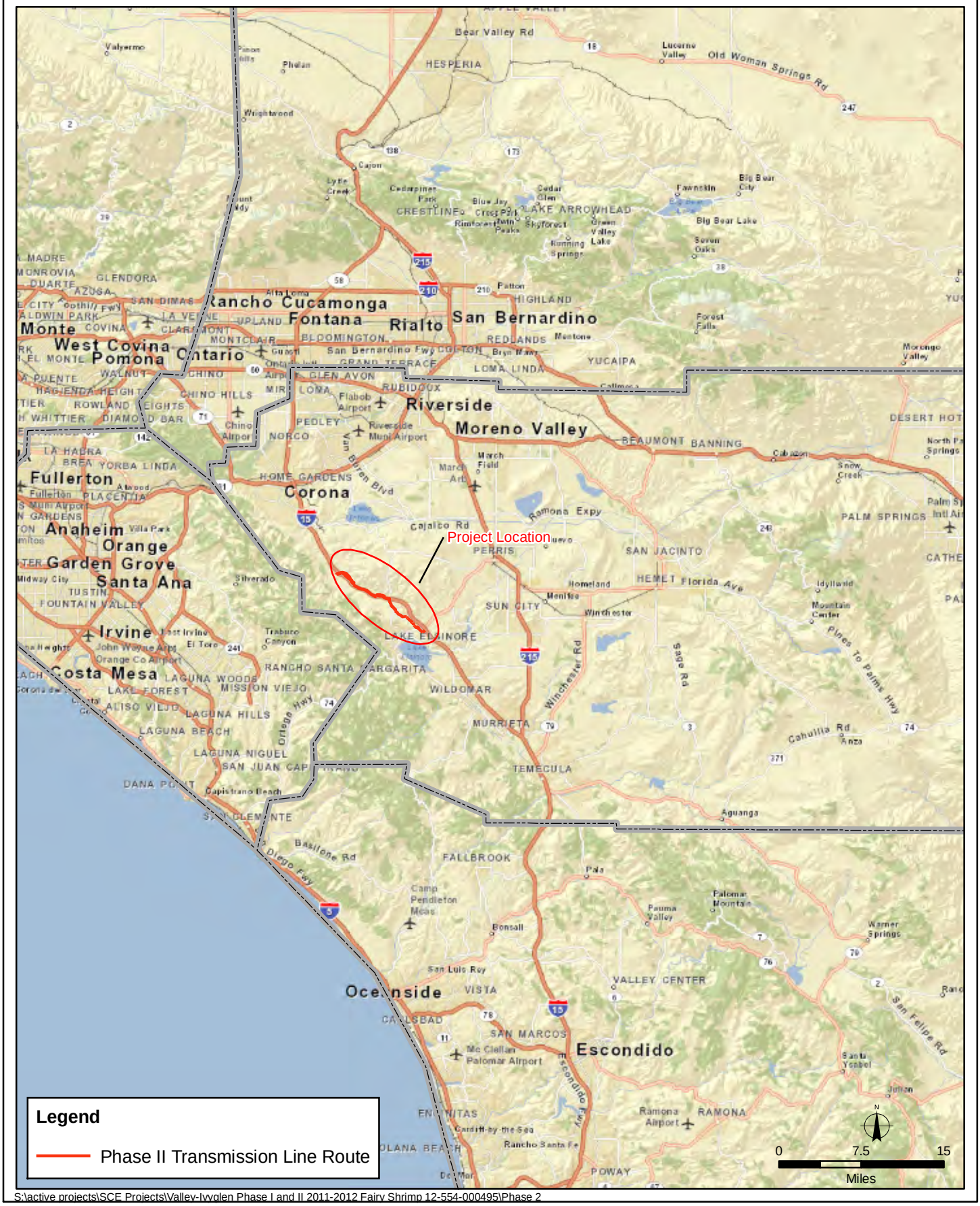
All surveys will be conducted by John F. Green under recovery permit number TE-054011-5. It is anticipated that the vernal pool surveys will begin two weeks after the current rain event.

Please contact me if you have any questions regarding this notification.

