

**WESTERN RIVERSIDE COUNTY MULTIPLE
SPECIES HABITAT CONSERVATION PLAN
CONSISTENCY ANALYSIS AND BIOLOGY
RESOURCES ASSESSMENT REPORT**

INDUSTRIAL OUTDOOR VENTURES

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LIST OF ABBREVIATIONS AND ACRONYMS

ac	acre/acres
APN	Assessor's Parcel Number
CASSA	Criteria Area Species Survey Area
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNPS	California Native Plant Society
CWA	Clean Water Act
DSF	Delhi sands flower-loving fly
ESA	Environmentally Sensitive Area
ft	foot/feet
HCP	Habitat Conservation Plan
I-15	Interstate 15
NRCS	Natural Resources Conservation Service
OHWM	ordinary high water mark
PQP lands	Public/Quasi-Public lands
project	Industrial Outdoor Ventures Project
RWQCB	Regional Water Quality Control Board
SR-60	State Route 60
USACE	United States Army Corps of Engineers
UFWWS	United States Fish and Wildlife Service
WRCMSHCP	Western Riverside County Multiple Species Habitat Conservation Plan

1.0 EXECUTIVE SUMMARY

LSA was retained by MIG to conduct a Western Riverside County Multiple Species Habitat Conservation Plan (WRCMSHCP) consistency analysis and general biological assessment of the approximately 6.88-acre (ac) Industrial Outdoor Ventures Project (project) site located on the north side of Riverside Drive west of Wineville Avenue in Jurupa Valley, Riverside County, California. The study was conducted to address compliance with the WRCMSHCP and the California Environmental Quality Act (CEQA), and for the identification of potential jurisdictional waters. Results of the WRCMSHCP consistency analysis and general biological assessment are summarized below. The project site is not within a WRCMSHCP Criteria Area or any Public/Quasi-Public lands (PQP lands).

One drainage feature occurs on the project site that is considered WRCMSHCP riverine and is potentially subject to jurisdiction by the California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB). This feature receives flows from two separate off-site features. The project has been designed to avoid effects to this drainage feature. No other ponded areas or riparian habitat potentially subject to jurisdiction by the CDFW, USACE, or RWQCB were found within the project site.

The site does not contain riparian areas or vernal pools as defined in the WRCMSHCP and does not contain any fairy shrimp habitat. Therefore, focused surveys will not be required for special-status riparian bird or fairy shrimp species.

The project site is within the WRCMSHCP survey area for western burrowing owl (*Athene cunicularia hypugaea*), and suitable habitat for this species is present on site. A focused western burrowing owl breeding season survey was conducted, and western burrowing owl was determined to be absent from the project site. However, due to the presence of suitable habitat, a preconstruction survey will be required within 30 days prior to ground disturbance.

The project site is within WRCMSHCP Survey Area Number 7 for narrow endemic plant species; however, no suitable habitat is present. Therefore, no surveys or further analysis for these species will be required.

The project site is not located within a WRCMSHCP-designated survey area for any other species. This site does contain Delhi series soils, which may provide suitable habitat for the Delhi sands flower-loving fly (DSF; *Rhaphiomidas terminatus abdominalis*). After 4 consecutive years of negative survey results, it was determined the project site does not support a population of DSF.

The project will not be subject to WRCMSHCP Urban/Wildlands interface requirements because the site is not within or adjacent to an identified Conservation Area.

The project is within the Stephens' Kangaroo Rat Habitat Conservation Plan area, and payment of a fee is required.

2.0 INTRODUCTION

LSA was retained by MIG to conduct a WRCMSHCP consistency analysis and general biological resources assessment of the approximately 6.88 ac Industrial Outdoor Ventures Project (project) located on the north side of Riverside Drive west of Wineville Avenue in Jurupa Valley, Riverside County, California (Figure 1; all figures are provided in Appendix A).

The study was conducted to document biological resources within the study area, including those protected under the WRCMSHCP and CEQA, and include a focused breeding season burrowing owl survey and assessment of potential jurisdictional waters. These studies were conducted on July 29 and August 12, 19, and 26, 2022 (July/August) by LSA Biologist Denise Woodard.

2.1 PROJECT AREA

The project area is 6.88 ac in size and consists of Assessor's Parcel Numbers (APNs) 156-030-016, 156-030-017, and 156-030-042. The majority of the site will be developed. The eastern portion of the site is designated to not be disturbed in order to avoid any potential impacts to drainages that have the potential to meet the definition of a riverine area under the WRCMSHCP, waters of the United States under the federal Clean Water Act (CWA), streambed under Fish and Game Code Section 1600, or waters of the State pursuant to the Porter-Cologne Water Quality Control Act. An ESA fence will be placed along the eastern limits of the project construction area to avoid impacts to the potential jurisdictional feature (Figure 2). The project is located within the WRCMSHCP, but is located outside any criteria cell, PQP land, or conservation areas. The project site is located within the WRCMSHCP Species Survey Area for Burrowing Owl and Narrow Endemic Plant Species.

2.2 PROJECT DESCRIPTION

Project activities include the development of a 25,000-square-foot warehouse/retail office building, uncovered outdoor sales area, parking spaces, electric vehicle charging station, a water quality basin, and other infrastructure improvements (Figure 2).

2.3 GENERAL SETTING

The project site (Figure 3) is undeveloped and bordered to the north and west by Interstate 15 (I-15)/State-Route 60 (SR-60) interchange ramps, to the east by industrial development, and to the south by Riverside Drive and industrial development. The site is relatively flat, and elevations range from approximately 790 to 800 feet (ft) above mean sea level. The soils in the study area, as mapped by the Natural Resources Conservation Service (NRCS) Online Web Soil Survey (n.d.), are Delhi fine sand, 2 to 15 percent slopes, wind-eroded (DaD2), and Gorgonio loamy sand, deep, 2 to 8 percent slopes (GIC) as shown on Figure 4. The soils in the study are regularly disced for weed abatement but appear consistent with the mapping.

3.0 RESERVE ASSEMBLY ANALYSIS

3.1 CELL AND CRITERIA ANALYSIS

The WRCMSHCP provides for the assembly of a Conservation Area consisting of Core Areas and Linkages for the conservation of covered species. The Conservation Area is to be assembled from portions of the WRCMSHCP Criteria Area, which consists of quarter-section (i.e., approximately 160 ac) Criteria Cells, each with specific criteria for the species conservation within that cell.

The project site is within the Jurupa Area Plan of the WRCMSHCP, but it is not located within a Criteria Area or adjacent to a Criteria Area or Conservation Area. Therefore, no Cell or Criteria Analysis is required. The closest Criteria Cell (Number 35) is located immediately east of the I-15/SR-60 interchange. Development has already occurred in that cell. Criteria Cell Number 35 is within Cell Group A of the Jurupa Area Plan, Subunit 3, Delhi Sands Area, which is within Proposed Noncontiguous Habitat Block 1. Conservation objectives of this area pertain to conservation of occupied DSF lands, which is not applicable to this site.

3.2 PUBLIC/QUASI-PUBLIC LANDS ANALYSIS

The project site is not within or adjacent to PQP lands. The closest PQP lands comprise Noncontiguous Habitat Block 2 in the Jurupa Mountains, over 2 miles northeast of the project site. The project will not have any direct or indirect impacts to PQP lands.

4.0 VEGETATION

The vegetation on site consists of nonnative grassland/ruderal as a result of regularly discing for weed abatement and surrounding development. A row of large eucalyptus (*Eucalyptus* sp.) trees is located along Riverside Drive. Dominant species on site include annual bur-sage (*Ambrosia acanthacarpa*), golden crownbeard (*Verbesina encelioides*), Russian thistle (*Salsola tragus*), ripgut brome (*Bromus diandrus*), mouse barley (*Hordeum murinum*), and shortpod mustard (*Hirschfeldia incana*). Table 4.A provides the impact acreages to vegetation, and a complete list of plant species observed on the site is included in Appendix B.

Table 4.A: Impacts to Vegetation

Land Cover Type	Permanent Impacts (acres)	Temporary Impacts (acres)	No Impacts/ No Disturbance (acres)
Ruderal/Nonnative Grassland	6.35	0 ¹	0.53
Total Impacts	6.35	0	0.53

Source: Compiled by LSA (2022).

¹ All impacts considered permanent.

5.0 PROTECTION OF SPECIES ASSOCIATED WITH RIPARIAN/RIVERINE AREAS AND VERNAL POOLS (WRCMSHCP SECTION 6.1.2)

Section 6.1.2 of the WRCMSHCP requires assessment of impacts to riparian habitats, riverine areas, and vernal pools, including focused surveys for sensitive riparian bird and fairy shrimp species when suitable habitat is present. The intent of the assessment requirement is to provide for the protection of resources used by WRCMSHCP-covered species, as well as existing and future downstream conservation areas. Riverine/riparian areas and vernal pools are defined in Section 6.1.2 of the WRCMSHCP as follows:

Riparian/Riverine Areas are lands which contain Habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.

Vernal pools are seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics, and the definition of the watershed supporting vernal pool hydrology, must be made on a case-by-case basis. Such determinations should consider the length of the time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, uses to which it has been subjected, and weather and hydrologic records.

Fairy Shrimp. For Riverside, vernal pool and Santa Rosa fairy shrimp, mapping of stock ponds, ephemeral pools and other features shall also be undertaken as determined appropriate by a qualified biologist.

With the exception of wetlands created for the purpose of providing wetlands Habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions.

5.1 RIPARIAN/RIVERINE

5.1.1 Methods

LSA conducted a review of current and historical aerial photography to preliminarily identify if there were any drainage features flowing into or out of the project site or signature patterns on the aerial photographs that would indicate that riparian vegetation was evident and whether there were any drainages. In addition, a previous study (LSA 2019) conducted for the project was reviewed. The project site was assessed for riparian/riverine areas at the time of the July 29 and August 12, 19, and 26, 2022 (July/August) site visits. The assessment included identification and mapping of plant

communities on the site as well as any drainage features on site or flowing into or out of the project site.

5.1.2 Existing Conditions and Results

There is no riparian vegetation on the project site; therefore, there are no areas that would meet the WRCMSHCP definition of riparian areas or that would require surveys for riparian species. There is one drainage feature that meets the WRCMSHCP definition of riverine.

There is a drainage feature fed by a trapezoidal concrete ditch that conveys flows into the northeastern corner of the site. Flows originate from Wineville Road to the east. On-site flows from this drainage feature are conveyed into the storm drain system through a 48-inch-diameter culvert at Riverside Drive. This feature also appears to receive sheet flows that are fed by a culvert under SR-60, north of the project site.

5.1.3 Impacts and Mitigation

The project will avoid effects to the drainage feature and sheet flow from SR-60. The project has been designed to avoid placing fill material or having any other ground disturbance to the riverine areas by the design of the project detention basin to be located at least 10 ft from the riverine feature. In addition, an ESA fence will be placed east of the project detention basin during construction to delineate the project work limits and avoid effects to the riverine areas to be left undisturbed. Because the project will avoid impacts to the on-site drainage features, no mitigation is required.

5.2 VERNAL POOLS

5.2.1 Methods

The project site was assessed for vernal pools at the time of the July/August 2022 site visits. The assessment included a search for depressions, indicators of wetland hydrology, suitable soils, and hydrophytic vegetation. The assessment also included a review of seasonally appropriate aerial photographs from 10/2003, 12/2003, 12/2005, 1/2006, 1/2007, 11/2009, 3/2011, 1/2013, 3/2013, 11/2013, 4/2014, 2/2016, 10/2016, 2/2018, 12/2018, 12/2020 and 2/2022 that were acquired via Google Earth Pro in July 2022.

5.2.2 Existing Conditions and Results

The only drainage feature on site has an outlet and drains to a culvert downstream at Riverside Drive. No ponded areas or features resembling vernal pools were observed on site. The soils mapped and observed on site are loamy sand and fine sand, which are not suitable to support ponding sufficient for vernal pool formation. There are no areas of hydrophytic vegetation on the site. Therefore, there are no vernal pools.

5.3 FAIRY SHRIMP

5.3.1 Methods

The project site was assessed for fairy shrimp habitat at the same time, and using the same methods, as the assessment for vernal pools. The WRCMSHCP calls for habitat assessments for three sensitive species of fairy shrimp: Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*), Riverside fairy shrimp (*Streptocephalus woottoni*), and vernal pool fairy shrimp (*Branchinecta lynchi*). Santa Rosa Plateau fairy shrimp occur only on the Santa Rosa Plateau of extreme southwest Riverside County. A fourth sensitive species of Southern California (i.e., San Diego fairy shrimp [*Branchinecta sandiegonensis*]) is found primarily in the coastal areas of Orange and San Diego Counties. San Diego fairy shrimp has been found as far inland as the Wildomar area of southwest Riverside County but is not expected in the project area. These sensitive fairy shrimp species inhabit vernal pools as well as stock ponds, large road ruts, or other similar habitats that pond water long enough to allow growth and reproduction. To provide fairy shrimp habitat, a feature must regularly pond water for at least 18 days for vernal pool fairy shrimp (Eriksen and Belk 1999) and 2 months for Riverside fairy shrimp (USFWS 2012). Fairy shrimp do not inhabit flowing waters.

5.3.2 Existing Conditions and Results

As noted above, there are no vernal pools or similar non-flowing aquatic habitats on the project site suitable for fairy shrimp. The site does not have habitat suitable for sensitive fairy shrimp species; therefore, no surveys will be required.

5.4 RIPARIAN BIRDS

5.4.1 Methods

Habitat suitability for riparian birds, including least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and yellow-billed cuckoo (*Coccyzus americanus*), was assessed in conjunction with the assessment for riverine/riparian areas.

5.4.2 Existing Conditions and Results

There are no riparian/riverine areas or any habitat suitable for riparian birds on the project site; therefore, no surveys for riparian birds will be required.

6.0 PROTECTION OF NARROW ENDEMIC PLANT SPECIES (WRCMSHCP SECTION 6.1.3)

Section 6.1.3 of the WRCMSHCP requires focused surveys for specified sensitive plant species if the project is located within a survey area for narrow endemic plant species and suitable habitat is present. The project site is located within a survey area for the three narrow endemic plant species summarized in Table 6.A; however, there is no suitable habitat for these species. Therefore, no surveys for narrow endemic plants will be required.

Table 6.A: Narrow Endemic Plant Species Occurrence Probability on the Project Site

Species	MSHCP Habitat	Growth Form & Blooming Period	Occurrence Probability
San Diego ambrosia <i>Ambrosia pumila</i>	Open floodplain terraces on Garretson gravelly fine sandy loams, or in the watershed margins of vernal pools or alkali playas on Las Posas loam in close proximity to Willow silty alkaline soils. Occurs in sparse annual vegetation.	Perennial; Generally non-flowering	Absent. No Garretson or Las Posas soils or vernal pools/alkali playas on site.
Brand's star phacelia <i>Phacelia stellaris</i>	Sandy soils of washes or benches in alluvial floodplains. This species is generally dependent on periodic flooding and sediment transport. The WRCMSHCP account for this species states that "within western Riverside County, Brand's phacelia is restricted to sandy benches along the Santa Ana River."	Annual; March–June	Absent. No alluvial floodplains on site.
San Miguel savory <i>Satureja chandleri</i>	Rocky, gabbroic, and metavolcanic substrates in chaparral or oak woodland.	Perennial; March–May	Absent. No chaparral or woodlands on site.

Source: Compiled by LSA (2022).

7.0 ADDITIONAL SURVEY NEEDS AND PROCEDURES (WRCMSHCP SECTION 6.3.2)

WRCMSHCP Section 6.3.2 requires surveys for additional plants, amphibians, small mammals, and burrowing owl for projects located within mapped survey areas.

7.1 CRITERIA AREA PLANT SPECIES

The project is not within a mapped survey area for Criteria Area Species Survey Area (CASSA) plant species.

7.2 AMPHIBIANS

The project is not within a mapped survey area for amphibian species.

7.3 BURROWING OWL

The project site is within the WRCMSHCP burrowing owl survey area. Burrowing owls are found in open and dry grasslands, agricultural and range lands, and desert habitats often associated with burrowing animals. They can also inhabit grass, forb, and shrub stages of pinyon and ponderosa pine habitats. They nest in abandoned burrows of ground squirrels or other animals, in pipes, under piles of rock or debris, and in other similar features.

7.3.1 Methods

A burrowing owl habitat assessment and focused burrow survey were conducted by LSA biologist Denise Woodard in accordance with Step I and Step II, Part A of the *Burrowing Owl Survey Instructions for the Western Riverside County Multiple Species Habitat Conservation Plan Area* (County of Riverside 2006). The habitat assessment and focused survey for burrowing owl burrows were conducted July 29, 2022. The assessment included an evaluation of soil texture, vegetative cover, topography, and the presence of mammal burrows, rock/debris piles, or other areas suitable for nest construction. The burrow surveys were conducted by walking throughout suitable habitat areas and pausing occasionally to scan the surrounding areas through binoculars. Transects were spaced at no more than 80 ft, which allowed for 100 percent visual coverage of suitable habitat. Burrows and other nesting features with potential to be occupied by the burrowing owl encountered during the survey were examined for owl sign (e.g., feathers, pellets, whitewash, and prey remnants). Survey dates, times, and weather conditions are summarized in Table 7.A.

7.3.2 Existing Conditions and Results

The site has low vegetative cover, is mostly devoid of trees, and has concrete debris piles and ground squirrel burrows. These conditions indicate potential habitat for burrowing owl. The entire site is suitable, except for the southern edge where tall trees provide roosting spots for hawks, ravens, and large owls that could prey upon burrowing owl. Several burrows with an opening of at least 4 inches in diameter were found throughout the project site. Potential burrowing owl burrow locations and survey transect lines are shown on Figure 5.

Table 7.A: Burrowing Owl Breeding Season Survey Details

Date	Type of Survey (Times)	Weather Conditions
July 29, 2022	Evening (5:45 PM–7:15 PM)	86–84°F clear skies, wind 5–8 mph
August 12, 2022	Dawn (6:10 AM–7:30 AM)	70–72°F, partly cloudy (10%), wind 1–3 mph
August 19, 2022	Dawn (6:30 AM –8:00 AM)	67–70°F, partly cloudy (5%), wind 1–3 mph
August 26, 2022	Dawn (6:35 AM–8:00 AM)	69–70°F, clear, 0 mph

Source: Compiled by LSA (2022).

°F = degrees Fahrenheit

mph = miles per hour

7.3.3 Impacts and Mitigation

Although no burrowing owl was found, due to the presence of potentially suitable habitat, a WRC MSHCP 30-day preconstruction survey for burrowing owl is required prior to project ground-disturbing activities (e.g., vegetation clearing and grubbing, and tree removal) to ensure that no burrowing owls have colonized the site in the days or weeks preceding the ground-disturbing activities. If burrowing owls are found during the preconstruction survey, the project proponent will need to inform the CDFW and United States Fish and Wildlife Service (USFWS) and prepare a Burrowing Owl Protection and Relocation Plan for approval by these agencies prior to initiating ground disturbance.

7.4 MAMMALS

The project is not within a mapped survey area for mammals.

8.0 INFORMATION ON OTHER SPECIES

8.1 DELHI SANDS FLOWER-LOVING FLY

The WRCMSHCP requires surveys for DSF in most areas of mapped Delhi series soils where suitable habitat exists (WRCMSHCP Section 9). The DSF was listed as an endangered species by the USFWS on September 23, 1993.

The southwestern portion of the project site is located within an area of mapped Delhi soils and (as noted in Chapter 2.0) soil observed throughout the site is sand and loamy sandy, which is consistent with Delhi soils. The site was surveyed for DSF over four consecutive field survey seasons in 2015, 2016, 2017, and 2018 with negative results (Osborne 2015, 2016, 2017, and 2018). Appendix C provides the 2017 and 2018 survey results. Based on four consecutive survey seasons with negative results, it was determined (Osborne 2018) the project site does not support a population of DSF. Therefore, this species is considered absent, and no additional survey or mitigation is required.

8.2 SPECIES NOT ADEQUATELY CONSERVED UNDER WRCMSHCP

Some species that will eventually have full coverage under the WRCMSHCP are not considered adequately conserved until requirements indicated in Table 9-3 of WRCMSHCP Section 9 are met.

8.2.1 Methods

A literature review was conducted to investigate the potential occurrence of special-status species on the project site or in the vicinity. Database records for the *Guasti*, *Fontana*, *Ontario*, *Corona North*, and *Riverside West, California* USGS 7.5-minute quadrangles were searched on July 21, 2022, using Rarefind 5 (CDFW 2022). LSA also reviewed the WRCMSHCP Table 9-3 species. No species noted from Table 9-3 or other special-status species were observed during the site visit.

8.2.2 Results

None of the species listed in WRCMSHCP Table 9-3 and lacking full coverage have been reported from the project site or within 3 miles of the project site, and none were observed during the biological resources assessment conducted on site. Given the habitat quality and small project footprint, none of these species are expected to occur; therefore, the proposed project is not anticipated to affect these species.

9.0 GUIDELINES PERTAINING TO THE URBAN/WILDLANDS INTERFACE (WRCMSHCP SECTION 6.1.4)

To preserve the integrity of areas described as existing or future WRCMSHCP Conservation Areas, the guidelines contained in WRCMSHCP Section 6.1.4 (Urban Wildlands Interface Guidelines) are to be implemented for projects that are located adjacent to either existing conservation or land described for conservation in the WRCMSHCP Criteria Area.

The project site is not located adjacent to conserved lands or lands in the Criteria Area that are described for conservation; therefore, the Urban Wildlands Interface Guidelines do not apply to this project.

10.0 POTENTIAL JURISDICTIONAL WATERS AND STREAMBEDS

The USACE, under Section 404 of the federal CWA, regulates discharges of dredged or fill material into “waters of the United States.” These waters include wetlands and non-wetland bodies of water that meet specific criteria, including a connection to interstate commerce. This connection may be direct (through a tributary system linking a stream channel with traditional navigable waters used in interstate or foreign commerce), or it may be indirect (through a connection identified in USACE regulations). The USACE typically regulates as non-wetland waters of the United States any body of water displaying an “ordinary high water mark” (OHWM). In order to be considered a “jurisdictional wetland” under Section 404, an area must possess hydrophytic vegetation, hydric soils, and wetland hydrology.

The CDFW, under Sections 1600 et seq. of the California Fish and Game Code, regulates alterations to lakes, rivers, and streams. A stream is defined by the presence of a channel bed and banks and at least an occasional flow of water.

The RWQCB is responsible for the administration of Section 401 of the CWA through water quality certification of any activity that may result in a discharge to jurisdictional waters of the United States. The RWQCB may also regulate discharges to “waters of the State,” including wetlands, under the California Porter-Cologne Water Quality Control Act.

No drainage features, ponded areas, or riparian habitat potentially subject to jurisdiction by the CDFW, USACE, or RWQCB were observed within the impact area of the project. There is a drainage feature fed by a trapezoidal concrete ditch that conveys flows into the northeastern corner of the site. Flows from this drainage feature are conveyed into the storm drain system through a 48-inch-diameter culvert at Riverside Drive. This feature also appears to receive sheet flows from a swale that is fed by a culvert under SR-60, north of the project site. The project has been designed to avoid placing fill material or having any other ground disturbance at the potentially jurisdictional feature/riverine area by the design of the detention basin located at least 10 ft from this feature. In addition, and an ESA fence will be placed east of the project detention basin during construction to delineate the project work limits and avoid effects to the potential jurisdictional feature/riverine areas to be left undisturbed. Due to the project design of avoidance, no further assessment or permits are required.

The findings and conclusions presented in this report, including the location and extent of wetlands and other waters subject to regulatory jurisdiction, represent the professional opinion of LSA. These findings and conclusions should be considered preliminary until verified by the RWQCB, USACE, and CDFW.

11.0 NESTING BIRDS

During the bird breeding season (typically February 1 through August 31), large trees on or adjacent to the study area may be used by hawks, ravens, or other large birds for nesting. Trees, shrubs, and other vegetation may provide nest sites for smaller birds, and western burrowing owls may nest in ground squirrel burrows, pipes, or similar features.

Most birds and their active nests are protected from “take” (meaning destruction, pursuit, possession, etc.) under the Migratory Bird Treaty Act and/or Sections 3503–3801 of California Fish and Game Code. Activities that cause destruction of active nests, or that cause nest abandonment and subsequent death of eggs or young, may constitute violations of one or both of these laws.

To avoid potential effects during the breeding season to fully protected raptors, special-status bird species, and other nesting birds protected by the California Fish and Game Code, and for compliance with WRCMSHCP Incidental Take Permit Condition 5, the following measures will be implemented:

- A nesting bird preconstruction survey will be conducted by a qualified biologist within 3 days prior to ground-disturbing and vegetation removal activities that occur during the nesting season (February 1 through August 31). Should nesting birds be found, an exclusionary buffer will be established by the qualified biologist. The buffer may be up to 500 ft in diameter, depending on the species of nesting bird found. This buffer will be clearly marked in the field by construction personnel under guidance of the qualified biologist, and construction or clearing will not be conducted within this zone until the qualified biologist determines that the young have fledged or the nest is no longer active. Nesting bird habitat within the study area will be resurveyed during bird breeding season if there is a lapse in construction activities longer than 7 days.

12.0 CEQA COMPLIANCE

12.1 ADOPTED HABITAT CONSERVATION PLANS

Section 10(a)(2)(A) of the 1973 Federal Endangered Species Act requires the preparation of a Habitat Conservation Plan (HCP) for incidental take of threatened or endangered species when there is no federal agency involvement in a project. Continuing land development may cause incidental take of listed species and, therefore, HCPs have been prepared for areas within western Riverside County. The WRCMSHCP and the Stephens' Kangaroo Rat HCP are the principal HCPs in western Riverside County. The USFWS regional office maintains a current list of HCPs for the Southern California region.

The project site is within the WRCMSHCP area and is the subject of this report. The project site is also within the Stephens' Kangaroo Rat HCP fee area. Focused surveys for Stephens' kangaroo rat will not be required for this project, but a fee will be assessed.

12.2 THREATENED AND ENDANGERED SPECIES

The USFWS and CDFW may list species as threatened or endangered under the Federal and State Endangered Species Acts. The USFWS can designate critical habitat that identifies specific areas, either occupied or unoccupied, that are essential to the conservation of a listed species. Critical habitat areas may require special management considerations or protections. The USFWS and CDFW have issued permits for the take of most threatened and endangered species within the WRCMSHCP Plan Area. The WRCMSHCP covers impacts to these species. However, if a project has the involvement of a federal agency, that agency is required to address impacts to listed species and critical habitat by consulting with the USFWS. The USFWS has indicated in the permit issued for the WRCMSHCP that, in such cases, the consultation will be expedited and that no restrictions will be imposed on the project beyond those specified in the WRCMSHCP.

Delhi soils are present on the project site for the DSF. The site was surveyed for DSF over four consecutive field seasons in 2015, 2016, 2017, and 2018 with negative results (Osborne 2015, 2016, 2017, and 2018). Appendix C provides the 2017 and 2018 survey results. Therefore, this species is considered absent, and no additional survey is required. No other threatened or endangered species are expected to occur on the project site.

12.3 OTHER SPECIAL-STATUS SPECIES

Other special-status species may occur on the proposed project site. The CDFW, USFWS, local agencies, and special interest groups, such as the California Native Plant Society (CNPS), maintain lists of species that they consider to be in need of monitoring. Legal protection for special-status species varies widely.

The special-status species listed in Table 12.A may be expected to occur in the general project vicinity but are not covered under the WRCMSHCP or are not adequately conserved by the WRCMSHCP at this time. Some of these species have a low potential of occurring on the project site. However, none of these species that may be present are listed as threatened or endangered under State or federal law, and the site does not contain high-quality habitat for any of these species. Therefore, any impacts to these species by the project would not be substantial. Neither additional surveys nor additional conservation measures will be required for this project for these species.

12.4 WILDLIFE MOVEMENT, CORRIDORS, AND NURSERY SITES

Wildlife movement includes seasonal migration along corridors as well as daily movements for foraging. Migration corridors may include areas of unobstructed movement of deer, riparian corridors providing cover for migrating birds, routes between breeding waters and upland habitat for amphibians, and between roosting and feeding areas for birds.

The project site is located adjacent to the I-15/SR-60 interchange, a major road, and existing development that already restrict wildlife movement in the project vicinity. The project site is not within a WRCMSHCP-designated wildlife corridor or linkage. The proposed project would not substantially limit wildlife movement.

12.5 NATURAL COMMUNITIES OF INTEREST

Riparian habitats, oak woodlands, and vernal pools are among the natural communities of interest to the CDFW. There are no riparian communities, vernal pools, or other sensitive plant communities on the project site.

12.6 WETLANDS

A formal jurisdictional delineation has not been conducted on site. There is a drainage feature on the site that flows to a culvert beneath Riverside Drive. The drainage did not contain hydrophytic vegetation associated with wetlands at the time of the July/August field surveys. The project plans have been designed to avoid the potential jurisdictional areas, including any potential wetlands, by the placement of an ESA fence as previously discussed in Chapter 10.0. Therefore, there will be no impacts to any wetlands on the project site.

12.7 LOCAL POLICIES AND ORDINANCES PROTECTING BIOLOGICAL RESOURCES

City and County General Plans and development ordinances may include regulations or policies governing biological resources. For example, policies may include tree preservation, locally designated species survey areas, local species of interest, and significant ecological areas.

The project will not be in conflict with local policies or ordinances applicable to biological resources.

Table 12.A: Special-Status Species Potentially Occurring in the Project Vicinity That are Not Adequately Covered by the WRCMSHCP

Species	Status	Description	Activity Period	Occurrence Probability
Plants				
Chaparral sand-verbena <i>Abronia villosa</i> var. <i>aurita</i>	US: – CA: 1B	Sandy areas (generally flats and benches along washes) in chaparral and coastal sage scrub, and improbably in desert dunes or other sandy areas, below 5,300 feet in elevation. In California, reported from Riverside, San Diego, Imperial, Los Angeles, and Ventura Counties. Believed extirpated from Orange County. Also reported from Arizona and Mexico (Baja California). Plants reported from desert communities are likely misidentified.	Blooms mostly March through August (annual or perennial herb)	Absent. No suitable habitat (sandy areas in chaparral or coastal sage scrub).
Marsh sandwort <i>Arenaria paludicola</i>	US: FE CA: SE/1B	Boggy areas in freshwater marshes and swamps below 560 feet in elevation. Known to presently occur only in San Luis Obispo County (at Oso Flaco Lake and Morro Bay). Believed extirpated from Los Angeles, San Francisco, Santa Cruz, Riverside, and San Bernardino Counties, and from the State of Washington. The last known record of this species in Riverside, San Bernardino, or Los Angeles Counties is from 1900.	Blooms May through August (perennial herb)	Absent. No marshes on site.
Lucky morning-glory <i>Calystegia felix</i>	US: – CA: 3	Wetland and marshy areas, sometimes alkaline, sometimes artificially watered, from 100 to 700 feet in elevation. All of the known extant occurrences are associated with well-watered landscaping on recently completed industrial, commercial, and residential developments in Chino within a historical area of artesian springs. Older collections are from areas that are now heavily urbanized areas (including one from South Los Angeles and another from Pico Rivera in Los Angeles County). Known to occur only in western San Bernardino County. Presumed extirpated from Riverside and Los Angeles Counties.	Blooms March through September (annual or perennial rhizomatous herb)	Absent. No marshes or wetlands on site.
Salt marsh bird's-beak <i>Chloropyron maritimum</i> spp. <i>maritimum</i>	US: FE CA: SE/1B	Coastal dunes and salt marshes. In California, known from Los Angeles, Orange, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, and Ventura Counties. Historical collections referred to this taxon from alkaline meadow in the vicinity of San Bernardino Valley and from interior San Diego County are intermediate to <i>C. maritimum</i> ssp. <i>canescens</i> . Also occurs in Mexico.	Blooms May through October (annual herb)	Absent. No coastal dunes or marshes on site.
California saw-grass <i>Cladium californicum</i>	US: – CA: 2B	Marshes and seeps below 2,000 feet in elevation. In California, known from Inyo, Riverside, Santa Barbara, San Bernardino, and San Luis Obispo Counties. Believed to be extirpated from Los Angeles and perhaps San Bernardino Counties. Also occurs in Arizona, New Mexico, Nevada, Texas, Utah, and Mexico.	Blooms June through September	Absent. No wet areas on site.

Table 12.A: Special-Status Species Potentially Occurring in the Project Vicinity That are Not Adequately Covered by the WRCMSHCP

Species	Status	Description	Activity Period	Occurrence Probability
Mesa horkelia <i>Horkelia cuneata</i> ssp. <i>puberula</i>	US: – CA: 1B	Sandy or gravelly soils in chaparral, or rarely in cismontane woodland or coastal scrub at 200 to 2,700 feet in elevation. Known only from San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Bernardino Counties, California. Believed extirpated from Riverside and San Diego Counties.	Blooms February through July, sometimes to September (perennial herb)	Absent. No chaparral, cismontane woodland, or coastal scrub on site. Believed extirpated from area.
Parish's desert-thorn <i>Lycium parishii</i>	US: – CA: 2B	Coastal scrub and Sonoran desert scrub at 440 to 3,300 feet in elevation. In California, known from Imperial and San Diego Counties. Report from Riverside County is based on a misidentification. Known only historically from San Bernardino County (benches and/or foothills north of San Bernardino).	Blooms March through April (deciduous shrub)	Absent. No coastal scrub or Sonoran desert scrub on site.
Parish's bush mallow <i>Malacothamnus parishii</i>	US: – CA: 1A	Known only from one occurrence in 1895, in chaparral and coastal sage scrub at 1,600 feet in elevation in the vicinity of San Bernardino. Presumed extinct.	Blooms June through July (deciduous shrub)	Absent. Presumed extinct. Only a historical record from the site vicinity.
Pringle's monardella <i>Monardella pringlei</i>	US: – CA: 1A	Sandy hills in coastal sage scrub at 980 to 1,300 feet in elevation. Known only from two occurrences west of Colton. Last seen in 1941. Habitat lost to urbanization. Presumed extinct.	Blooms May through June	Absent. No coastal sage scrub on site.
White rabbit-tobacco <i>Pseudognaphalium leucocephalum</i>	US: – CA: 2B	Sand and gravel at the edges of washes or mouths of steep canyons at 0 to 7,000 feet in elevation. In California, known from Los Angeles, Orange, Riverside, Santa Barbara, San Diego, San Luis Obispo, and Ventura Counties. Also occurs in Arizona, New Mexico, Texas, and Mexico.	Blooms usually August through November (perennial herb)	Absent. No edges of washes or mouths of steep canyons on site.
Chaparral ragwort <i>Senecio aphanactis</i>	US: – CA: 2B	Openings (especially alkaline flats) in cismontane woodland, coastal sage scrub, and chaparral at 50 to 2,600 feet in elevation. Known in California from Alameda, Contra Costa, Fresno, Los Angeles, Merced, Monterey, Orange, Riverside, Santa Barbara, Santa Clara, San Diego, San Luis Obispo, Solano, and Ventura Counties. Also occurs in Baja California.	Blooms January through April (annual herb)	Absent. No woodland, scrub or chaparral on site.
Salt Spring checkerbloom <i>Sidalcea neomexicana</i>	US: – CA: 2B	Alkaline springs and brackish marshes below 5,000 feet in elevation. In California, known only from Kern, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Believed extirpated from Los Angeles County. Also known from Arizona, New Mexico, Nevada, Utah, and Mexico.	Blooms March through June (perennial herb)	Absent. No alkaline or brackish habitats on site.
Prairie wedge grass <i>Sphenopholis obtusata</i>	US: – CA: 2B	Wet meadows, stream banks, and ponds at 1,000 to 6,600 feet in elevation. Widely distributed. In Southern California, known only from San Bernardino, Riverside (Santa Ana River), and perhaps San Diego Counties.	Blooms April through July (perennial herb)	Absent. No wet areas on site.

Table 12.A: Special-Status Species Potentially Occurring in the Project Vicinity That are Not Adequately Covered by the WRCMSHCP

Species	Status	Description	Activity Period	Occurrence Probability
San Bernardino aster <i>Symphyotrichum defoliatum</i>	US: – CA: 1B	Vernally wet sites (e.g., ditches, streams, and springs) in many plant communities below 6,700 feet in elevation. In California, known from Ventura, Kern, San Bernardino, Los Angeles, Orange, Riverside, and San Diego Counties. May also occur in San Luis Obispo County. In the western Riverside County area, this species is scarce, and documented only from Temescal and San Timoteo Canyons (<i>The Vascular Plants of Western Riverside County, California</i> . F.M. Roberts Jr. et al., 2004).	Blooms July through November (perennial herb)	Absent. No suitable wet areas on site.
Rigid fringepod <i>Thysanocarpus rigidus</i>	US: – CA: 1B	Dry rocky slopes, in oak, pine, or juniper woodland at 2,000 to 7,200 feet in elevation. In California, known from Los Angeles, Riverside, San Bernardino, and San Diego Counties. Also occurs in Mexico.	Blooms February through May (annual herb)	Absent. Woodland is not present on site. Site is outside elevation range of species.
Fish				
Santa Ana speckled dace <i>Rhinichthys osculus</i> ssp. 3	US: – CA: SSC	Found in the headwaters of the Santa Ana and San Gabriel River drainages. Found in riffles in small streams and shore areas with abundant gravel and rock.	Year-round	Absent. No streams on site.
Reptiles				
Southern California legless lizard <i>Anniella stebbinsi</i>	US: – CA: SSC	Inhabits sandy or loose loamy soils with high moisture content under sparse vegetation in Southern California.	Nearly year round, at least in southern areas	Absent. No loose or moist soils on site.
California glossy snake <i>Arizona elegans occidentalis</i>	US: – CA: SSC	Scrub and grassland habitats, often with loose or sandy soils. Patchily distributed from the eastern portion of San Francisco Bay to southern San Joaquin Valley and in non-desert areas of southern California. Also occurs in Baja California, Mexico.	Most active March through June (nocturnal)	Low. Grasslands, with loose or sandy soils present on site. However, habitat is marginal due to development on all sides of the small <7 ac site.
Two-striped garter snake <i>Thamnophis hammondi</i>	US: – CA: SSC	Highly aquatic. Only in or near permanent sources of water. Streams with rocky beds supporting willows or other riparian vegetation. From Monterey County to northwest Baja California.	Diurnal, year-round	Absent. No water on site.
Birds				
Yellow rail <i>Coturnicops noveboracensis</i>	US: – CA: SSC	Inhabits freshwater marshes as a very local breeder in the northeastern interior of California and as a winter visitor (early October to mid-April) on the coast and in the Suisun Marsh region.	Year-round	Absent. No freshwater marshes on site.
California black rail <i>Laterallus jamaicensis coturniculus</i>	US: – CA: ST/CFP	Requires shallow water in salt marshes, freshwater marshes, wet meadows, or flooded grassy vegetation. Prefers areas of moist soil vegetated by fine-stemmed emergent plants, rushes, grasses, or sedges, with scattered small pools. Known from coastal California, northwestern Baja California, the lower Imperial Valley, and the lower Colorado River of Arizona and California. Now extirpated from virtually all of coastal Southern California.	Year-round	Absent. No wet areas on site.

Table 12.A: Special-Status Species Potentially Occurring in the Project Vicinity That are Not Adequately Covered by the WRCMSHCP

Species	Status	Description	Activity Period	Occurrence Probability
Mammals				
Pallid bat <i>Antrozous pallidus</i>	US: – CA: SSC	Most common in open, dry habitats with rocky areas for roosting. Day roosts in caves, crevices, rocky outcrops, tree hollows or crevices, mines and occasionally buildings, culverts, and bridges. Night roosts may be more open sites, such as porches and open buildings. Grasslands, shrublands, woodlands, and forest in western North America.	Year-round, nocturnal	Low. No rocky areas nearby.
Western mastiff bat <i>Eumops perotis californicus</i>	US: – CA: SSC	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in vertical cliff faces, high buildings, and tunnels, and travels widely when foraging.	Year-round, nocturnal	Low. No roosting habitat but may forage on site.
Western yellow bat <i>Lasiurus xanthinus</i>	US: – CA: SSC	Found mostly in desert and desert riparian areas of the southwestern United States, but also expanding its range with the increased usage of native and nonnative ornamental palms in landscaping. Individuals typically roost amid dead fronds of palms in desert oases but have also been documented roosting in cottonwood trees. Forage over many habitats.	Year-round, nocturnal	Absent. Site is not in a desert area, and no palm plantings in vicinity.
Pocketed free-tailed bat <i>Nyctinomops femorosaccus</i>	US: – CA: SSC	Usually associated with cliffs, rock outcrops, or slopes. May roost in buildings (including roof tiles) or caves. Rare in California, where it is found in Riverside, San Diego, Imperial, and possibly Los Angeles Counties. More common in Mexico.	Year-round, nocturnal	Absent. No nesting or foraging habitat on site.
Big free-tailed bat <i>Nyctinomops macrotis</i>	US: – CA: SSC	Inhabits rugged, rocky canyon country in southwestern United States. Found from northern South America and the Caribbean Islands northward to the western United States. In the southwestern United States, populations appear to be scattered.	Probably year-round	Absent. No nesting or foraging habitat on site.

Source: Compiled by LSA (2022).

US: Federal Classification

FE = Listed as Endangered.

CA: State Classifications

SE = State-listed as Endangered.

ST = State-listed as Threatened.

CFP = California Fully Protected. Refers to animals protected from take under Fish and Game Code Sections 3511, 4700, 5050, and 5515.

SSC = Species of Special Concern. Refers to animals with vulnerable or seriously declining populations.

SA = Special Animal. Refers to any other animal monitored by the Natural Diversity Data Base, regardless of its legal or protection status

ac = acres

WRCMSHCP = Western Riverside County Multiple Species Habitat Conservation Plan

1A = California Rare Plant Rank 1A. Presumed extinct in California.

1B = California Rare Plant Rank 1B. Rare, threatened or endangered in California and elsewhere.

2B = California Rare Plant Rank 2. Rare, threatened or endangered in California, but more common elsewhere.

3 = California Rare Plant Rank 3. A review list of plants about which more information is needed.

12.8 INDIRECT EFFECTS

Indirect impacts to surrounding areas as a result of the project may include, but are not limited to, increased dust, noise, lighting, traffic, and storm water runoff. Because of the small scale of the project and its location within a landscape that is already highly disturbed or developed, substantial indirect impacts to sensitive biological resources are not anticipated.

12.9 CUMULATIVE EFFECTS

Project construction will contribute to the incremental loss of nonnative grassland in the region, including potential habitat for some special-status species. Cumulative impacts potentially include habitat fragmentation, increased edge effects, reduced habitat quality, and increased wildlife mortality. The WRCMSHCP provides a comprehensive approach to the regional conservation of these habitats and, as a regional plan, serves to provide mitigation for cumulative impacts to covered species. Project compliance and consistency with the WRCMSHCP ensures that any cumulative impacts to covered species are effectively mitigated. Special-status species that are not covered by the WRCMSHCP also benefit from the surveys, conservation, and other measures of the WRCMSHCP because they occupy many of the same habitats.