Thank You,

John F. Green
E-mail: john.f.green@amec.com

AMEC Environment & Infrastructure, Inc.
3120 Chicago Ave., Ste 110
Riverside, CA 92507 www.amec.com



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Regional Location
Fairy Shrimp Surveys
Valley-Ivyglen Transmission Line Project: Phase II

FIGURE

1

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Legend

Project Features

- Phase I Transmission Line Route
- Material Yards
- Map Grid Boundaries
- 2012/2013 Fairy Shrimp Survey Area

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season

Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Transmission Line Project: Phase I
Riverside County, CA

Map A-1

Legend

Project Features

- Phase I Transmission Line Route
- Material Yards
- Map Grid Boundaries
- 2012/2013 Fairy Shrimp Survey Area

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season

Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Transmission Line Project: Phase I
Riverside County, CA

Map A-2

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Legend

Project Features

- Phase I Transmission Line Route
- Material Yards
- Map Grid Boundaries
- 2012/2013 Fairy Shrimp Survey Area

Depressions Sampled for Fairy Shrimp

- First Identified in 2012/2013 Season

Aerial Source: Eagle Aerial (2011)

N

1 inch = 125 feet

0 30 60 120

Feet

amec

Appendix A
Fairy Shrimp Survey Results
Valley-Ivyglen Transmission Line Project: Phase I
Riverside County, CA

Map A-3

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APPENDIX D

DEPRESSION SAMPLING DATA

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Depression Sampling Data for 2013-2014 within the Proposed Valley-Ivyglen Subtransmission Line Project

Pool	Week	Date	Time of Sample	Actual Dept (in)	Max Dept (in)	Actual Length (ft)	Max Length (ft)	Water Temp (ºF)	Air Temp (ºF)	Shrimp sp.	No. of Shrimp	Reproductive Status	Gender	Habitat Condition	Other Species	Comments
433	1	12/6/2013	9:44	3.6	5.8	25	50	46	58	VFS	low 100s	adults/juveniles	M/F	depression	water boatmen	As in previous year, tire tracks and trash present. Pool in material storage yard.
433	2	12/20/2013	?	4.25	5.8	32	50	49	58	***	***	***	***	depression	***	Most likely dried and refilled within the past two weeks because VFS was present last time and there was a rain event the day before.
433	3	1/3/2014	11:25	1.25	5.8	12	50	68	69	*Branchinecta* sp.	100s	juveniles	***	depression	copepods; beetle larvae	Juveniles too small to ID confidently, *B. lindahli* known from depression.
433	8	3/11/2014	14:10	4.5	5.8	25	50	81.3	83.7	VFS	low 10s	adults	M/F	depression	surface flies	Trash, bird, dog, and fire tracks present (depression in active yard).
444	8	3/11/2014	13:35	2	4	18	30	81.5	85.1	***	***	***	***	depression	spadefoot tadpoles	Trash and tire tracks present; depression in junkyard
449	8	3/11/2014	10:20	2.5	5	12	25	57.4	68.2	***	***	***	***	road rut	***	Trash and tire tracks present (road shoulder)
450	3	1/3/2014	9:35	1.5	4.2	18	30	40	59	VFS	1s	adults	M/F	road rut	***	Trash and tire tracks present (road shoulder)
450	8	3/11/2014	10:35	1	4.2	3	30	67.3	66	VFS	low 10s	adults	M/F	road rut	***	Trash and tire tracks present (road shoulder)
491	8	3/11/2014	10:30	3	3	20	20	59.5	66.6	*Branchinecta* sp.	1s	juveniles	***	road rut	***	Juveniles too small to ID confidently, *B. lindahli* known from road rut; trash and tire tracks present (road shoulder).
2014a	8	3/11/2014	9:55	1	16	12	40	61.9	66.2	VFS	high 100s	adults/juveniles	M/F	detention basin	surface flies	Trash present
2014b	8	3/11/2014	11:50	5.5	12	75	75	67.8	84.6	***	***	***	***	detention basin	spadefoot tadpoles; mosquito larvae	Naturalized Created detention basin.

Notes:

F = Female; ID = Identify; M = Male; VFS= Versatile Fairy Shrimp