13.0 REFERENCES

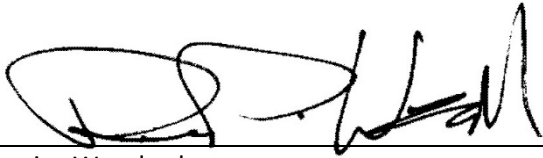
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14.0 CERTIFICATION STATEMENT

I hereby certify that the statements furnished in this report present the data and information required for this biological evaluation and the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Date: March 22, 2023

Signature:



Denise Woodard

APPENDIX A

FIGURES

Figure 1: Regional and Project Location

Figure 2: Biological Resources, Site Plan, ESA Fence, and Photograph Locations

Figure 3: Site Photographs

Figure 4: Soils Within Biological Study Area

Figure 5: Burrowing Owl Survey

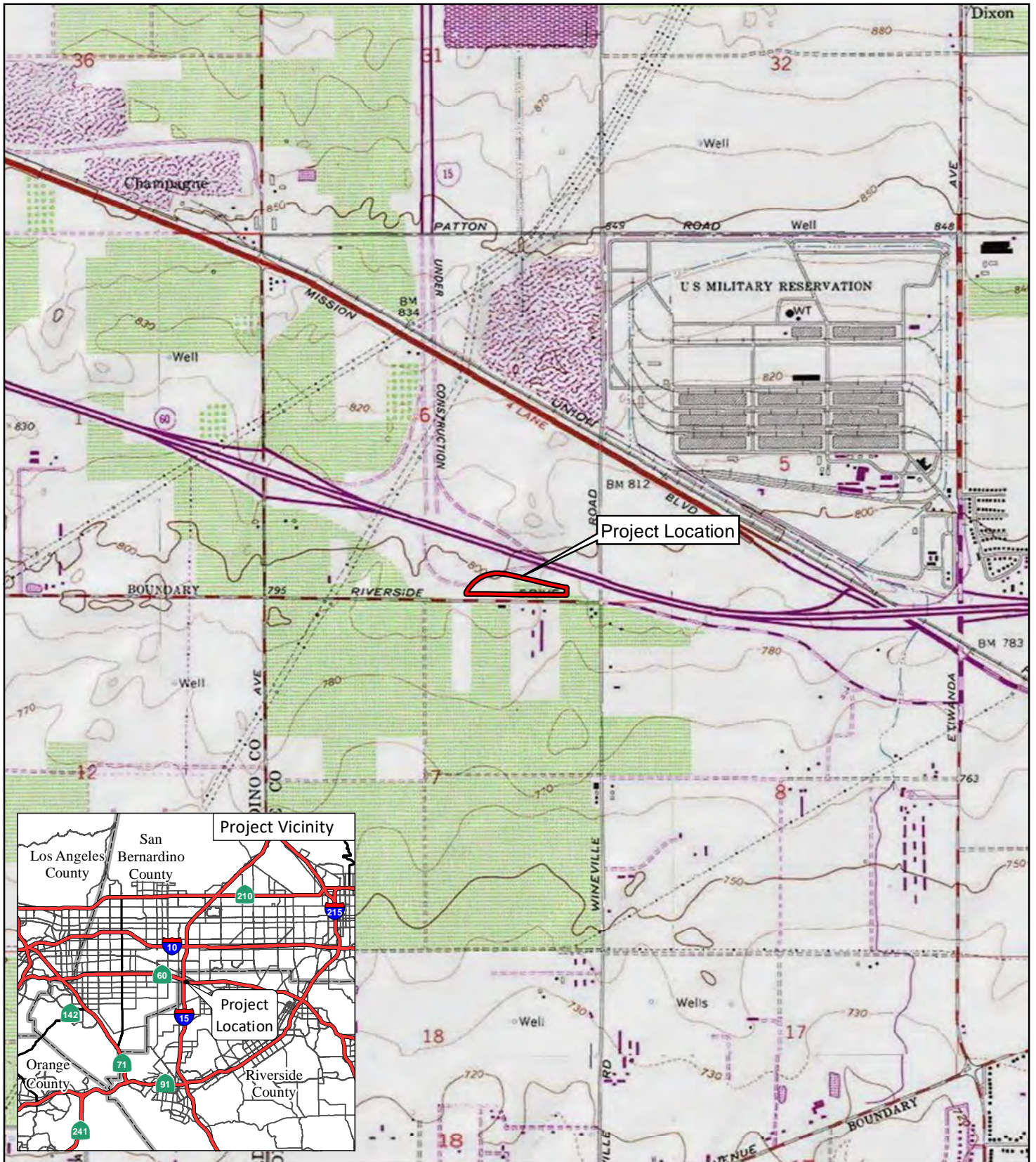



FIGURE 1

LSA

LEGEND

 Project Location



0 1000 2000
FEET

SOURCE: USGS 7.5' Quad: Guasti(1981), Corona North (1981), CA

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Industrial Outdoor Ventures
Regional and Project Location

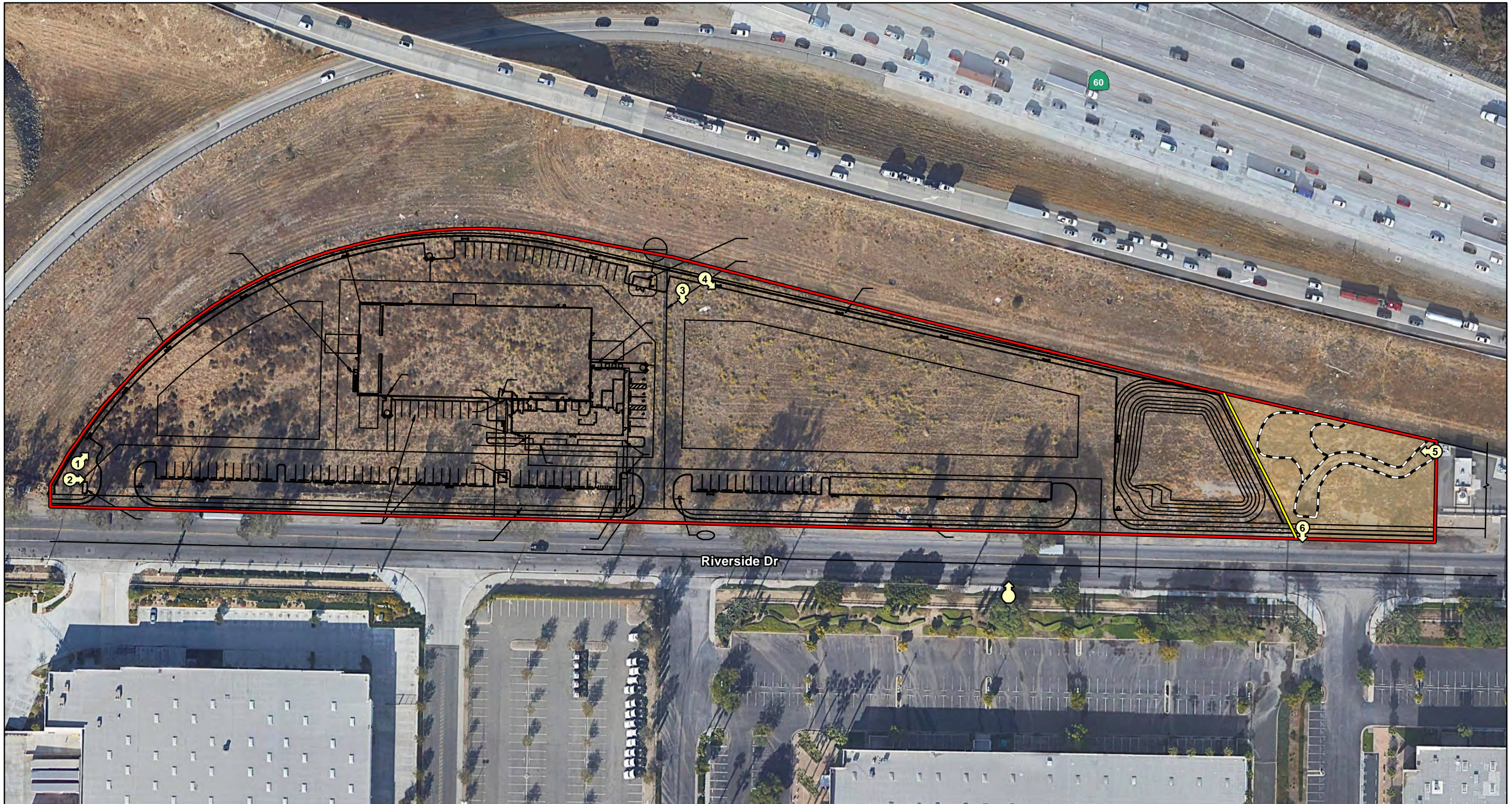


FIGURE 2

LSA

LEGEND

- Biological Study Area
- Potential Jurisdictional Waters
- Proposed Environmentally Sensitive Area (ESA) Fence (to be verified prior to construction)
- Photo Location
- Area to be Left Undisturbed

Note: All vegetation within the Biological Study Area is non-native grassland/ruderal

Industrial Outdoor Ventures
Biological Resources, Site Plan, ESA Fence, and Photograph Locations



1. View facing northeast. Photograph taken August 12, 2022.



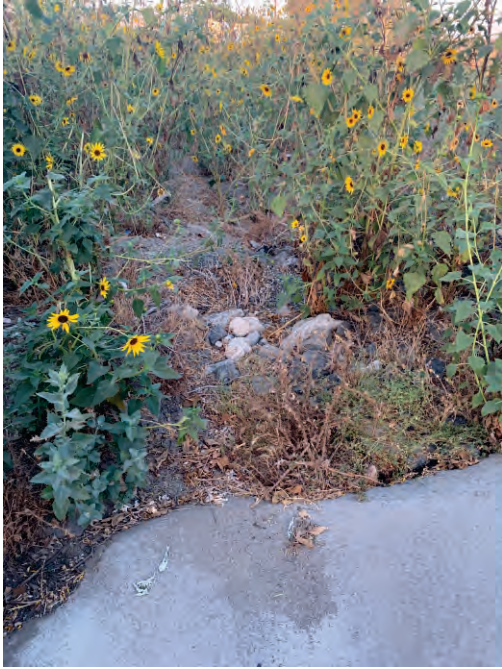
2. View facing east. Photograph taken August 12, 2022.



3. View facing south. Photograph taken August 12, 2022.



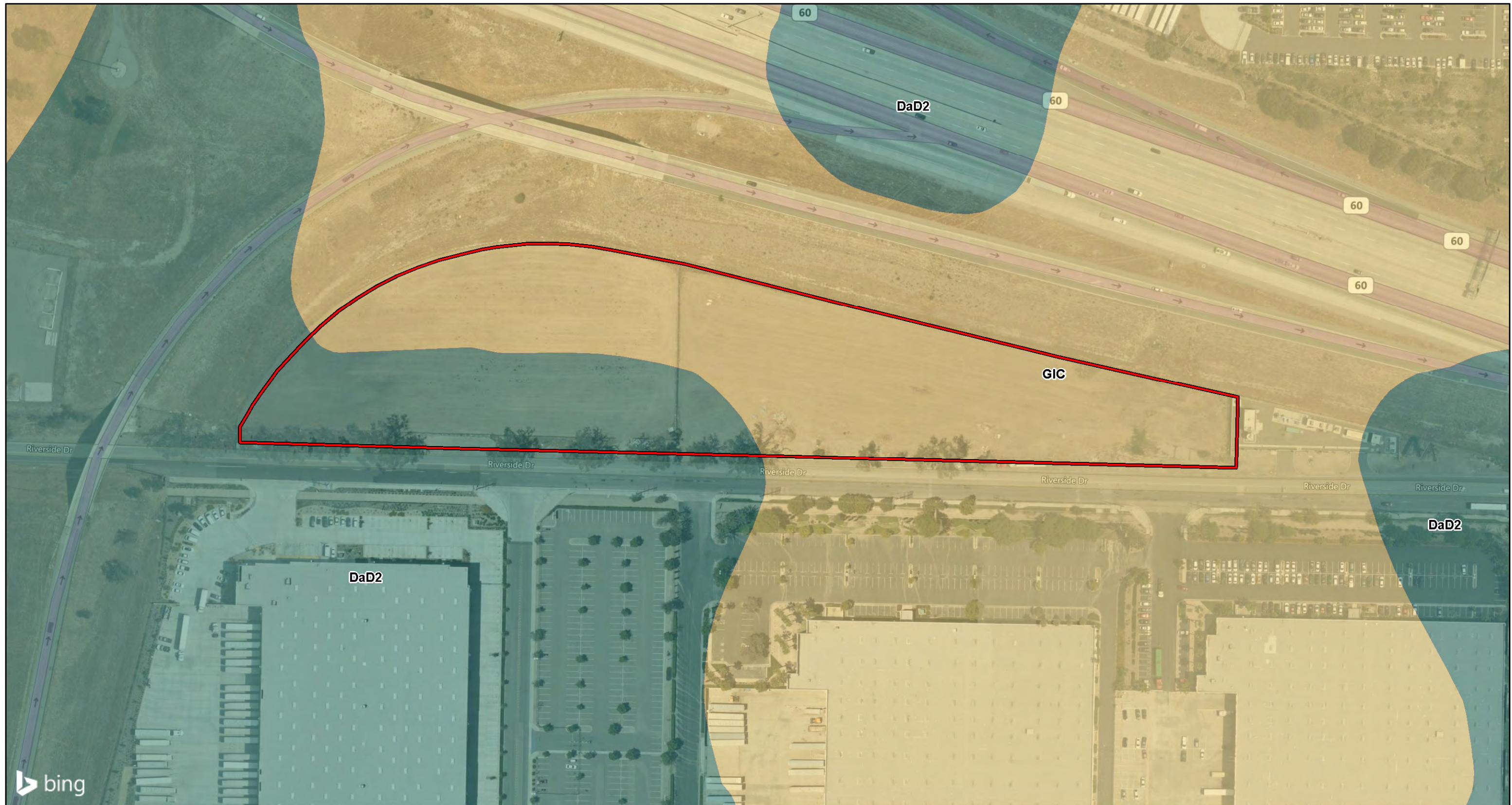
4. View facing east. Photograph taken August 12, 2022.



5. View facing west of drainage feature.
Photograph taken August 26, 2022.




6. View facing south of culvert at Riverside Avenue.
Photograph taken August 12, 2022.





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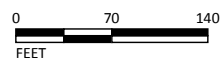
LEGEND

 Biological Study Area

Soils

 DaD2 -Delhi fine sand, 2 to 15 percent slopes, wind-eroded

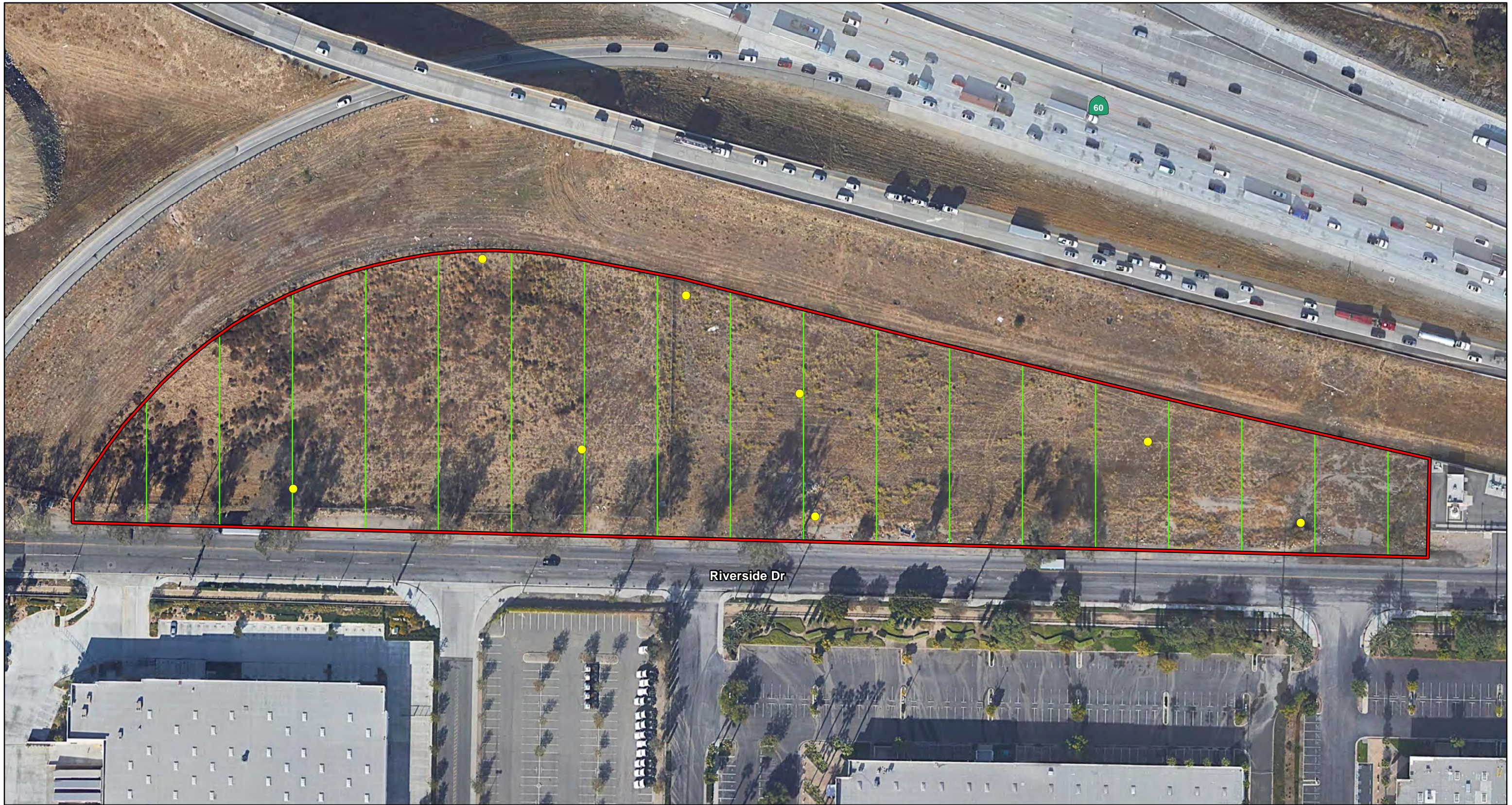
 GIC - Gorgonio loamy sand, deep, 2 to 8 percent slopes



SOURCE: Bing (2018); Ssurgo (2018)

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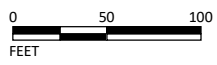
FIGURE 4



LSA

LEGEND

- Biological Study Area
- Potential Burrowing Owl Burrow
- Burrowing Owl Transect (every 80 ft)



SOURCE: Google (2021)

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FIGURE 5

APPENDIX B

PLANT AND ANIMAL SPECIES OBSERVED

* = Nonnative species

MAGNOLIID FLOWERING PLANTS

Amaranthaceae

Amaranthus albus

Asteraceae

Ambrosia acanthicarpa

*Centaurea melitensis**

Erigeron canadensis

Helianthus annuus

Heterotheca grandiflora

*Oncosiphon pilulifer**

*Verbesina encelioides**

Boraginaceae

Amsinckia sp.

Brassicaceae

*Hirschfeldia incana**

*Sisymbrium irio**

Chenopodiaceae

*Salsola tragus**

Fabaceae

Acemispom americanus

Lamiaceae

*Marrubium vulgare**

Polygonaceae

Eriogonum fasciculatum

Solanaceae

*Nicotiana glauca**

MONOCOTS FLOWERING PLANTS

Poaceae

*Bromus diandrus**

Bromus rubens

*Hordeum murinum**

*Schismus barbatus**

Amaranth Family

White amaranth

Sunflower Family

Annual bur-sage

Maltese star-thistle

Canadian horseweed

Common sunflower

Telegraph weed

Stinknet

Golden crownbeard

Borage Family

Fiddleneck

Mustard Family

Shortpod mustard

London rocket

Saltbush Family

Russian thistle

Pea Family

Spanish clover

Mint Family

Horehound

Buckwheat Family

California buckwheat

Nightshade Family

Tree tobacco

Grass Family

Ripgut brome

Red brome

Mouse barley

Common Mediterranean grass

REPTILES

Phrynosomatidae

Uta stansburiana

Phrynosomatid Lizards

Common side-blotched lizard

BIRDS

Columbidae

*Columba livia**

Zenaida macroura

Pigeons and Doves

Rock pigeon

Mourning dove

Trochilidae

Calypte anna

Hummingbirds

Anna's hummingbird

Accipitridae

Buteo jamaicensis

Kites, Hawks, and Eagles

Red-tailed hawk

Tyrannidae

Sayornis nigricans

Tyrant Flycatchers

Black phoebe

Corvidae

Corvus brachyrhynchos

Crows and Ravens

American crow

Hirundinidae

Petrochelidon pyrrhonota

Swallows

Cliff swallow

Mimidae

Mimus polyglottos

Mockingbirds and Thrashers

Northern mockingbird

Sturnidae

*Sturnus vulgaris**

Starlings

European starling

Passeridae

*Passer domesticus**

Old World Sparrows

House sparrow

Fringillidae

Haemorhous mexicanus

Spinus psaltria

Finches

House finch

Lesser goldfinch

MAMMALS

Sciuridae

Spermophilus beecheyi

Squirrels

California ground squirrel

Geomyidae

Thomomys bottae

Pocket Gophers

Botta's pocket gopher

Leporidae

Sylvilagus audubonii

Rabbits and Hares

Desert cottontail

APPENDIX C

DELHI SANDS FLOWER-LOVING FLY FOCUSED 2017 AND 2018 SURVEYS

**THIRD YEAR FOCUSED SURVEY FOR
DELHI SANDS FLOWER-LOVING FLY
(*Rhaphiomidas terminatus abdominalis*)
ON A 7-acre SITE IN MIRA LOMA, RIVERSIDE
COUNTY, CALIFORNIA**

Prepared for:

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October 10, 2017

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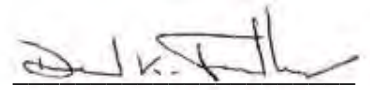
The undersigned certify this report to be a complete and accurate account of the findings and conclusions of a third year, 2017 focused survey for Delhi Sands Flower-loving Fly (*Rhaphiomidas terminatus abdominalis*) on a 7-acre site, Mira Loma, Riverside County, California.



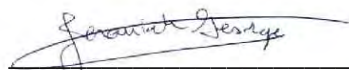
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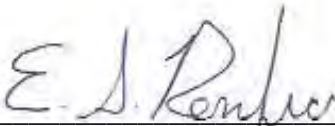
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October 10, 2017

SUMMARY

Mr. Keith Wade, on behalf Ahern Rentals, Inc., has requested a third year focused survey to assess the presence or absence of Delhi Sands Flower-Loving Fly (DSF, *Rhaphiomidas terminatus abdominalis*) on a 7-acre site in Mira Loma, Riverside County, California. To assess this site for potential as habitat for the federally endangered DSF, and to determine presence or absence of DSF on the site, a habitat evaluation and focused survey for DSF were undertaken in 2015 and 2016 with negative results for DSF, and for a third season in 2017, a series of 24 field visits, totaling 13.60 hours, were conducted on the site from July 11 to September 20, 2017 again with negative results for DSF.

The site has soils mapped as Delhi sands, and consists of open, vacant parcels. Habitat conditions on the site are uniform sand supporting annual grassland and forb vegetation, representing *Moderate Quality* to *High Quality* habitat potential for the DSF.

Delhi Sands Flower-Loving Fly was not observed on the site during the course of this third year, 2017 field season. The subject site does not support a population of the Delhi Sands Flower-Loving Fly. No special status plant or animal species (species of concern) were encountered in the course of this survey.

1.0 INTRODUCTION

This report presents the methods and results of a Delhi Sands Flower-Loving Fly (DSF, *Rhaphiomidas terminatus abdominalis*) focused survey for a 7-acre site, in Mira Loma, Riverside County. The site has been surveyed for DSF over three consecutive field seasons in 2015, 2016 and 2017 with negative results. The DSF was listed as an endangered species by the U.S. Fish and Wildlife Service on September 23, 1993 (USFWS 1993).

The survey site is located on the Guaste, California USGS 7.5-minute quadrangle map, Township 2 South, Range 6 West, in the southeast corner of Section 6. Latitude ranges from approximately 34° 01' 7.4" to 34° 01' 10.8" N and Longitude from 117° 32' 36.5" to 117° 23' 54.3" W. Figure 1 shows the general vicinity of the survey site at 50% scale on the Guaste, California USGS 7.5-minute quadrangle map. Figure 2 displays the survey site at 200% scale on this USGS quadrangle. This site is located on the north side of E. Riverside Drive (between E. Riverside Drive and Highway 60), immediately west of Wineville Rd., in Mira Loma, Riverside County, CA.

The DSF was not found on the subject site during the course of surveys for either years 2015, 2016 (Osborne 2015, 2016) or 2017. We conclude that the subject site does not support a population of the Delhi Sands Flower-Loving Fly.

2.0 NATURAL HISTORY OF THE DELHI SANDS FLOWER-LOVING FLY

Delhi Sands Flower-loving fly belongs to a genus (*Rhaphiomidas*) of flies that have long been known as "giant flower loving flies". There are more than 30 species of these flies, distributed across the southwestern United States and northern Mexico. These flies are huge by the

standards set by most flies – with size among the species ranging from approximately 1.5 centimeters up to 3, and even 4 centimeters, usually gray, tan, rust or yellow in color. All species of *Rhaphiomidas* are associated with rather arid, sandy habitats, with most species living on dune systems of inland desert valleys, rivers, deltas, and beach strands. A few species are found in sandy washes, alluvial benches and remnant glacial moraines. Many species of these flies often hover before flowers in the manner of hummingbirds, using a long, thin, tubular proboscis (mouth-part), with which the flies probe for nectar – hence a traditional name “giant flower-loving flies”. Smaller flies of the family Apioceridae, once considered very closely related to *Rhaphiomidas* were formerly called “flower-loving flies”.

The DSF is only known to occur in association with Delhi sand deposits, presumably occupied the once extensive dune system of the upper Santa Ana River Valley, including portions of what is now the City of Colton, west through portions of the City of Mira Loma, and south to the Santa Ana River. Today, DSF exists on only a few disjunct sites (USFWS 1997) within a radius of about eight miles in southwestern San Bernardino and northwestern Riverside Counties (Colton, Rialto, Fontana, and Mira Loma). More than 95 percent of known DSF habitat was considered eliminated by development, agriculture and other land management practices by 1993 (Smith 1993, USFWS 1996 in Kingsley 1996), however, this proportion is now nearer 98 to 99% due to these ongoing processes. Many of the last remaining fragments of DSF habitat are currently under pressure by land management efforts such as heavy disking, irrigation, manure dumping, and gravel dumping. There is presently an estimated 1,200 acres of habitat that can support this species (USFWS 1997), but this estimate likely includes lands needing extensive habitat restoration.

Adult DSF flight period is typically August and September, when individual adults emerge, reproduce and die. The adult life span of an individual DSF lasts for a few days and adults do not live beyond the flight period (Kiyani 1995). Adult DSF are highly mobile, agile fliers. Male DSF are frequently seen flying low through habitat, using apparently random, circuitous paths around and between shrubs in search of females. Such “cruising” behavior often covers areas on the scale of 1000 square meters in the time span of a minute. Alternatively, male DSF are often seen flying about an open patch of ground (ca 100 square meters) such as along a dirt path or dune blow-out area. Here, males may repetitively land and rest on one or another object (such as small dried plants) in the area, and such rests are interrupted by periods of patrolling flight (apparently territorial) about the spot. When alarmed, these insects tend to fly rapidly in more or less a straight line – often covering distances of 100 meters in less than 6 seconds. Adult DSF are known to nectar at flowers of California buckwheat and California croton.

DSF, like other *Rhaphiomidas* species, appears to have, at minimum, an annual life cycle (because of the annual flight). However, it has been widely believed that the underground larval/pupal stage may persist for additional years, depending upon various environmental factors such as annual rainfall, food availability and weather conditions during the flight season (many desert *Rhaphiomidas* species do not appear after a drought year and often, substantial flights occur only sporadically over the years). Though it has long been known that *Rhaphiomidas* larvae develop underground, until recently the specific biology (larval biology, habits and food requirements) were not known for any *Rhaphiomidas* species. In 2003, an extensive excavation in known habitat of *Rhaphiomidas trochilus* (Osborne and Ballmer 2014)

recovered very large and strange looking fly larvae - we inferred as *Rhaphiomidas* and which were later confirmed to be those of *R. trochilus* based on DNA analysis. The biology of *R. trochilus* is likely informative of *Rhaphiomidas* species in general and DSF in particular. Based on observations of captive *R. trochilus* larvae (Osborne and Ballmer 2014) it is reasonable to conclude that they are mobile opportunistic predators of soft-bodied, sand-inhabiting insects. Larvae from Sand Ridge, Kern County, CA were maintained in captivity for several months, during which they burrowed actively through sand maintained with slight moisture content (similar to the damp sand where they were found). They fed on larvae of a scarab beetle (Scarabaeidae) and an unidentified bee fly (Diptera: Bombyliidae), which were also recovered from Sand Ridge, and larvae of paper wasps (*Polistes* sp.) which were removed from their nests and buried in the sand. Captive larvae grew and molted after feeding; but, when not fed for extended periods of time, they molted again – losing weight and size in the process. Some larvae were observed to repeat the growth and “shrinkage” cycle multiple times. One larva survived about 17 months in captivity; because it was captured nine months after the most recent flight season, it was at least two years old at time of death. This larva molted four times while undergoing five cycles of growth and shrinkage driven by variable food availability. Its final dry weight was slightly smaller than the typical dry weight of an adult male *R. trochilus*. The ability of *R. trochilus* larvae to molt down during times of scarce food resources could allow an extended and indeterminate larval growth period, but with maturation and appearance of adults always during summer months. This may also explain the common observations that populations of various *Rhaphiomidas* species apparently exhibit little or no adult emergence in some years (especially years of below normal precipitation).

The brief adult life span and active, random search mate-locating behavior of DSF males (typical of all *Rhaphiomidas* species) indicates that relatively high population density and/or nearly synchronous adult emergence are likely crucial to survival of populations. Protracted *Rhaphiomidas* larval biology and staggered (across years) adult emergence must enhance population momentum and cross generational gene flow, and the requirement of abundant and diverse insect prey on which larvae develop – all explain why DSF populations appear as long-term entities (persisting for decades) associated with ecologically intact dune habitats; and why some populations, even though small numbers of adults emerge during flight seasons, eventually fail. These doomed “ghost populations” dwindle down to extinction after overall ecological health of habitat is compromised by various forms of ecological diminishment – ever increasing portions of habitat developed, agricultural use, incessant recreational vehicle use, annual disking of the vegetation community and upper soil column, encroachment of exotic plants, etc.

2.1 DSF Habitat Characteristics

DSF is typically found in areas of unconsolidated sandy soils (Delhi series) supporting an open community of native and exotic plant species. Dominant plants are typically California buckwheat (*Eriogonum fasciculatum*), California croton (*Croton californicus*), telegraph weed (*Heterotheca grandiflora*), and deerweed (*Acmespon scoparius*) but many exotic species often dominate on DSF habitat as well. DSF have been found in habitats that do not support these dominant plant species, and plant species composition may not be directly relevant to larval development (due to likely predatory or parasitic habit of DSF larvae). Adult DSF are anecdotally believed to nectar at

flowers of California buckwheat and California croton, though such a habitat is rare at best and not yet documented. Many other plant species are common, including Thurber's eriogonum (*Eriogonum thurberi*), autumn vinegar weed (*Lessingia glandulifera*), and sapphire eriastrum (*Eriastrum sapphirinum*). Non native plant species also occur in DSF habitat (and incidentally, virtually everywhere). DSF habitat also supports other associated insects such as flies and wasps considered as indicator species – *Apiocera convergens*, *Apiocera chrysolasia*, *Ligyra gozophylax*, *Campsomeris tolteca*, *Trielis alcione*, and *Nemomydas pantherinus*. Over 350 insect species have been found on one DSF site, and DSF habitat is typically marked by high abundance and diversity of predatory and parasitic insect groups including many highly specialized families of flies, wasps, bees, beetles, and antlions. The Delhi Sands community is one of California's unique natural communities containing an array of native plants and animals, some of which are found nowhere else. One plant species, Pringle's monardella, (*Monardella pringlei*) is already presumed extinct, as no living individuals have been observed in many years. Several species of insects and some vertebrates, which inhabit the Delhi Sands dunes system, are as endangered as the DSF, but no one has yet petitioned to have them officially declared Endangered. These include the convergent flower-loving fly *Apiocera convergens*, a newly discovered species of Jerusalem cricket, (*Stenopelmatus* sp.), a new species of camel cricket (*Ceuthophilus* sp.) and an endemic subspecies of butterfly *Apodemia mormo nigrescens* (Emmel and Emmel 1998). The other apiocerid fly (*Apiocera chrysolasia*), although known from approximately six general localities, is only common within the Delhi sands.

3.0 METHODOLOGY

3.1 DSF Survey Guidelines

Interim General Survey Guidelines for the DSF have been suggested by the USFWS (1996). By following these guidelines, DSF presence or absence survey results may be deemed acceptable to the USFWS (rejection of survey results may result where the guidelines are not followed). The guidelines indicate that focused DSF surveys should be conducted wherever Delhi sands are present within the presumed range of DSF, twice weekly (two days per week) during the single annual flight period (usually from July 1 to September 20). Recent early season DSF discoveries lead the USFWS to recommend a survey season from July 15 to September 20 for 2003 and a survey season from July 1 to September 20 from the year 2004. Weather conditions must be suitable for DSF activity at the times survey work is pursued. The DSF is generally active when daytime temperatures exceed 80 degrees Fahrenheit (°F), but may fly with slightly cooler temperatures in bright sunlight.

3.2 Habitat Assessment Methods

Osborne examined the subject site to rate its potential to support DSF (Osborne 2015). Photographs were taken of the site from various perspectives. Habitat suitability for DSF was evaluated using indicators of potential DSF habitat including: presence and abundance of loose, unconsolidated Delhi sands with low organic contamination; degree of habitat disturbance indicated by plant species composition and disposition of soil surface, presence and abundance of native sand associated plants such as *Croton californicus*, *Heterotheca grandiflora*, *Eriogonum thurberi* and *Eriogonum fasciculatum*. These plants are actually more an indication of relative

disturbance regimen – conditions with lesser disturbance being of higher quality for DSF. Presence and abundance of Delhi sands associated insects such as *Apiocera convergens*, *Apiocera chrysolasia* and (to a lesser extent) *Nemomydas pantherinus*, noted throughout the course of focused surveys, serve as further indicators of DSF habitat quality. Potential DSF habitat has been further evaluated on the basis of overall insect diversity and abundance, particularly with respect to sand associated predators and parasitoids.

In the course of previous work Osborne (2003, Osborne et al. 2003) developed a means of rating habitat on site for potential to support DSF, rating areas within any site based on a scale of 1 to 5, with 5 being the best quality and most suitable habitat based on the following scheme:

1. Developed areas, non-Delhi sands soils with high clay, silt, and/or gravel content. Delhi sands extensively and deeply covered by dumping of exotic soils, rubble, trash, manure, or organic debris. *Unsuitable*.
2. Delhi sands are present but the soil characteristics include a predominance of exotic soils such as alluvial materials, or predominance of other foreign contamination as gravels, manure, or organic debris. Severe and frequent disturbance (such as a maintenance yard or high use roadbed). *Very Low Quality*.
3. Moderately contaminated Delhi sands. Delhi sands with moderate to high disturbance (such as annual disking). Sufficient Delhi Sands are present to prevent soil compaction (related to contamination by foreign soils). Some sandy soils exposed on the surface due to fossorial animal activity. *Low Quality*.
4. Abundant clean Delhi Sands with little or no foreign soils (such as alluvial material) present. Moderate abundance of exposed sands on the soil surface. Low vegetative cover. Evidence of moderate degree of fossorial animal activity by vertebrates and invertebrates. May represent high quality habitat with mild or superficial disturbance. *Moderate Quality*
5. Sand dune habitat with clean Delhi Sands. High abundance of exposed sands on the soil surface. Low vegetative cover. Evidence (soil surface often gives under foot) of high degree of fossorial animal activity by vertebrates and invertebrates. Sand associated plant and arthropod species may be abundant. *High Quality*

It should be noted that habitat qualities often vary spatially within a site so that conditions on a site fall within a range of qualities. Further, overall habitat quality is affected by the overall habitat area on a site, such that very small areas diminish the overall habitat value of a site. It is also important to note that suitable habitats, even rated as high quality for DSF, are very rarely actually occupied by DSF. These ratings are more informative on mitigation and conservation measures in the event that DSF is found on any particular site. Use of this habitat rating system is somewhat subjective and best undertaken by a biologist who has extensive experience with *Rhaphiomidas* species. While investigating the subject site, Osborne subjected the site to an analysis of this kind so as to give a general estimate of overall habitat conditions relevant to DSF potential.

3.3 Focused Survey Methods

Following the USFWS Interim General Survey Guidelines, we surveyed all portions of the subject site at least twice a week, between the hours of 1000 and 1400 (Table 1). In the case of this survey, site acreage indicated a minimum of 34 minutes per visit, with site visits twice a week. A minimal survey effort thus would require 13.6 hours over the 12-week season. The client realized the implications of a skipped year of survey, and by July 11, 2017, requested the continued survey. Missed survey dates for the first week of survey were compensated with additional survey efforts in succeeding weeks. For the 2017 field season, the subject site was surveyed on 24 dates, totaling at least 13.6 field hours, with site visits made from July 11, to September 20, 2017. Focused DSF surveys were conducted by Kendall H. Osborne, Permit # TE-837760-10, Dr. Jeremiah George (under Osborne’s permit), Rick Rogers # TE-844465-1, David K. Faulkner # TE-838743-6, and Eric S. Renfro # TE-142436-2, a team which incidentally boasts a combined 243 years of entomological experience. The survey protocol, as set forth in the Interim General Guidelines for the Delhi Sands flower-loving fly survey, is designed to maximize the validity of a presence/absence determination.

Osborne photographed the property from several perspectives to document existing conditions. Notes were taken on vegetative cover and plant species composition, abundance and diversity and species composition of insects and other animals, soil types, degree and nature of disturbance, surface cover, organic content, compaction, current land management practices, existing development, and conditions of surrounding vicinity and proximity of other DSF populations.

Table 1. Dates, personnel, times and conditions for focused DSF survey work (2017).

Date	Biologist	Hours	Weather Conditions
7/11/2017	R. Rogers	1000-1034	clear, winds 0-3 mph, 89-95° F
7/14/2017	K. Osborne	1325-1400	clear, winds 5-7 mph, 94° F
7/16/2017	K. Osborne	1251-1326	20% clouds, overcast, winds 2-9 mph, 92° F, humid
7/18/2017	E. Renfro	1242-1317	clear, winds 3-6 mph, 91-92° F
7/21/2017	D. Faulkner	1000-1035	haze/clear, winds 0-1 mph, 87-88° F
7/23/2017	E. Renfro	1255-1329	clear, winds 2-3 mph, 92-93° F
7/25/2017	K. Osborne	1310-1344	10-25% clouds, patchy, winds 0-5 mph, 89° F
7/27/2017	K. Osborne	1209-1243	clear, winds 3-6 mph, 90° F
7/30/2017	R. Rogers	1000-1034	clear, winds 0-4 mph, 85-86° F
8/2/2017	D. Faulkner	1000-1034	90-95% clouds, overcast, winds 0-1 mph, 84-85° F
8/5/2017	E. Renfro	1255-1325	clear, winds 1-2 mph, 91-92° F
8/8/2017	R. Rogers	1030-1104	clear, winds 1-4 mph, 88-90° F
8/12/2017	D. Faulkner	1000-1034	clear, haze, winds 1-2 mph, 80-81° F
8/16/2017	K. Osborne	1305-1339	clear, winds 0-4 mph, 83-84° F
8/20/2017	D. Faulkner	1000-1034	50% clouds, haze, patchy, clear, winds 0-1 mph, 74-76° F
8/25/2017	J. George	1250-1324	clear, winds 10 mph, 86-88° F
8/30/2017	K. Osborne	1259-1333	clear, winds 0-7 mph, 108° F
9/1/2017	D. Faulkner	1000-1034	clear, haze, winds 1-3 mph, 93-95° F
9/4/2017	R. Rogers	1010-1044	5% patchy clouds, winds 0-4 mph, 89-94° F
9/8/2017	D. Faulkner	1000-1034	clear, haze, winds 1-2 mph, 80-81° F
9/10/2017	K. Osborne	1000-1034	clear, calm, 85-89° F

9/13/2017	R. Rogers	1040-1114	clear, winds 1-5 mph, 88° F
9/16/2017	K. Osborne	1006-1040	100% overcast, winds 3-5 mph, 73-75° F
9/20/2017	R. Rogers	1040-1115	100% overcast, winds 1-3 mph, 80-82° F

4.0 RESULTS

4.1 Survey Results

Delhi Sands Flower-Loving Fly (DSF, *Rhaphiomidas terminatus abdominalis*) was not observed on the subject site during the course of this year 2017 survey season. Lists of plants and insects observed during the course of all surveys for 2015 through 2017 are given in the appendix.

4.3 Existing Environment and Community

4.3.1 Adjacent lands

The survey area is bounded on the south, E. Riverside Drive, and commercial development beyond. A freeway interchange, Hwy 15 and Hwy 60 is west and north of the site. Municipal Water district facilities are on the eastern boundary of the site.

4.3.2 Topography

The site is generally flat throughout all portions. Elevation on the site is approximately 800 feet.

4.3.3 Soils

Knecht (1971) indicated the site to consist of Delhi fine sands. These sands are evident throughout the site.

4.3.4 Vegetation

The survey area is generally characterized as highly disturbed due to a history of annual disking, and supports low vegetative diversity of an early successional type. Dominant plants are golden crownbeard (*Verbesina encelioides*), Russian thistle (*Salsola tragus*) and summer mustard (*Hirschfeldia incana*). A stand of *Eucalyptus* lines portions the southern site boundary along E. Riverside Rd. Figures 3-7 present representative views of the survey site and habitats. Figure 8 provides a key as to where on the site these photographs were taken. Table 1 (Appendix A) provides a list of plant species encountered on the survey site. No special status plant species (species of concern) were encountered in the course of this survey. Field conditions on the site did not substantially vary between the 2015, 2016 and 2017 field seasons.

4.3.5 Insect Community

At least 90 insect species were observed over the course of the 2015, 2016, and 2017 field seasons. A list of most insect species observed is presented in the appendix (Table 2, Appendix A). The

insect community encountered on the subject site was relatively species depauperate as compared to undisturbed ecological communities occurring on Delhi sands, but included Apioceridae, Asilidae, Scoliidae, Mymerliontidae, Crabronidae and Sphecidae. Indicators of potential high quality of DSF habitat found on the subject site during the course of the current survey include *Apiocera convergens* and *Campsomeris tolteca*.

5.0 CONCLUSIONS

Delhi Sands Flower-loving fly is absent from the site. Finding of the presence of Delhi sands on the survey site, and the observations of Mydidae (*Nemomydas pantherinus*), Apioceridae (*A. convergens*), and Asilidae, along with the overall habitat ratings made for the site and the historic presence of DSF nearby to the northwest, have suggested some degree of habitat suitability and potential for DSF. After the course of three field seasons of DSF survey with negative results, we conclude that the project site does not support a population of DSF.

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7.0 FIGURES

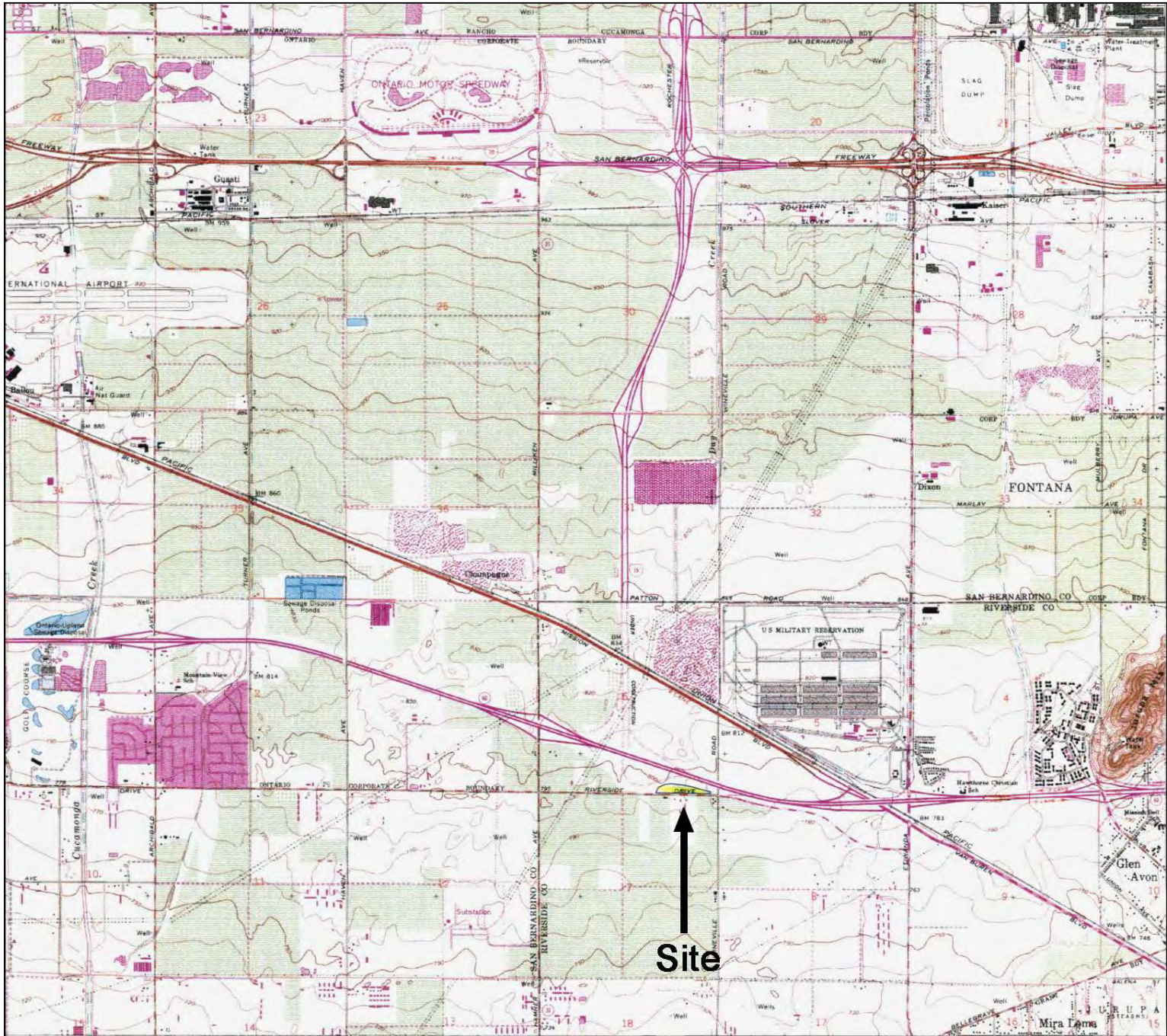
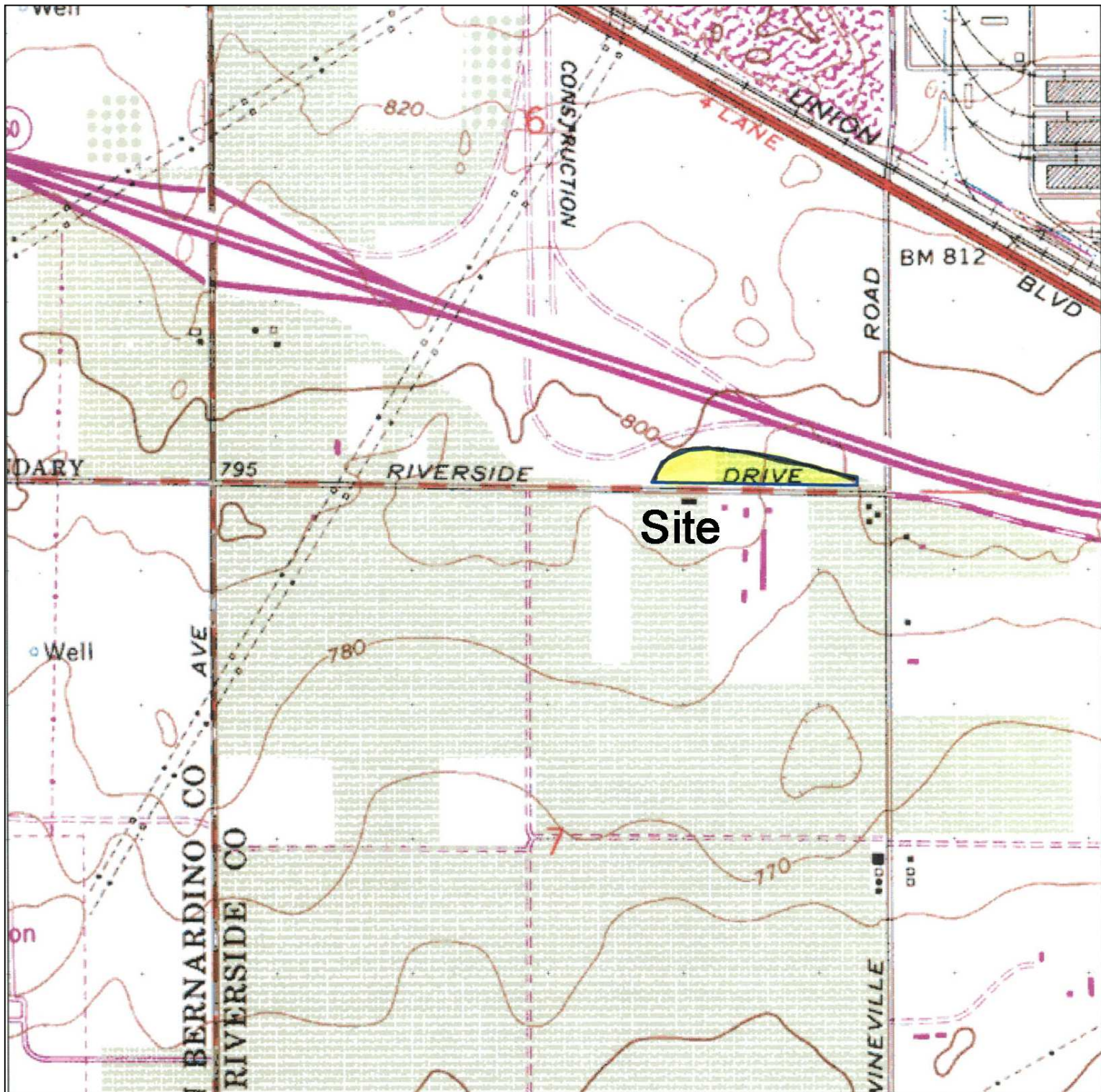
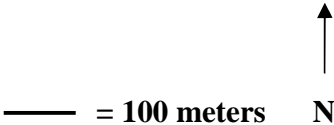


Figure 1. General vicinity of survey site, Guaste, California USGS 7.5" quadrangle at 50%. 7-acre site is outlined in blue and highlighted in yellow (arrow).





 — = 100 meters N

Figure 2. Survey site, Guaste, California USGS 7.5" quadrangle at 200%. 7-acre site is outlined in blue and highlighted in yellow.



Figure 3. Photograph (2016) of the eastern boundary of the survey site (wall at left), looking to the north from the side of E. Riverside Dr.



Figure 4. Photograph (2017) of eastern portions of the survey site.. View looks west northwest from the southern edge of the site near its eastern end (along E. Riverside Dr.). *Eucalyptus* stands which line the roadside are seen at right. Part of the Hwy 15-Hwy 60 interchange is seen in the background off site.



Figure 5. Photograph (2016) of central portions of the survey site. View looks north from the central, southern edge of the site (along E. Riverside Dr.). Part of the Hwy 15-Hwy 60 interchange is seen in the background off site. The fence at left is not a site boundary, but merely crosses the site, separating parcels.



Figure 6 Photograph (2016) of the western portion of the site looking to the east from the southwestern corner of the site. *Eucalyptus* stands along E. Riverside Dr. are seen at left.



Figure 7. Photograph (2017) of central portions of the survey site. View looks east from the central, southern edge of the site (along E. Riverside Rd.).



Figure 8. Approximate locations around survey site from which photographs were taken (base of arrows). Arrow indicates the direction a photograph was taken. Numbers next to the arrows indicate figure numbers (Figures 3-7).

8.0 APPENDIX

Appendix A

Table A1. Plant species encountered on the survey site (2015, 2016 and 2017).

FAMILY	<i>Species</i>
ASTERACEAE	
Western ragweed	<i>Ambrosia acanthicarpa</i>
thistle	<i>Ciricium</i>
horseweed	<i>Conyza canadensis</i>
sunflower	<i>Helianthus annua</i>
telegraphweed	<i>Heterotheca grandiflora</i>
prickly lettuce	<i>Lactuca serriola</i>
golden crownbeard	<i>Verbesina encelioides</i>
BORAGINACEAE	
ranchers fiddleneck	<i>Amsinkia intermedia</i>
BRASSICACEAE	
shortpod mustard	<i>Hirschfeldia incana</i>
London rocket	<i>Sisymbrium irio</i>
CHENOPODIACEAE	
lamb's quarters	<i>Chenopodium album</i>
Russian thistle	<i>Salsola tragus</i>
EUPHORBIACEAE	
California croton	<i>Croton californicus</i>
FABACEAE	
Spanish clover	<i>Lotus purshianus</i>
alfalfa	<i>Medicago alba</i>
MYRTACEAE	
Eucalyptus	<i>Eucalyptus</i>
POLYGONACEAE	
Cal buckwheat	<i>Eriogonum fasciculatum</i>
ZYGOPHYLLACEAE	
Puncture vine	<i>Tribulus terrestris</i>
POACEAE	
slender oat	<i>Avena barbata</i>
Foxtail chess/red brome	<i>Bromus madritensis</i>
Shismus	<i>Schismus barbatus</i>

Table A2. Insects encountered on the survey site (2015, 2016 and 2017).

ORDER	FAMILY	Species	
Diptera	Mydidae	<i>Nemomydas pantherinus</i>	
	Apioceridae	<i>Apiocera convergens</i>	
	Asilidae	<i>Efferia albibarbis</i>	
		<i>Mallophora fautrix</i>	
		<i>Stenopogon brevisculus</i>	
		<i>Stenopogon lomae</i>	
		Bombyliidae	<i>Geron sp.</i>
		<i>Neodiplocampta mira</i>	
		<i>Poecilognathus</i>	
		<i>Poecilognathus sulphura</i>	
		<i>Thyridanthrax atrata</i>	
		<i>Villa molitor</i>	
	Syrphidae	<i>Baccha clavata</i>	
		<i>Copestylum mexicana</i>	
		<i>Eristalis aenea</i>	
		<i>Paragus tibialis</i>	
		<i>Pseudodoros clavatus</i>	
		<i>Syritta pipiens</i>	
		Muscidae	<i>Musca domestica</i>
		Sarcophagidae	<i>Sarcophaga sp</i>
Tachinidae		<i>Archytas sp.</i>	
		<i>Trichopoda pennipes</i>	
Hymenoptera	Tephritidae	unidentified	
	Dolichopodidae	<i>Condylostylus pilicornis</i>	
	Crabionidae	<i>Gastrosericina sp.</i>	
		<i>Tachytes distinctus</i>	
		<i>Bembix comatus</i>	
	Sphecidae	<i>Philanthus multimaculatus</i>	
		<i>Ammophila azteca</i>	
		<i>Haplomelinus albitomentosus</i>	
		<i>Prionyx parkeri</i>	
		<i>Prionyx thomae</i>	
<i>Sceliphron caementarium</i>			
<i>Campsomeris tolteca</i>			
Vespidae	<i>Polistes apachus</i>		
	<i>Perdita</i>		
Andrenidae	<i>Melissodes sp.</i>		
	<i>Svastra texana</i>		
Apidae	<i>Anthophora</i>		
	<i>Apis mellifera</i>		
	<i>Diadasia</i>		
Halictidae	<i>Agapostemon</i>		

Hymenoptera	Halictidae	<i>Lasioglossum</i>
	Megachilidae	unidentified
	Formicidae	<i>Pogonomyrmex californicus</i>
Coleoptera	Chrysomelidae	<i>Coscinoptera aeneipennis</i>
		<i>Chrysophtharta</i>
	Coccinellidae	<i>Coccinella septempunctata</i>
		<i>Hippodamia convergens</i>
	Curculionidae	<i>Apleurus albitomentosa</i>
	Meloidae	<i>Nemognatha lurida</i>
	Scarabaeidae	<i>Cotinus mutabilis</i>
	Tenebrionidae	<i>Eleodes gracilis</i>
Neuroptera	Mymerliontidae	<i>Brachynemurus</i>
		<i>Brachynemurus</i>
Lepidoptera	Danaidae	<i>Danaus plexippus</i>
	Nymphalidae	<i>Junonia coenia</i>
		<i>Vanessa cardui</i>
		<i>Vanessa virginiensis</i>
	Pieridae	<i>Colias eurytheme</i>
		<i>Pieris rapae</i>
		<i>Pontia protodice</i>
	Lycaenidae	<i>Brephidium exilis</i>
		<i>Leptotes marina</i>
		<i>Strymon melinus</i>
	Hesperiidae	<i>Hylephila phyleus</i>
		<i>Lerodia eufala</i>
		<i>Pyrgus albescens</i>
	Arctiidae	<i>Estigmene acrea</i>
Heteroptera (Hemiptera)	Largidae	<i>Largus sp.</i>
	Pentatomidae	<i>Bagrada hilaris</i>
		<i>Chlorochroa sayi</i>
		<i>Chlorochroa uhleri</i>
		<i>Trichopepla aurorae</i>
	Reduviidae	<i>Sinea diadema</i>
	Reduviidae	<i>Zelus renardii</i>
	Scutelleridae	<i>Euptychodera corrugata</i>
Heteroptera (Auchenorrhyncha)	Cicadellidae	<i>Homolodisca lacerta</i>
	Membracidae	unidentified
Orthoptera	Acrididae	<i>Psoloessa thamnogaea</i>
		<i>Schistocerca nitens</i>
		<i>Trimerotropis californica</i>
		<i>Trimerotropis pallidipennis</i>
Mantodea	Mantidae	<i>Iris oratoria</i>
Odonata	Aeshnidae	<i>Anax junius</i>
		<i>Aeshna multicolor</i>

Odonata

Libellulidae

Pantala flavescens
Pantala hymenaea
Tramea onusta
Pachydiplax longipennis

Appendix B

**Correspondence with USFWS
Field Notes**

Ken H. Osborne (permit #TEE837760-10)
Osborne Biological Consulting
6675 Avenue Juan Diaz
Riverside, CA 92509
(951) 360-6461

July 11, 2017

Attn: Ms. Stacey Love.
USFWS Carlsbad Field Office
Fish and Wildlife Service
2177 Salk Avenue, Ste 250
Carlsbad, CA 92008

RE: Intent to conduct the third year protocol survey for Delhi Sands Giant Flower-loving fly on a 7-acre site in Mira Loma, Riverside County. Request for protocol deviation.

Dear Ms. Love,

I write to notify you of intent to conduct the third year of protocol survey for Delhi Sands Giant Flower-loving fly (*Rhaphiomidas terminatus abdominalis*) on an approximately 7-acre site in Mira Loma, Riverside County. In addition, due to the late initiation of this study, I request permission to deviate from USFWS recommended survey protocol to perform two additional dates of survey during the second and third weeks of July in order to compensate for the missed survey dates from the first week of July.

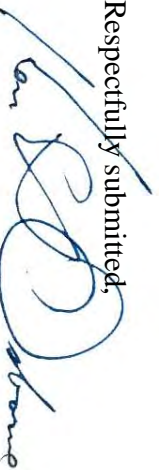
After driving past this site in the last week, and discovering that the site remains undeveloped (after completing two successive years of DSF surveys for my client), I again advised (same advice given in my previous report) my client of the implications for their project following a missed season of DSF survey and USFWS policy regarding maintenance of current status of these surveys. In response, Mr. Wade, representing Ahern Rentals, Inc., has requested we continue the surveys for this season.

This site is located on the north side of Riverside Avenue and south of the southeastern quadrant of the Hwy I-15/Hwy 60 interchange (the site being sandwiched between Riverside Ave., and the freeway interchange).

The site may be located on the Guasti, California USGS 7.5-minute quadrangle map, Township 2 South, Range 6 West, on the southeastern corner of Section 6. The attached map shows the site on a portion of this map at 200% scale.

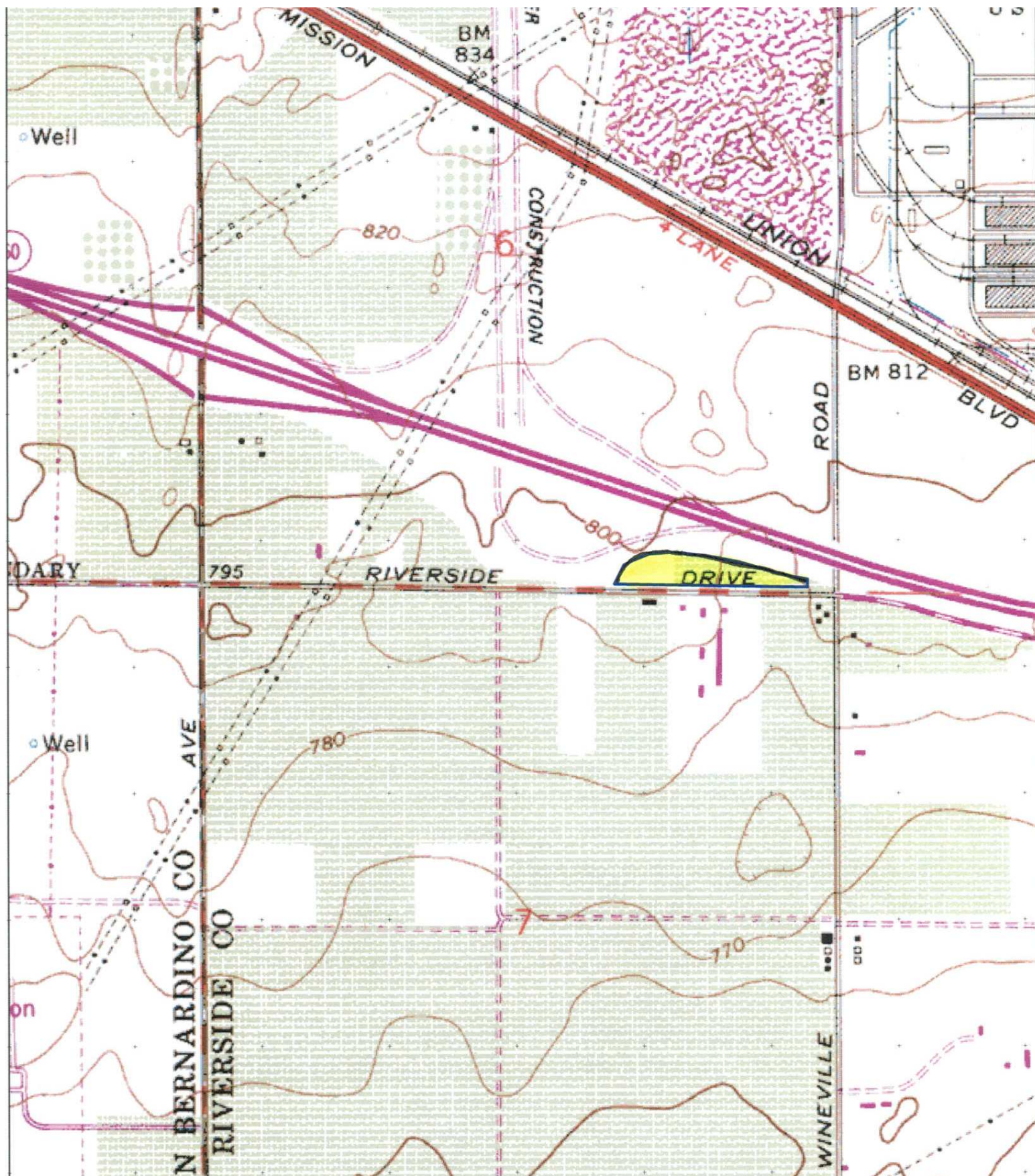
If you have any questions or comments regarding this survey, please feel free to contact me.

Respectfully submitted,



Ken H. Osborne

cc. Keith Wade (Ahern Rentals, Inc.)



— = 100 meters



General vicinity of survey site, Guasti, California USGS 7.5" quadrangle at 200%. Approximately 7-acre site is highlighted in yellow.

Re: Notification for third year of fly surveys for 7-acre Mira Loma site; and request deviation from protocol.

HG

Hund, Geary

Fri 7/14, 9:22 PM

You;

Karin Cleary-Rose (karin_cleary-rose@fws.gov);

stacey love (stacey_love@fws.gov);

Keith Wade (KEITHAW@ahern.com)

Dear Ken,

Disregard my request for the details of your make-up surveys. I found them in you attached notification letter. Your proposal is acceptable.

Geary

On Fri, Jul 14, 2017 at 2:18 PM, Hund, Geary <geary_hund@fws.gov> wrote:

Dear Mr. Osborne,

Thank you for the notification. Please consider this email our approval for you to deviate from the survey guidelines for the Delhi Sands flower-loving fly as requested in your email dated July 11, 2017:

"I also request permission to deviate from protocol in order to perform make-up surveys to compensate for the lost first week of July. "

Please provide me with the details of your proposal for make-up surveys.

Thank you,

Geary

On Tue, Jul 11, 2017 at 8:18 AM, Ken Osborne <euproserpinus@msn.com> wrote:

Good morning Ms. Love,

Please find attached my notification of intent to conduct a third year of surveys for the Delhi Sands Flower-loving fly on the 7-acre site in Mira Loma we have investigated over the previous two years, on behalf of Ahern Rentals, Inc. I also request permission to deviate from protocol in order to perform make-up surveys to compensate for the lost first week of July. Recently seeing this site not developed after two consecutive years of fly surveys, and the dire implications for my client's project after a missed season of survey !

Thank you,

Ken

Ken H. Osborne
Osborne Biological Consulting
6675 Avenue Juan Diaz
Riverside, CA 92509
(951) 360-6461

Delhi sands flower-loving fly - General Field Form

Date July 11, 2017 Overall Time 34 min.

Job Ahenn

Surveyor Rick Rogers Survey Partner(s) 0

Mileage 44467

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>10:00</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0-1</u>	<u>89</u>
<u>10:15</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>1-2</u>	<u>95</u>
<u>10:20</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0-1</u>	<u>95</u>
Stop <u>10:34</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>2-3</u>	<u>95</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids _____ Sphecids
 Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Bombix comata, Lusio glossum sp., Catantus
Liris sp. (sm.), Pieris protodice, Nemognatha sp., Melipotis
sp. (sm., brown), Strymon melinus, Larqus sp., Hemaledriza

Vertebrates: _____

Comments: entire area plowed!

Delhi sands flower-loving fly - General Field Form

Date July 13, 2016 Overall Time 34 min

Job DFA/1c(Cooley)

Surveyor Rick Rogers Survey Partner(s) 0

Mileage 180882

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>11-30</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>3-5</u>	<u>94</u>
<u>11-40</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>3-4</u>	<u>94</u>
<u>11-50</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>3-5</u>	<u>94</u>
Stop <u>12:04</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>3-5</u>	<u>94</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids Asilids
 Mydids _____ Apiocerids _____ Sphecids
 Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Efferia albicincta, Apleuros albitomentosa, Sinea sp.,
Villa molitor, Brachymyrmex sp (G. Antlion)

Vertebrates: _____

Comments: _____

Delhi sands flower-loving fly – General Field Form

Date 7/14/17 Overall Time 125 - 200 Job Ahorn Ranch.Surveyor KAO Survey Partner(s) _____Mileage 9229 on site.

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>125</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>5-7</u>	<u>94</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>200</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>5-6</u>	<u>94</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____Other arthropods (general) Bombyliids _____ Asilids
Mydids _____ Apiocerids _____ Sphecids _____
Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note

Meloidae, Bagrada, Bemisia, Eucalyptus chrysoneoid
Meloid. T.p.

Vertebrates: _____

Comments:

Heavily disked.

Delhi sands flower-loving fly – General Field Form

Date 7/16/17 Overall Time 1251 - 126 Job AhernSurveyor KAO Survey Partner(s) GMileage 9296

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>1251</u>	<u>20</u>	clear	patchy	<u>overcast</u>	drizzle	shower	<u>2-5/10g</u>	<u>88 92 Humid</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>126</u>	<u>20</u>	clear	patchy	<u>overcast</u>	drizzle	shower	<u>5-8</u>	

Biological elements:

Rhaphiomidas terminatus? ___ time ___ sex ___ numbers ___

Other arthropods (general) Bombyliids ___ Asilids ___
 Mydids ___ Apicerids ___ Sphecids ___
 Pompillids ___ Scoliids ___ Chrysidids ___
 Other insects of note Pogo Mosca,

Vertebrates: Uta R010

Comments:

Delhi sands flower-loving fly - General Form

(07 min)

Date 7/18/2017 Overall Time 12:42-1:17

Jobs Green

Surveyor Eric Raniro Survey Partner(s) N/A

Overall Mileage _____

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>12:42</u>	<u>0</u>	clear	patchy	overcast	drizzle	shower	<u>5-6</u>	<u>91</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>1:17</u>	<u>0</u>	clear	patchy	overcast	drizzle	shower	<u>3-4</u>	<u>92</u>

Site #	Time	Mileage on site
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____
_____	_____ to _____	_____

Biological elements:

Rhaphiomidas terminatus? N/A time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids
 Mydids _____ Apiocerids _____ Sphecids
 Pompillids _____ Scoliids _____ Chrysidids _____
 Other insects of note _____

Comments:

Dust bowl / Planet Dune

Vertebrates:

Delhi sands flower-loving fly - General Field Form

Date 21 July 2017 Overall Time 35 minutes Job Flhern

Surveyor David K. Faulkner Survey Partner(s) Ø

Mileage (194238) 63mi from RB.

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1000</u>	<u>Ø</u>	<u>clear</u> patchy overcast drizzle shower	<u>0-1</u>	<u>87°</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1035</u>	<u>Ø</u>	<u>clear</u> patchy overcast drizzle shower	<u>0-1</u>	<u>88°</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids ✓
 Mydids _____ Apiocerids _____ Sphecids ✓
 Pompillids _____ Scoliids _____ Chrysidids _____
 Other insects of note Bembix, Pogonomyrmex, Asilid ♀ (brown), long-horn Bees on
composites.

Plants: *Croton* ✓ Telegraph weed _____ *Eriogonum fasciculatum* _____
Eriogonum thurberi _____ other *Eriogonum* _____ *Oenothera* _____
Camissonia _____ *Eriastrum* _____
 Others: Tumbleweed, composites

Vertebrates: lizards

Comments: Disked habitat > 25 Croton

Delhi sands flower-loving fly - General Field Form

Date 7/23/2017 Overall Time 12:55 - 13:29

Job Altern

Surveyor Eric Reintro

Survey Partner(s) N/A

Mileage _____

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>12:55</u>	<u>0</u>	clear	patchy	overcast	drizzle	shower	<u>2-3</u>	<u>92</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>1:29</u>	<u>0</u>	clear	patchy	overcast	drizzle	shower	<u>2-3</u>	<u>93</u>

Biological elements:

Rhaphiomidas terminatus? x time N/A sex _____ numbers _____

Other arthropods (general) Bombyliids Asilids

Mydids _____ Apiocerids _____ Sphecids _____

Pompilids _____ Scoliids _____ Chrysidids _____

Other insects of note Villa Molitor, Colinus texana,

Exochus sp.

Plants: *Croton* _____ Telegraph weed _____ *Eriogonum fasciculatum* _____

Eriogonum thurberi _____ other *Eriogonum* _____ *Oenothera* _____

Camissonia _____ *Eriastrum* _____

Others: _____

Vertebrates: _____

Comments: _____

Delhi sands flower-loving fly – General Field Form

Date 7/27/2017 Overall Time 1209-1243 Job Ahern

Surveyor K. H. Osborne Survey Partner(s) S

Mileage 9920

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1209</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>4-6</u>	<u>90</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1243</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>3-5</u>	<u>90</u>

Biological elements:

Rhaphiomidas terminatus? ___ time ___ sex ___ numbers ___

Other arthropods (general) Bombyliids ___ Asilids /
Mydids ___ Apiocerids ___ Sphecids ___
Pompillids ___ Scoliids ___ Chrysidids ___

Other insects of note

1 sp. 2 parasit. Pautia Malcol Maliphora

Vertebrates: Cephalopod

Comments:

92

Delhi sands flower-loving fly – General Field Form

Date July 30, 2017 Overall Time 3:10 min Job Ahern

Surveyor Rick Rogers Survey Partner(s) 0

Mileage 11480

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start 10:00	0	clear patchy overcast drizzle shower	0-0	85
10:15	0	clear patchy overcast drizzle shower	1-2	85
10:20	0	clear patchy overcast drizzle shower	1-4	86
Stop 10:34	0	clear patchy overcast drizzle shower	2-3	86

Biological elements:

Rhaphiomidas terminatus ? time sex numbers

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids _____ Sphecids
 Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Piarrisprotopice, Lotinus, Nemognatha lurida
Melectes sp. (sm. brown), Diadasia sp., Agapostemon texana
Aschna m. bicolor, coccinellid, coccinellid (Chrysomelid)
Ammophila azteca, Paragus tibialis, Panfalla flavescens

Vertebrates: _____

Comments:

Copies

Delhi sands flower-loving fly – General Field Form

Date 2 Aug 2017 Overall Time _____ Job (S.S.TES) ALTERNSurveyor DAVID K. FAULKNER Survey Partner(s) ØMileage _____ (195542) (64 miles)

Weather:

Time (24 hr)	% Cloud	Sky				Winds (mph)	Temp (F)	
Start <u>1000</u>	<u>90%</u>	clear	patchy	<u>overcast</u>	drizzle	shower	<u>Ø</u>	<u>84°</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>1034</u>	<u>95%</u>	clear	patchy	<u>overcast</u>	drizzle	shower	<u>0-1</u>	<u>85°</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers __________

Other arthropods (general) Bombyliids _____ Asilids _____

Mydids _____ Apiocerids _____ Sphecids

Pompilids _____ Scoliids _____ Chrysidids _____

Other insects of note Mantid (immature), long-horn bee, Bombyx, Federitid fly_____
_____Plants: *Croton* Telegraph weed _____ *Eriogonum fasciculatum* _____*Eriogonum thurberi* _____ other *Eriogonum* _____ *Oenothera* _____*Camissonia* _____ *Eriastrum* _____

Others: _____

_____Vertebrates: Doves_____

Comments:

Delhi sands flower-loving fly – General Field Form

Date 8/5/2017 Overall Time 12:55 - 1:25 Job Aherm
 Surveyor Eric Rentro Survey Partner(s) N/A

Mileage _____

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>12:55</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>1-2</u>	<u>91</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>1:25</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>1-2</u>	<u>92</u>

Biological elements:

Rhaphiomidas terminatus? N/A time N/A sex N/A numbers N/A

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids Sphecids
 Pompillids _____ Scoliids _____ Chrysidids _____
 Other insects of note Megachilidae sp., Apioceira convergens

Plants: *Croton* _____ Telegraph weed _____ *Eriogonum fasciculatum* _____
Eriogonum thurberi _____ other *Eriogonum* _____ *Oenothera* _____
Camissonia _____ *Eriastrum* _____
 Others: _____

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date Aug 8, 2017 Overall Time 34 min Job Alcena

Surveyor Rick Rogers Survey Partner(s) 0

Mileage 46489

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start 10:30	0	clear patchy overcast drizzle shower	1-3	88
10:40	0	clear patchy overcast drizzle shower	2-4	89
10:50	0	clear patchy overcast drizzle shower	1-4	90
Stop 11:04	0	clear patchy overcast drizzle shower	1-2	90

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids

Mydids _____ Apiocerids _____ Sphecids

Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Leptodes mariana, Pteris protodica, Nemeretha lurida,
Homalodisca laevis sp., Pericoma sp., Paratropis tibialis,
Mallephora flutrix, Liris sp., Liris bratoria (nymph)

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date 12 Aug 2017 Overall Time _____ Job AMERNSurveyor David K. Faulkner Survey Partner(s) ØMileage _____ (196883)

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1000</u>	<u>Ø HAZE</u>	<u>clear</u> patchy overcast drizzle shower	<u>1-2</u>	<u>80°</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1034</u>	<u>Ø HAZE</u>	<u>clear</u> patchy overcast drizzle shower	<u>1-2</u>	<u>81°</u>

Biological elements:

Rhaphiomidas terminatus ? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids _____ Sphecids
 Pompillids _____ Scoliids _____ Chrysidids _____
 Other insects of note Bombus, Pogonomyrmex, mellisid bees, Vespids.

Plants: *Croton* Telegraph weed _____ *Eriogonum fasciculatum* _____
Eriogonum thurberi _____ other *Eriogonum* _____ *Oenothera* _____
Camissonia _____ *Eriastrum* _____
 Others: _____

Vertebrates: Red-tail hawk, ground squirrel

Comments:

Delhi sands flower-loving fly – General Field Form

Date 8/16/17 Overall Time 105-139 Job AhernSurveyor KAC Survey Partner(s) [signature]Mileage 1672

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>105</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0</u>	<u>84</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>139</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>2-4</u>	<u>83</u>

Biological elements:

Rhaphiomidas terminatus ? time _____ sex _____ numbers _____Other arthropods (general) Bombyliids Asilids _____

Mydids _____ Apiocerids _____ Sphecids _____

Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Cotinus, Musca, Melisodes, Pentatomid or Coreid, Moleid, Iris, Xylacopa, V-C, V. melitor

Vertebrates: _____

Comments:

Generally very few insects on this district site.

Delhi sands flower-loving fly – General Field Form

Date 8/25/2017 Overall Time _____Job AHERNSurveyor Jeremiah A George Survey Partner(s) _____

Mileage _____

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start 1250	Hazy	(clear) patchy overcast drizzle shower	10mph ^{SSW}	86°F
1320	Hazy	(clear) patchy overcast drizzle shower	10mph	88°F
		clear patchy overcast drizzle shower		
Stop		clear patchy overcast drizzle shower		

Biological elements:

Rhaphiomidas terminatus? No time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids _____ Sphecids _____
 Pompillids _____ Scoliids _____ Chrysidids _____
 Other insects of note Terpilid sp., psalita on cistron, large Neurosp-ash Dove, Bombyx,

Plants: *Croton* *Telegraph weed* *Eriogonum fasciculatum* - Adjacent on CACTRANS
Eriogonum thurberi _____ other *Eriogonum* _____ *Oenothera* _____
Camissonia _____ *Eriastrum* _____
 Others: Amorpha,

Vertebrates: UTA, P

Comments:

^{FOR DISKED.}
 SITE completely mowed - looks relatively recent. SOILS very good on East end, West side has good sand BUT WITH clear history of some AG.

Delhi sands flower-loving fly – General Field Form

Date 8/30/2017 Overall Time 1259-133 Job AhernSurveyor W.A. Osborne Survey Partner(s) JMileage 3286

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1259</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>6-5</u>	<u>108</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>133</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>4-7</u>	<u>108</u>

Biological elements:

Rhaphiomidas terminatus? ___ time ___ sex ___ numbers ___.

Other arthropods (general) Bombyliids ___ Asilids ___
 Mydids ___ Apiocerids ___ Sphecids ___
 Pompillids ___ Scoliids ___ Chrysidids ___
 Other insects of note Pedicular T. terminus pectoratorius.

Vertebrates: RORO, Ota.

Comments:

Delhi sands flower-loving fly – General Field Form

Date 1 Sept 2017 Overall Time _____ Job AHERNSurveyor DAVID K. FAULKNER Survey Partner(s) ∅Mileage _____ (200048)

Weather:

Time (24 hr)	% Cloud	Sky				Winds (mph)	Temp (F)	
Start <u>1000</u>	<u>∅</u> <u>HAZE</u>	<u>clear</u>	<u>patchy</u>	<u>overcast</u>	<u>drizzle</u>	<u>shower</u>	<u>1-2</u>	<u>93°</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>1034</u>	<u>∅</u> <u>HAZE</u>	<u>clear</u>	<u>patchy</u>	<u>overcast</u>	<u>drizzle</u>	<u>shower</u>	<u>2-3</u>	<u>95°</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids _____ Sphecids _____
 Pompillids _____ Scoliids _____ Chrysidids _____
 Other insects of note H. convergens, Pogonomyrmex, Halictid bee, Andrena bee

Plants: *Croton* Telegraph weed _____ *Eriogonum fasciculatum* _____
Eriogonum thurberi _____ other *Eriogonum* _____ *Oenothera* _____
Camissonia _____ *Eriastrum* _____
 Others: only plants are >20 croton, sunflowers - mostly along fence.

Vertebrates: red-tail hawk, small lizards

Comments:

FEW insects - very limited vegetation

Delhi sands flower-loving fly – General Field Form

Date Sept 4, 2017 Overall Time 34 min. Job Ahera

Surveyor Rick Rogers Survey Partner(s) 0

Mileage 49944

Weather:

Time (24 hr)	% Cloud	Sky				Winds (mph)	Temp (F)	
Start 10:10	5	clear	patchy	overcast	drizzle	shower	0-0	89
10:20	5	clear	patchy	overcast	drizzle	shower	1-3	93
10:30	5	clear	patchy	overcast	drizzle	shower	2-3	93
Stop 10:44	5	clear	patchy	overcast	drizzle	shower	2-4	94

Biological elements:

Rhaphiomidas terminatus ? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids Asilids _____
 Mydids _____ Apiocerids _____ Sphecids _____
 Pompilids _____ Scoliids _____ Chrysidids _____

Other insects of note Melessodes sp. (sm. brown), Agapostemon texana,
Pantalla hirsuta, Pantalla flavescens, Geron sp., Pindesia sp.,
H. phylaxia, Eristalinus aeneus, Iris oratoria (nymph)

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date 8 Sept 2017 Overall Time _____ Job AHERNSurveyor David K. FAULKNER Survey Partner(s) ∅Mileage _____ (200357)

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1000</u>	<u>∅ HAZE</u>	<u>clear</u> patchy overcast drizzle shower	<u>1-2</u>	<u>80°</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1034</u>	<u>∅ HAZE</u>	<u>clear</u> patchy overcast drizzle shower	<u>1-2</u>	<u>81°</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids _____ Sphecids
 Pompilids _____ Scoliids _____ Chrysidids _____
 Other insects of note Bombix, M. domestica, small bees.

Plants: *Croton* _____ Telegraph weed _____ *Eriogonum fasciculatum* _____
Eriogonum thurberi _____ other *Eriogonum* _____ *Oenothera* _____
Camissonia _____ *Eriastrum* _____
 Others: _____

Vertebrates: _____

Comments:

Very little - Croton still in flower

Delhi sands flower-loving fly – General Field Form

Date 9/10/2017 Overall Time 10⁰⁰ - 10³⁴ Job A lawnSurveyor K.A.O. Osborne Survey Partner(s) Mileage 4033

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>10⁰⁰</u>	<u>1</u>	<u>clear</u>	<u>patchy</u>	<u>overcast</u>	<u>drizzle</u>	<u>shower</u>	<u>0</u>	<u>85</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>10³⁴</u>	<u>1</u>	<u>clear</u>	<u>patchy</u>	<u>overcast</u>	<u>drizzle</u>	<u>shower</u>	<u>0</u>	<u>89</u>

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____.

Other arthropods (general) Bombyliids _____ Asilids _____

Mydids _____ Apiocerids _____ Sphecids _____

Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note _____

Musca, Sarcophaga

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date Sept-13, 2017 Overall Time 34 min.

Job Ahern

Surveyor Rick Rogers Survey Partner(s) 0

Mileage 51205

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>10:40</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>2-5</u>	<u>88</u>
<u>10:50</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>2-4</u>	<u>88</u>
<u>11:00</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>1-4</u>	<u>88</u>
Stop <u>11:14</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>2-5</u>	<u>88</u>

Biological elements:

Rhaphiomidas terminatus ? ___ time ___ sex ___ numbers ___

Other arthropods (general) Bombyliids ___ Asilids ___

Mydids ___ Apiocerids ___ Sphecids ___

Pompillids ___ Scoliids ___ Chrysidids ___

Other insects of note Melessodes sp. (Smbrown), Homolodisca sp., Pantalla
flavescens, Agapostemon texana, Cynthia cardui, Eristalinus caesus

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date 9/16/2017 Overall Time 10⁰⁶ - 10⁴⁰ Job AhernSurveyor KAO Osborne Survey Partner(s) Mileage 4283 on SE.

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>10⁰⁶</u>	<u>100</u>	clear	patchy	<u>overcast</u>	drizzle	shower	<u>3-4</u>	<u>73</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>10⁴⁰</u>	<u>100</u>	clear	patchy	<u>overcast</u>	drizzle	shower	<u>3-5</u>	<u>75</u>

Biological elements:

Rhaphiomidas terminatus ? ___ time ___ sex ___ numbers ___.

Other arthropods (general) Bombyliids ✓ Asilids ___
 Mydids ___ Apiocerids ___ Sphecids ✓
 Pompillids ___ Scoliids ___ Chrysidids ___
 Other insects of note Mosco, 100s, Malischa, largeid, Black Chrysomelid
Bombix & latialis

Plants: *Croton* ___ Telegraph weed ___ *Eriogonum fasciculatum* ___
Eriogonum thurberi ___ other *Eriogonum* ___ *Oenothera* ___
Camissonia ___ *Eriastrum* ___
 Others: _____

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date Sept 20, 2017 Overall Time 34 min.

Job Aheru

Surveyor ~~52332~~ Rick Rogers Survey Partner(s) 0

Mileage 52332

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start 10:40	100	clear	patchy	overcast	drizzle	shower	1-3	80
10:55	100	clear	patchy	overcast	drizzle	shower	1-3	81
11:10	100	clear	patchy	overcast	drizzle	shower	1-2	81
Stop 11:15	100	clear	patchy	overcast	drizzle	shower	1-2	82

Biological elements:

Rhaphiomidas terminatus? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids
 Mydids _____ Apiocerids _____ Sphecids
 Pompilids _____ Scoliids _____ Chrysidids _____

Other insects of note Melessodes sp. (sm. brown), Tachigidae (Sm. gray),
Agapostemon texana, H. phylacus, Pantalla hymaenes,
Sarcophaga sp. (lg.), Bembix comata, Cynthia cardui,

Vertebrates: _____

Comments:

**FOURTH YEAR FOCUSED SURVEY FOR
DELHI SANDS FLOWER-LOVING FLY
(*Rhaphiomidas terminatus abdominalis*)
ON A 7-acre SITE IN MIRA LOMA, RIVERSIDE
COUNTY, CALIFORNIA**

Prepared for:

**Mr. Keith A. Wade, J. D.
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Ahern Rentals, Inc.
8350 Eastgate Road
Henderson, NV 891015**

Prepared by:

**Kendall H. Osborne
Osborne Biological Consulting
6675 Avenue Juan Diaz
Riverside, CA 92509**

October 19, 2018

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**FOURTH YEAR FOCUSED SURVEY FOR
DELHI SANDS FLOWER-LOVING FLY
(*Rhaphiomidas terminatus abdominalis*)
ON A 7-acre SITE IN MIRA LOMA, RIVERSIDE
COUNTY, CALIFORNIA**

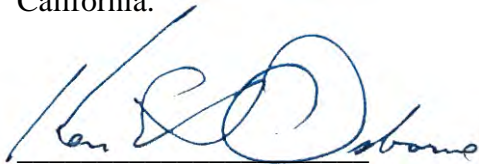
Prepared for

**Mr. Keith A. Wade, J. D.
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Henderson, NV 891015**

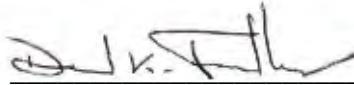
Prepared by

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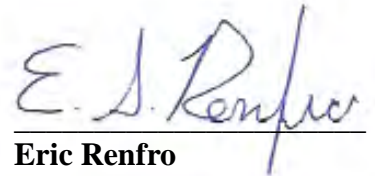
The undersigned certify this report to be a complete and accurate account of the findings and conclusions of a fourth year, 2018 focused survey for Delhi Sands Flower-loving Fly (*Rhaphiomidas terminatus abdominalis*) on a 7-acre site, Mira Loma, Riverside County, California.



**Ken H. Osborne
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Riverside, CA 92509**



**David K. Faulkner
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Rancho Dominguez, CA
90220**



**Eric Renfro
22909 Pennsylvania Ave.
Torrance, CA 90501**

October 19, 2018

SUMMARY

Mr. Keith Wade, on behalf Ahern Rentals, Inc., has requested a fourth year focused survey to assess the presence or absence of Delhi Sands Flower-Loving Fly (DSF, *Rhaphiomidas terminatus abdominalis*) on a 7-acre site in Mira Loma, Riverside County, California. To assess this site for potential as habitat for the federally endangered DSF, and to determine presence or absence of DSF on the site, a habitat evaluation and focused survey for DSF were undertaken in 2015, 2016, and 2017 with negative results for DSF, and for a fourth season in 2018, a series of 24 field visits, totaling 13.60 hours, were conducted on the site from July 3 to September 20, 2018 again with negative results for DSF.

The site has soils mapped as Delhi sands, and consists of open, vacant parcels. Habitat conditions on the site are uniform sand supporting annual grassland and forb vegetation, representing *Moderate Quality* to *High Quality* habitat potential for the DSF.

Delhi Sands Flower-Loving Fly was not observed on the site during the course of this fourth year, 2017 field season. The subject site does not support a population of the Delhi Sands Flower-Loving Fly. No special status plant or animal species (species of concern) were encountered in the course of this survey.

1.0 INTRODUCTION

This report presents the methods and results of a Delhi Sands Flower-Loving Fly (DSF, *Rhaphiomidas terminatus abdominalis*) focused survey for a 7-acre site, in Mira Loma, Riverside County. The site has been surveyed for DSF over four consecutive field seasons in 2015, 2016, 2017, and 2018 with negative results. The DSF was listed as an endangered species by the U.S. Fish and Wildlife Service on September 23, 1993 (USFWS 1993).

The survey site is located on the Guaste, California USGS 7.5-minute quadrangle map, Township 2 South, Range 6 West, in the southeast corner of Section 6. Latitude ranges from approximately 34° 01' 7.4" to 34° 01' 10.8" N and Longitude from 117° 32' 36.5" to 117° 23' 54.3" W. Figure 1 shows the general vicinity of the survey site at 50% scale on the Guaste, California USGS 7.5-minute quadrangle map. Figure 2 displays the survey site at 200% scale on this USGS quadrangle. This site is located on the north side of E. Riverside Drive (between E. Riverside Drive and Highway 60), immediately west of Wineville Rd., in Mira Loma, Riverside County, CA.

The DSF was not found on the subject site during the course of surveys for any of the years 2015 through 2018 (Osborne 2015, 2016, 2017). We again conclude that the subject site does not support a population of the Delhi Sands Flower-Loving Fly.

2.0 NATURAL HISTORY OF THE DELHI SANDS FLOWER-LOVING FLY

Delhi Sands Flower-loving fly belongs to a genus (*Rhaphiomidas*) of flies that have long been known as “giant flower loving flies”. There are more than 30 species of these flies, distributed across the southwestern United States and northern Mexico. These flies are huge by the

standards set by most flies – with size among the species ranging from approximately 1.5 centimeters up to 3, and even 4 centimeters, usually gray, tan, rust or yellow in color. All species of *Rhaphiomidas* are associated with rather arid, sandy habitats, with most species living on dune systems of inland desert valleys, rivers, deltas, and beach strands. A few species are found in sandy washes, alluvial benches and remnant glacial moraines. Many species of these flies often hover before flowers in the manner of hummingbirds, using a long, thin, tubular proboscis (mouth-part), with which the flies probe for nectar – hence a traditional name “giant flower-loving flies”. Smaller flies of the family Apioceridae, once considered very closely related to *Rhaphiomidas* were formerly called “flower-loving flies”.

The DSF is only known to occur in association with Delhi sand deposits, presumably occupied the once extensive dune system of the upper Santa Ana River Valley, including portions of what is now the City of Colton, west through portions of the City of Mira Loma, and south to the Santa Ana River. Today, DSF exists on only a few disjunct sites (USFWS 1997) within a radius of about eight miles in southwestern San Bernardino and northwestern Riverside Counties (Colton, Rialto, Fontana, and Mira Loma). More than 95 percent of known DSF habitat was considered eliminated by development, agriculture and other land management practices by 1993 (Smith 1993, USFWS 1996 in Kingsley 1996), however, this proportion is now nearer 98 to 99% due to these ongoing processes. Many of the last remaining fragments of DSF habitat are currently under pressure by land management efforts such as heavy disking, irrigation, manure dumping, and gravel dumping. There is presently an estimated 1,200 acres of habitat that can support this species (USFWS 1997), but this estimate likely includes lands needing extensive habitat restoration.

Adult DSF flight period is typically August and September, when individual adults emerge, reproduce and die. The adult life span of an individual DSF lasts for a few days and adults do not live beyond the flight period (Kiyani 1995). Adult DSF are highly mobile, agile fliers. Male DSF are frequently seen flying low through habitat, using apparently random, circuitous paths around and between shrubs in search of females. Such “cruising” behavior often covers areas on the scale of 1000 square meters in the time span of a minute. Alternatively, male DSF are often seen flying about an open patch of ground (ca 100 square meters) such as along a dirt path or dune blow-out area. Here, males may repetitively land and rest on one or another object (such as small dried plants) in the area, and such rests are interrupted by periods of patrolling flight (apparently territorial) about the spot. When alarmed, these insects tend to fly rapidly in more or less a straight line – often covering distances of 100 meters in less than 6 seconds. Adult DSF are known to nectar at flowers of California buckwheat and California croton.

DSF, like other *Rhaphiomidas* species, appears to have, at minimum, an annual life cycle (because of the annual flight). However, it has been widely believed that the underground larval/pupal stage may persist for additional years, depending upon various environmental factors such as annual rainfall, food availability and weather conditions during the flight season (many desert *Rhaphiomidas* species do not appear after a drought year and often, substantial flights occur only sporadically over the years). Though it has long been known that *Rhaphiomidas* larvae develop underground, until recently the specific biology (larval biology, habits and food requirements) were not known for any *Rhaphiomidas* species. In 2003, an extensive excavation in known habitat of *Rhaphiomidas trochilus* (Osborne and Ballmer 2014)

recovered very large and strange looking fly larvae - we inferred as *Rhaphiomidas* and which were later confirmed to be those of *R. trochilus* based on DNA analysis. The biology of *R. trochilus* is likely informative of *Rhaphiomidas* species in general and DSF in particular. Based on observations of captive *R. trochilus* larvae (Osborne and Ballmer 2014) it is reasonable to conclude that they are mobile opportunistic predators of soft-bodied, sand-inhabiting insects. Larvae from Sand Ridge, Kern County, CA were maintained in captivity for several months, during which they burrowed actively through sand maintained with slight moisture content (similar to the damp sand where they were found). They fed on larvae of a scarab beetle (Scarabaeidae) and an unidentified bee fly (Diptera: Bombyliidae), which were also recovered from Sand Ridge, and larvae of paper wasps (*Polistes* sp.) which were removed from their nests and buried in the sand. Captive larvae grew and molted after feeding; but, when not fed for extended periods of time, they molted again – losing weight and size in the process. Some larvae were observed to repeat the growth and “shrinkage” cycle multiple times. One larva survived about 17 months in captivity; because it was captured nine months after the most recent flight season, it was at least two years old at time of death. This larva molted four times while undergoing five cycles of growth and shrinkage driven by variable food availability. Its final dry weight was slightly smaller than the typical dry weight of an adult male *R. trochilus*. The ability of *R. trochilus* larvae to molt down during times of scarce food resources could allow an extended and indeterminate larval growth period, but with maturation and appearance of adults always during summer months. This may also explain the common observations that populations of various *Rhaphiomidas* species apparently exhibit little or no adult emergence in some years (especially years of below normal precipitation).

The brief adult life span and active, random search mate-locating behavior of DSF males (typical of all *Rhaphiomidas* species) indicates that relatively high population density and/or nearly synchronous adult emergence are likely crucial to survival of populations. Protracted *Rhaphiomidas* larval biology and staggered (across years) adult emergence must enhance population momentum and cross generational gene flow, and the requirement of abundant and diverse insect prey on which larvae develop – all explain why DSF populations appear as long-term entities (persisting for decades) associated with ecologically intact dune habitats; and why some populations, even though small numbers of adults emerge during flight seasons, eventually fail. These doomed “ghost populations” dwindle down to extinction after overall ecological health of habitat is compromised by various forms of ecological diminishment – ever increasing portions of habitat developed, agricultural use, incessant recreational vehicle use, annual disking of the vegetation community and upper soil column, encroachment of exotic plants, etc.

2.1 DSF Habitat Characteristics

DSF is typically found in areas of unconsolidated sandy soils (Delhi series) supporting an open community of native and exotic plant species. Dominant plants are typically California buckwheat (*Eriogonum fasciculatum*), California croton (*Croton californicus*), telegraph weed (*Heterotheca grandiflora*), and deerweed (*Acmespon scoparius*) but many exotic species often dominate on DSF habitat as well. DSF have been found in habitats that do not support these dominant plant species, and plant species composition may not be directly relevant to larval development (due to likely predatory or parasitic habit of DSF larvae). Adult DSF are anecdotally believed to nectar at

flowers of California buckwheat and California croton, though such a habitat is rare at best and not yet documented. Many other plant species are common, including Thurber's eriogonum (*Eriogonum thurberi*), autumn vinegar weed (*Lessingia glandulifera*), and sapphire eriastrum (*Eriastrum sapphirinum*). Non native plant species also occur in DSF habitat (and incidentally, virtually everywhere). DSF habitat also supports other associated insects such as flies and wasps considered as indicator species – *Apiocera convergens*, *Apiocera chrysolasia*, *Ligyra gozophylax*, *Campsomeris tolteca*, *Trielis alcione*, and *Nemomydas pantherinus*. Over 350 insect species have been found on one DSF site, and DSF habitat is typically marked by high abundance and diversity of predatory and parasitic insect groups including many highly specialized families of flies, wasps, bees, beetles, and antlions. The Delhi Sands community is one of California's unique natural communities containing an array of native plants and animals, some of which are found nowhere else. One plant species, Pringle's monardella, (*Monardella pringlei*) is already presumed extinct, as no living individuals have been observed in many years. Several species of insects and some vertebrates, which inhabit the Delhi Sands dunes system, are as endangered as the DSF, but no one has yet petitioned to have them officially declared Endangered. These include the convergent flower-loving fly *Apiocera convergens*, a newly discovered species of Jerusalem cricket, (*Stenopelmatus* sp.), a new species of camel cricket (*Ceuthophilus* sp.) and an endemic subspecies of butterfly *Apodemia mormo nigrescens* (Emmel and Emmel 1998). The other apiocerid fly (*Apiocera chrysolasia*), although known from approximately six general localities, is only common within the Delhi sands.

3.0 METHODOLOGY

3.1 DSF Survey Guidelines

Interim General Survey Guidelines for the DSF have been suggested by the USFWS (1996). By following these guidelines, DSF presence or absence survey results may be deemed acceptable to the USFWS (rejection of survey results may result where the guidelines are not followed). The guidelines indicate that focused DSF surveys should be conducted wherever Delhi sands are present within the presumed range of DSF, twice weekly (two days per week) during the single annual flight period (usually from July 1 to September 20). Recent early season DSF discoveries lead the USFWS to recommend a survey season from July 15 to September 20 for 2003 and a survey season from July 1 to September 20 from the year 2004. Weather conditions must be suitable for DSF activity at the times survey work is pursued. The DSF is generally active when daytime temperatures exceed 80 degrees Fahrenheit (°F), but may fly with slightly cooler temperatures in bright sunlight.

3.2 Habitat Assessment Methods

Osborne examined the subject site to rate its potential to support DSF (Osborne 2015). Photographs were taken of the site from various perspectives. Habitat suitability for DSF was evaluated using indicators of potential DSF habitat including: presence and abundance of loose, unconsolidated Delhi sands with low organic contamination; degree of habitat disturbance indicated by plant species composition and disposition of soil surface, presence and abundance of native sand associated plants such as *Croton californicus*, *Heterotheca grandiflora*, *Eriogonum thurberi* and *Eriogonum fasciculatum*. These plants are actually more an indication of relative

disturbance regimen – conditions with lesser disturbance being of higher quality for DSF. Presence and abundance of Delhi sands associated insects such as *Apiocera convergens*, *Apiocera chrysolasia* and (to a lesser extent) *Nemomydas pantherinus*, noted throughout the course of focused surveys, serve as further indicators of DSF habitat quality. Potential DSF habitat has been further evaluated on the basis of overall insect diversity and abundance, particularly with respect to sand associated predators and parasitoids.

In the course of previous work Osborne (2003, Osborne et al. 2003) developed a means of rating habitat on site for potential to support DSF, rating areas within any site based on a scale of 1 to 5, with 5 being the best quality and most suitable habitat based on the following scheme:

1. Developed areas, non-Delhi sands soils with high clay, silt, and/or gravel content. Delhi sands extensively and deeply covered by dumping of exotic soils, rubble, trash, manure, or organic debris. *Unsuitable*.
2. Delhi sands are present but the soil characteristics include a predominance of exotic soils such as alluvial materials, or predominance of other foreign contamination as gravels, manure, or organic debris. Severe and frequent disturbance (such as a maintenance yard or high use roadbed). *Very Low Quality*.
3. Moderately contaminated Delhi sands. Delhi sands with moderate to high disturbance (such as annual disking). Sufficient Delhi Sands are present to prevent soil compaction (related to contamination by foreign soils). Some sandy soils exposed on the surface due to fossorial animal activity. *Low Quality*.
4. Abundant clean Delhi Sands with little or no foreign soils (such as alluvial material) present. Moderate abundance of exposed sands on the soil surface. Low vegetative cover. Evidence of moderate degree of fossorial animal activity by vertebrates and invertebrates. May represent high quality habitat with mild or superficial disturbance. *Moderate Quality*
5. Sand dune habitat with clean Delhi Sands. High abundance of exposed sands on the soil surface. Low vegetative cover. Evidence (soil surface often gives under foot) of high degree of fossorial animal activity by vertebrates and invertebrates. Sand associated plant and arthropod species may be abundant. *High Quality*

It should be noted that habitat qualities often vary spatially within a site so that conditions on a site fall within a range of qualities. Further, overall habitat quality is affected by the overall habitat area on a site, such that very small areas diminish the overall habitat value of a site. It is also important to note that suitable habitats, even rated as high quality for DSF, are very rarely actually occupied by DSF. These ratings are more informative on mitigation and conservation measures in the event that DSF is found on any particular site. Use of this habitat rating system is somewhat subjective and best undertaken by a biologist who has extensive experience with *Rhaphiomidas* species. While investigating the subject site, Osborne subjected the site to an analysis of this kind so as to give a general estimate of overall habitat conditions relevant to DSF potential.

3.3 Focused Survey Methods

Following the USFWS Interim General Survey Guidelines, we surveyed all portions of the subject site at least twice a week, between the hours of 1000 and 1400 (Table 1). In the case of this survey, site acreage indicated a minimum of 34 minutes per visit, with site visits twice a week. A minimal survey effort thus would require 13.6 hours over the 12-week season. For the 2018 field season, the subject site was surveyed on 24 dates, totaling at least 13.6 field hours, with site visits made from July 3, to September 20, 2017. Focused DSF surveys were conducted by Kendall H. Osborne, Permit # TE-837760-10, David K. Faulkner # TE-838743-6, and Eric S. Renfro # TE-142436-2. The survey protocol, as set forth in the Interim General Guidelines for the Delhi Sands flower-loving fly survey, is designed to maximize the validity of a presence/absence determination.

Osborne photographed the property from several perspectives to document existing conditions. Notes were taken on vegetative cover and plant species composition, abundance and diversity and species composition of insects and other animals, soil types, degree and nature of disturbance, surface cover, organic content, compaction, current land management practices, existing development, and conditions of surrounding vicinity and proximity of other DSF populations.

Table 1. Dates, personnel, times and conditions for focused DSF survey work (2018).

Date	Biologist	Hours	Weather Conditions
3-Jul	K. Osborne	1000-1034	10% clouds to clear, calm, 75-78° F.
7-Jul	E. Renfro	1000-1034	clear, winds 1 mph, 105-107° F.
9-Jul	K. Osborne	1000-1034	80-90% overcast, winds 4-6 mph, 99-100° F.
12-Jul	E. Renfro	1000-1034	clear, winds 1 mph, 84-86° F.
17-Jul	E. Renfro	1000-1034	clear, winds 1 mph, 81-83° F.
19-Jul	K. Osborne	1000-1034	clear, winds 0-4 mph, 85-87° F.
22-Jul	E. Renfro	1000-1034	clear, winds 1-2 mph, 85° F.
26-Jul	E. Renfro	1000-1034	clear, winds 2 mph, 88-89° F.
31-Jul	E. Renfro	1000-1034	30-15% patchy clouds, winds 1 mph, 87-88° F.
3-Aug	D. Faulkner	1000-1034	clear, winds 1-2 mph, 84-88° F.
6-Aug	E. Renfro	1000-1034	clear, winds 2 mph, 86-91° F.
9-Aug	E. Renfro	1000-1034	clear, winds 1 mph, 91-93° F.
12-Aug	K. Osborne	1255-1329	5% patchy clouds, winds 0-2 mph, 92° F.
14-Aug	D. Faulkner	1000-1034	clear, winds 0-1 mph, 80-82° F.
19-Aug	K. Osborne	1255-1329	clear, winds 0-2 mph, 94-95° F.
23-Aug	K. Osborne	1000-1034	clear, calm, 79-83° F.
26-Aug	K. Osborne	1306-1340	clear, winds 0-5 mph, 83-85° F.
29-Aug	K. Osborne	1325-1359	clear, winds 0-5 mph, 92-93° F.
3-Sep	K. Osborne	1000-1034	20% patchy clouds, clearing, humid, winds 0-1 mph, 75-78° F.
6-Sep	D. Faulkner	1000-1034	clear, winds 1-2 mph, 78-80° F.
9-Sep	E. Renfro	1000-1034	clear, winds 1 mph, 87-89° F.
12-Sep	K. Osborne	1000-1034	clear, calm, 74° F.
16-Sep	K. Osborne	1000-1034	clear, winds 0-2 mph, 78-82° F.
20-Sep	K. Osborne	1322-1356	clear, winds 2-5 mph, 90-91° F.

4.0 RESULTS

4.1 Survey Results

Delhi Sands Flower-Loving Fly (DSF, *Rhaphiomidas terminatus abdominalis*) was not observed on the subject site during the course of this year 2017 survey season. Lists of plants and insects observed during the course of all surveys for 2015 through 2018 are given in the appendix.

4.3 Existing Environment and Community

4.3.1 Adjacent lands

The survey area is bounded on the south, E. Riverside Drive, and commercial development beyond. A freeway interchange, Hwy 15 and Hwy 60 is west and north of the site. Municipal Water district facilities are on the eastern boundary of the site.

4.3.2 Topography

The site is generally flat throughout all portions. Elevation on the site is approximately 800 feet.

4.3.3 Soils

Knecht (1971) indicated the site to consist of Delhi fine sands. These sands are evident throughout the site.

4.3.4 Vegetation

The survey area is generally characterized as highly disturbed due to a history of annual disking, and supports low vegetative diversity of an early successional type. Dominant plants are golden crownbeard (*Verbesina encelioides*), Russian thistle (*Salsola tragus*) and summer mustard (*Hirschfeldia incana*). A stand of *Eucalyptus* lines portions the southern site boundary along E. Riverside Rd. Figures 3-7 present representative views of the survey site and habitats. Figure 8 provides a key as to where on the site these photographs were taken. Table 1 (Appendix A) provides a list of plant species encountered on the survey site. No special status plant species (species of concern) were encountered in the course of this survey. Field conditions on the site did not substantially vary between the 2015, 2016, 2017, and 2018 field seasons.

4.3.5 Insect Community

At least 99 insect species were observed over the course of the 2015, 2016, 2017, and 2018 field seasons. A list of most insect species observed is presented in the appendix (Table 2, Appendix A). The insect community encountered on the subject site was relatively species depauperate as compared to undisturbed ecological communities occurring on Delhi sands, but included Apioiceridae, Asilidae, Scoliidae, Mymerliontidae, Crabronidae and Sphecidae. Indicators of

potential high quality of DSF habitat found on the subject site during the course of the current survey include *Apiocera convergens* and *Campsomeris tolteca*.

5.0 CONCLUSIONS

Delhi Sands Flower-loving fly is absent from the site. Finding of the presence of Delhi sands on the survey site, and the observations of Mydidae (*Nemomydas pantherinus*), Apioceridae (*A. convergens*), and Asilidae, along with the overall habitat ratings made for the site and the historic presence of DSF nearby to the northwest and continued DSF presence only 1.5 km north of our study site (J. George pers com 2018), have suggested some degree of habitat suitability and potential for DSF. After the course of four field seasons of DSF survey with negative results, we conclude that the project site does not support a population of DSF.

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7.0 FIGURES

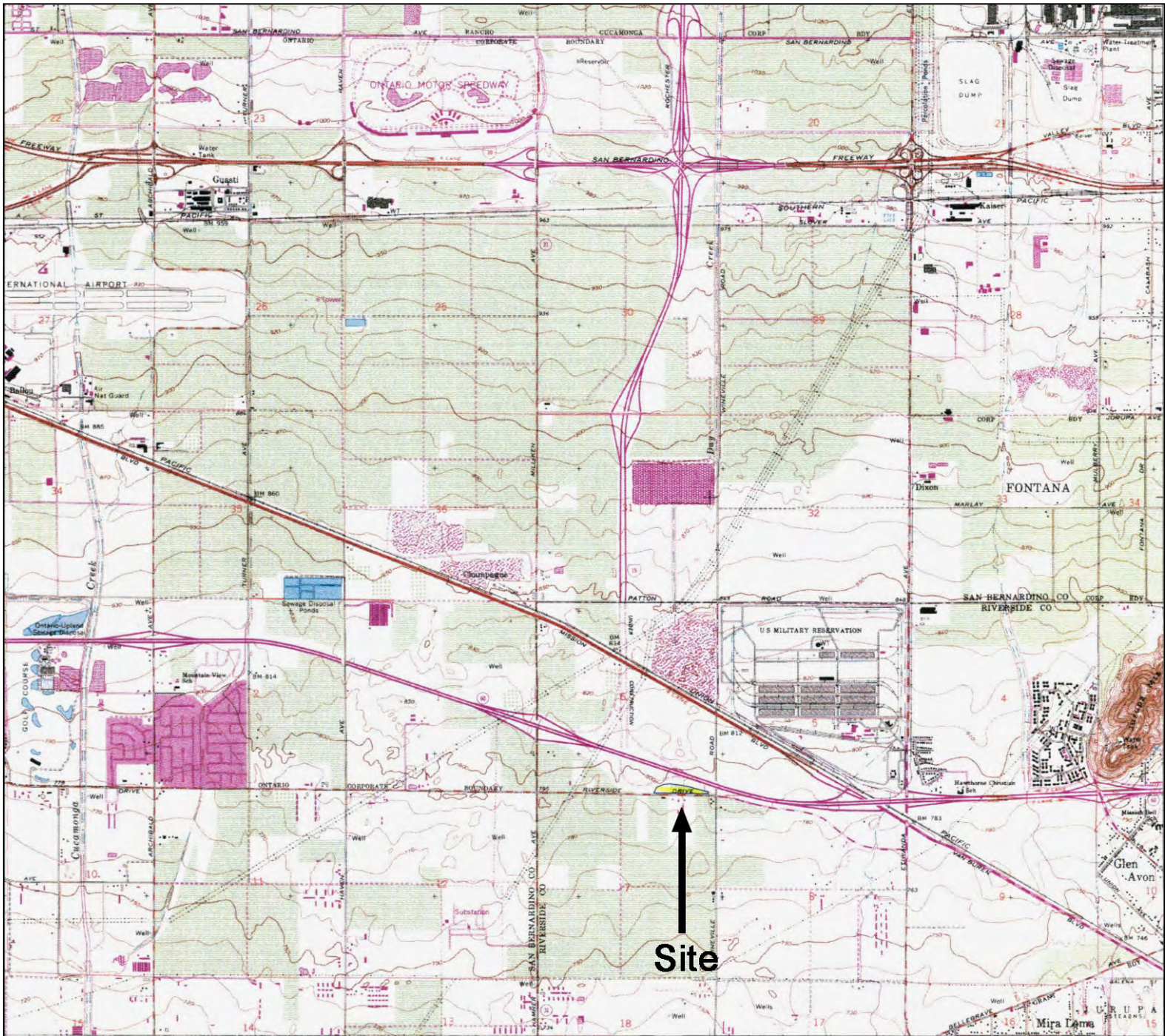
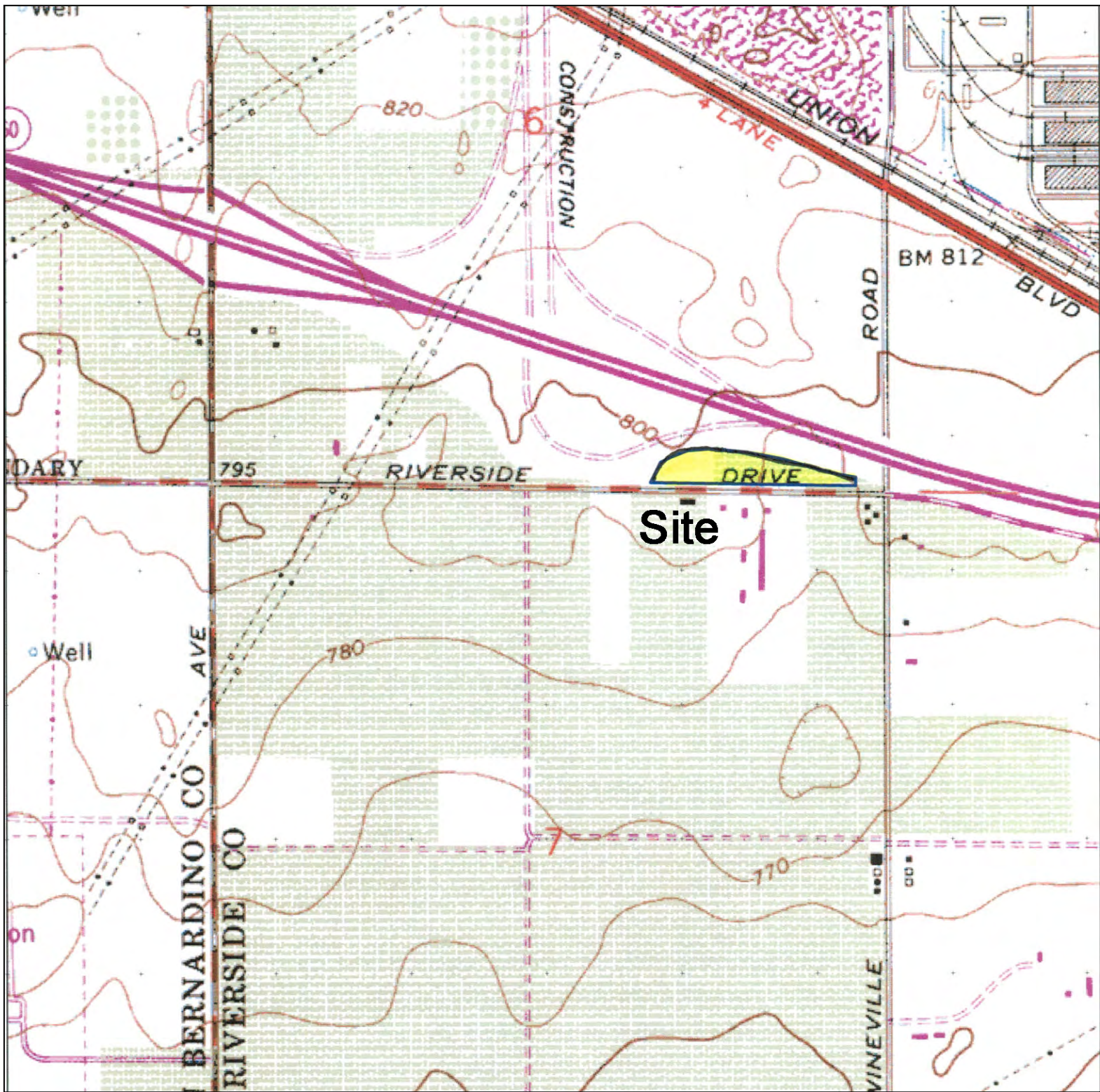


Figure 1. General vicinity of survey site, Guaste, California USGS 7.5" quadrangle at 50%. 7-acre site is outlined in blue and highlighted in yellow (arrow).



= 100 meters N ↑

Figure 2. Survey site, Guaste, California USGS 7.5" quadrangle at 200%. 7-acre site is outlined in blue and highlighted in yellow.



Figure 3. Photograph (2016) of the eastern boundary of the survey site (wall at left), looking to the north from the side of E. Riverside Dr.



Figure 4. Photograph (2017) of eastern portions of the survey site. View looks west northwest from the southern edge of the site near its eastern end (along E. Riverside Dr.). *Eucalyptus* stands which line the roadside are seen at right. Part of the Hwy 15-Hwy 60 interchange is seen in the background off site.



Figure 5. Photograph (2018) of central portions of the survey site. View looks south from the central, northern edge of the site. The fence at left is not a site boundary, but merely crosses the site, separating parcels.



Figure 6 Photograph (2016) of the western portion of the site looking to the east from the southwestern corner of the site. *Eucalyptus* stands along E. Riverside Dr. are seen at left.



Figure 7. Photograph (2018) of central portions of the survey site. View looks northeast from the central, southern edge of the site (along E. Riverside Rd.).



Figure 8. Approximate locations around survey site from which photographs were taken (base of arrows). Arrow indicates the direction a photograph was taken. Numbers next to the arrows indicate figure numbers (Figures 3-7).

8.0 APPENDIX

Appendix A

Table A1. Plant species encountered on the survey site (2015 through 2018).

FAMILY	<i>Species</i>
ASTERACEAE	
Western ragweed	<i>Ambrosia acanthicarpa</i>
thistle	<i>Ciricium</i>
horseweed	<i>Conyza canadensis</i>
sunflower	<i>Helianthus annua</i>
telegraphweed	<i>Heterotheca grandiflora</i>
prickly lettuce	<i>Lactuca serriola</i>
golden crownbeard	<i>Verbesina encelioides</i>
BORAGINACEAE	
ranchers fiddleneck	<i>Amsinkia intermedia</i>
BRASSICACEAE	
shortpod mustard	<i>Hirschfeldia incana</i>
London rocket	<i>Sisymbrium irio</i>
CHENOPODIACEAE	
lamb's quarters	<i>Chenopodium album</i>
Russian thistle	<i>Salsola tragus</i>
EUPHORBIACEAE	
California croton	<i>Croton californicus</i>
FABACEAE	
Spanish clover	<i>Lotus purshianus</i>
alfalfa	<i>Medicago alba</i>
MYRTACEAE	
Eucalyptus	<i>Eucalyptus</i>
POLYGONACEAE	
Cal buckwheat	<i>Eriogonum fasciculatum</i>
ZYGOPHYLLACEAE	
Puncture vine	<i>Tribulus terrestris</i>
POACEAE	
slender oat	<i>Avena barbata</i>
Foxtail chess/red brome	<i>Bromus madritensis</i>
Shismus	<i>Schismus barbatus</i>

Table A2. Insects encountered on the survey site (2015 through 2018).

ORDER	FAMILY	Species	
Diptera	Mydidae	<i>Nemomydas pantherinus</i>	
	Apioceridae	<i>Apiocera convergens</i>	
	Asilidae	<i>Efferia albibarbis</i>	
		<i>Mallophora fautrix</i>	
		<i>Stenopogon brevisculus</i>	
		<i>Stenopogon lomae</i>	
		Bombyliidae	<i>Geron sp.</i>
			<i>Neodiplocampta mira</i>
			<i>Poecilognathus</i>
			<i>Poecilognathus sulphura</i>
			<i>Thyridanthrax atrata</i>
			<i>Villa molitor</i>
	Syrphidae	<i>Baccha clavata</i>	
		<i>Copestylum mexicana</i>	
		<i>Eristalis aenea</i>	
		<i>Paragus tibialis</i>	
		<i>Pseudodoros clavatus</i>	
		<i>Syritta pipiens</i>	
		<i>Musca domestica</i>	
		Sarcophagidae	<i>Sarcophaga sp.</i>
Tachinidae		<i>Archytas sp.</i>	
<i>Trichopoda pennipes</i>			
Tephritidae	unidentified		
Hymenoptera	Dolichopodidae	<i>Condylostylus pilicornis</i>	
	Crabionidae	<i>Gastrosericina sp.</i>	
		<i>Cerceris</i>	
		<i>Bembix comatus</i>	
		<i>Oxybellus</i>	
		<i>Philanthus multimaculatus</i>	
		<i>Tachytes distinctus</i>	
		Sphecidae	<i>Ammophila azteca</i>
			<i>Haplomelinus albitomentosus</i>
			<i>Prionyx parkeri</i>
			<i>Prionyx thomae</i>
	<i>Sceliphron caementarium</i>		
	<i>Campsomeris tolteca</i>		
	Scoliidae	<i>Polistes apachus</i>	
	Vespidae	<i>Perdita</i>	
	Andrenidae	<i>Melissodes sp.</i>	
	Apidae	<i>Svastra texana</i>	
		<i>Anthophora</i>	
		<i>Apis mellifera</i>	

Hymenoptera	Apidae	<i>Diadasia</i>
	Halictidae	<i>Agapostemon</i>
Hymenoptera	Halictidae	<i>Lasioglossum</i>
	Megachilidae	unidentified
	Formicidae	<i>Pogonomyrmex californicus</i>
Coleoptera	Chrysomelidae	<i>Coscinoptera aeneipennis</i>
		<i>Chrysophtharta</i>
		<i>Saxinis</i>
	Coccinellidae	<i>Coccinella septempunctata</i>
		<i>Hippodamia convergens</i>
	Curculionidae	<i>Apleurus albitomentosa</i>
	Meloidae	<i>Nemognatha lurida</i>
	Scarabaeidae	<i>Cotinus mutabilis</i>
	Tenebrionidae	<i>Eleodes gracilis</i>
Neuroptera	Mymerliontidae	<i>Brachynemurus</i>
		<i>Brachynemurus</i>
Lepidoptera	Danaidae	<i>Danaus plexippus</i>
	Nymphalidae	<i>Junonia coenia</i>
		<i>Vanessa cardui</i>
		<i>Vanessa virginiensis</i>
	Pieridae	<i>Colias eurytheme</i>
		<i>Pieris rapae</i>
		<i>Pontia protodice</i>
	Lycaenidae	<i>Brephidium exilis</i>
		<i>Hemiargus ceraunus</i>
		<i>Leptotes marina</i>
		<i>Plebejus acmon</i>
		<i>Strymon melinus</i>
	Hesperiidae	<i>Hylephila phyleus</i>
		<i>Lerodia eufala</i>
		<i>Pyrgus albescens</i>
	Arctiidae	<i>Estigmene acrea</i>
Heteroptera (Hemiptera)	Largidae	<i>Largus sp.</i>
	Pentatomidae	<i>Bagrada hilaris</i>
		<i>Chlorochroa sayi</i>
		<i>Chlorochroa uhleri</i>
		<i>Trichopepla aurorae</i>
	Reduviidae	<i>Sinea diadema</i>
	Reduviidae	<i>Zelus renardii</i>
	Scutelleridae	<i>Euptychodera corrugata</i>
	Tingidae	
Heteroptera (Auchenorrhyncha)	Cicadellidae	<i>Homolodisca lacerta</i>
	Membracidae	unidentified
Orthoptera	Acrididae	<i>Psoloessa thamnogaea</i>

Orthoptera	Acrididae	<i>Schistocerca nitens</i> <i>Trimerotropis californica</i> <i>Trimerotropis pallidipennis</i>
Mantodea	Mantidae	<i>Iris oratoria</i>
Odonata	Aeshnidae	<i>Anax junius</i> <i>Aeshna multicolor</i>
Odonata	Libellulidae	<i>Pantala flavescens</i> <i>Pantala hymenaea</i> <i>Tramea onusta</i> <i>Pachydiplax longipennis</i> <i>Parithemis intensa</i> <i>Sympetrum corruptum</i>
	Coenagrionidae	<i>Enallagma</i>

Appendix B

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2177 Salk Avenue, Ste 250
Carlsbad, CA 92008

RE: Intent to conduct the fourth year protocol survey for Delhi Sands Giant Flower-loving fly on a 7-acre site in Mira Loma, Riverside County.

Dear Ms. Love,

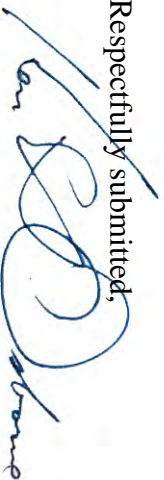
I write to notify you of intent to conduct the fourth year of protocol survey for Delhi Sands Giant Flower-loving fly (*Rhaphiomidas terminatus abdominalis*) on an approximately 7-acre site in Mira Loma, Riverside County.

Mr. Wade, representing Ahern Rentals, Inc., has requested we continue the surveys for this season. This site is located on the north side of Riverside Avenue and south of the southeastern quadrant of the Hwy I-15/Hwy 60 interchange (the site being sandwiched between Riverside Ave., and the freeway interchange).

The site may be located on the Guasti, California USGS 7.5-minute quadrangle map, Township 2 South, Range 6 West, on the southeastern corner of Section 6. The attached map shows the site on a portion of this map at 200% scale.

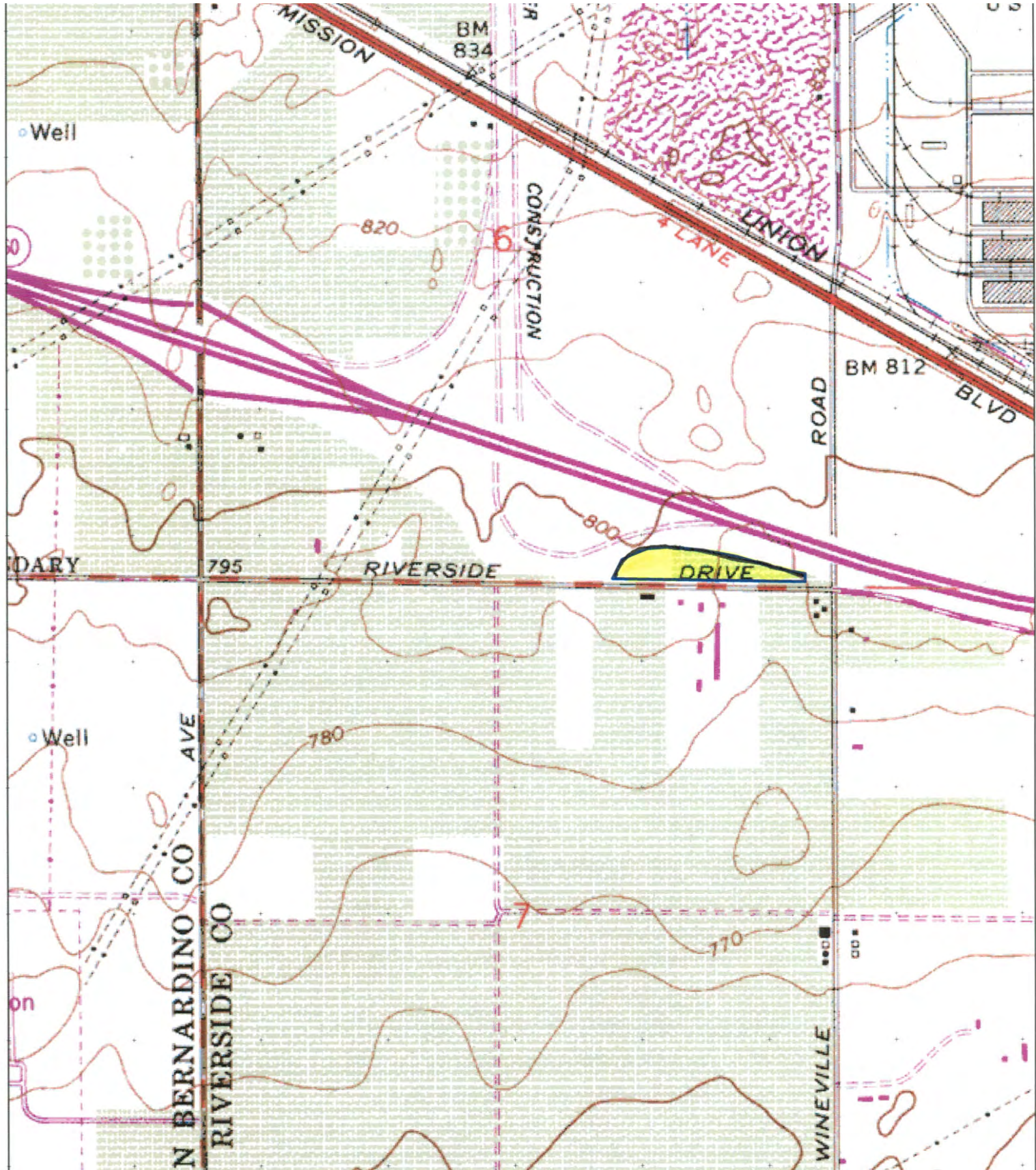
If you have any questions or comments regarding this survey, please feel free to contact me.

Respectfully submitted,



Ken H. Osborne

cc: Keith Wade (Ahern Rentals, Inc.)



— = 100 meters



General vicinity of survey site, Guasti, California USGS 7.5" quadrangle at 200%. Approximately 7-acre site is highlighted in yellow.

Delhi sands flower-loving fly – General Field Form

Date 7/7/2018 Overall Time 34 min. Job Ahern (34 min)Surveyor E. Rento 142436-2 Survey Partner(s) N/AMileage Beg. 190905

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>10:00</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>1</u>	<u>105</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>10:34</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>1</u>	<u>107</u>

Biological elements:

Rhaphiomidas terminatus? N/A time N/A sex N/A numbers N/A

Other arthropods (general) Bombyliids _____ Asilids _____

Mydids _____ Apiocerids _____ Sphecids _____

Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Megachile sp., Halictidae

Vertebrates: _____

Comments:

Hot! not much insect flight. Plant coverage minimal.

Delhi sands flower-loving fly – General Field Form

Date 7/12/2018 Overall Time 34 min Job Ahern
 Surveyor 142436-2 (Rento) Survey Partner(s) NA
 Mileage 191375

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>10:00</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>1</u>	<u>84</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>10:34</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>1</u>	<u>86</u>

Biological elements:

Rhaphiomidas terminatus? NA time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids _____
 Mydids _____ Apiocerids _____ Sphecids
 Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Sceliphron caementarium megalis
Halictids *Chrysomelidae (black color) Apis mellifera
Colletes apachus Agapostemon sp., Arziidae

*Saxinis sp

Vertebrates: _____

Comments:

More flight of insects. Cooler?

Delhi sands flower-loving fly – General Field Form

Date 7/19/18 Overall Time 10⁰⁰ - 1034 Job Ahern
 Surveyor K.A. Osborne Survey Partner(s) 0
 Mileage 3805

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>10⁰⁰</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0-4</u>	<u>85</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1034</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0</u>	<u>87</u>

Biological elements:

Rhaphiomidas terminatus ? ___ time ___ sex ___ numbers ___.

Other arthropods (general) Bombyliids ___ Asilids ✓
 Mydids ___ Apiocerids ___ Sphecids ___
 Pompilids ___ Scoliids ___ Chrysidids ___
 Other insects of note

T. californicus, Bagrada, Long Psychod, Culex,
Stenomacrus, Etheis, Sarcophaga

Vertebrates: CAKI

Comments:

Prunella S. iris, Avena, Buonus dimanta, B. rubens,
Brastia toulouanthii
From beginning of season - clay soils dumped along
roadside.

Delhi sands flower-loving fly – General Field Form

Date 3 Aug 2018 Overall Time 34 minutes Job AHERNSurveyor DAVID K. FAULKNER Survey Partner(s) ∅Mileage (243750) (64 mi from start)

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1000</u>	<u>∅</u>	<u>(clear)</u> patchy overcast drizzle shower	<u>1-2</u>	<u>84°</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1034</u>		<u>(clear)</u> patchy overcast drizzle shower	<u>1-2</u>	<u>88°</u>

Biological elements:

Rhaphiomidas terminatus? No time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids _____ Asilids _____

Mydids _____ Apiocerids _____ Sphecids _____

Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note Fiery skipper, Mellisades bee, Pogonomyza, chinch bugs,
Miris, Tephritid fruit flies, A. mellifera, Megachile sp., Bagada bugs
Andrenid bee, Agapostomena bee, Arctiid larvae, A chion blue
Tachnid fly.Vertebrates: Doves, lizards

Comments:

Clear with haze - more vegetation than last year, limited filling:Croton, composites, Tumbleweed

Delhi sands flower-loving fly - General Field Form

Date 8/6/2018 Overall Time 34 min.Job AhernSurveyor 142436-2 (Rento) Survey Partner(s) N/AMileage 193362

Weather:

Time (24 hr)	% Cloud	Sky					Winds (mph)	Temp (F)
Start <u>10:00</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>86</u> <u>2</u>	<u>86</u>
		clear	patchy	overcast	drizzle	shower		
		clear	patchy	overcast	drizzle	shower		
Stop <u>10:34</u>	<u>0</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>2</u>	<u>91</u>

Biological elements:

Rhaphiomidas terminatus? time N/A sex N/A numbers _____Other arthropods (general) Bombyliids _____ Asilids _____
Mydids _____ Apiocerids _____ Sphecids
Pompilids _____ Scoliids _____ Chrysidids _____Other insects of note Tramea onusta, Copestylum mexicana
Megachilidae, Halictidae, Sceliphron caementarium
Apis mellifera, Arctidae, Plebejus acmon (acmon blue)
Agapostemon sp., Bombix comataVertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date 14 Aug 2018 Overall Time 34 min. (on site) Job AHERNSurveyor DAVID K. FAULKNER Survey Partner(s) ∅Mileage 243985 (64 mi. from start)

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1000</u>	<u>∅</u>	<u>(clear)</u> patchy overcast drizzle shower	<u>0-1</u>	<u>80°</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1034</u>	<u>∅</u>	<u>(clear)</u> patchy overcast drizzle shower	<u>0-1</u>	<u>82°</u>

Biological elements:

Rhaphiomidas terminatus? No time _____ sex _____ numbers _____Other arthropods (general) Bombyliids ✓ Asilids ✓
Mydids _____ Apiocerids _____ Sphecids ✓
Pompillids _____ Scoliids _____ Chrysidids _____Other insects of note A. mellifera, Asilid (Efferia ♀), Mud dauber, Colletes sp. (yellow)
Bombyliid (small), Halicid bees, B. exilis, grasshoppers, Cotinus (most in
Eucalyptus), Arctiid larvae common

Vertebrates: _____

Comments:

Clear with HAZE - scattered clouds over Mountains

Delhi sands flower-loving fly – General Field Form

Date 8/26/2018 Overall Time 106 - 140 Job AhernSurveyor KWC Survey Partner(s) ØMileage 4793

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>106</u>	<u>0</u>	clear patchy overcast drizzle shower	<u>0-5</u>	<u>83</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>140</u>	<u>0</u>	clear patchy overcast drizzle shower	<u>0-5</u>	<u>85</u>

Biological elements:

Rhaphiomidas terminatus? ____ time ____ sex ____ numbers ____.

Other arthropods (general) Bombyliids ____ Asilids ____
 Mydids ____ Apiocerids ____ Sphecids ____
 Pompillids ____ Scoliids ____ Chrysidids ____
 Other insects of note _____

Parabellia P., Strymon, Colinus, Melisodes, Tenebrio, P. acron
Asapostemon, Pantia,

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date 8/29/18 Overall Time 125-159 Job A HornSurveyor KAO Survey Partner(s) JMileage 4972

Weather:

Time (24 hr)	% Cloud	Sky				Winds (mph)	Temp (F)
Start <u>125</u>	<u>1</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>92</u>
		clear	patchy	overcast	drizzle	shower	
		clear	patchy	overcast	drizzle	shower	
Stop <u>159</u>	<u>1</u>	<u>clear</u>	patchy	overcast	drizzle	shower	<u>93</u>

Biological elements:

Rhaphiomidas terminatus ? _____ time _____ sex _____ numbers _____.

Other arthropods (general) Bombyliids _____ Asilids _____

Mydids _____ Apiocerids Sphecids _____

Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note A. convergens, C. fuscus, S. sp.

Vertebrates: _____

Comments:

_____.

_____.

_____.

_____.

_____.

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Delhi sands flower-loving fly – General Field Form

Date 9/3/2018 Overall Time 10⁰⁰ - 10³⁴ Job AhornSurveyor KAO Survey Partner(s) 0Mileage 5040

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>10⁰⁰</u>	<u>20</u>	<u>clear</u> patchy overcast drizzle shower	<u>0</u>	<u>75</u>
<u>10¹⁵</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>.</u>	
		clear patchy overcast drizzle shower		
Stop <u>10³⁴</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0-1</u>	<u>78</u> <u>Acumid</u>

Biological elements:

Rhaphiomidas terminatus ? _____ time _____ sex _____ numbers _____Other arthropods (general) Bombyliids ✓ Asilids _____
Mydids _____ Apiocerids ✓ Sphecids _____
Pompillids _____ Scoliids _____ Chrysidids _____Other insects of note Cotinus Fryman Brepheidon, Pentia, Coliar.
T.c. P.c., A. convergens ♀ + 6♂, V. maliter, V. mexicana,
Mexican Amberwing ♀ Musca

Vertebrates: _____

Comments:

Delhi sands flower-loving fly – General Field Form

Date 6 Sept 2018 Overall Time 34 min. Job AHERN SITESurveyor DWIGHT FAULKNER Survey Partner(s) ∅Mileage (246339) (64 mi from START)

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1000</u>	<u>∅</u>	<u>(clear)</u> patchy overcast drizzle shower	<u>1-2</u>	<u>78°</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1034</u>	<u>∅</u>	<u>(clear)</u> patchy overcast drizzle shower	<u>1-2</u>	<u>80°</u>

Biological elements:

Rhaphiomidas terminatus? NO, time _____ sex _____ numbers _____

 Other arthropods (general) Bombyliids _____ Asilids ✓
 Mydids _____ Apocercids _____ Sphecids ✓
 Pompillids _____ Scoliids _____ Chrysidids _____

Other insects of note _____

Ammophila, Efferia sp. - Nothing else not already noted.

Vertebrates: Ground Squirrels, Crows.

Comments:

Clear with haze (sky)

Delhi sands flower-loving fly – General Field FormDate 9/12/2018 Overall Time 1000-1034 Job AhernSurveyor KAD Survey Partner(s) 0Mileage 5429**Weather:**

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>1000</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0</u>	<u>74</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>1034</u>	<u>0</u>	<u>clear</u> patchy overcast drizzle shower	<u>0</u>	<u>74</u>

Biological elements:*Rhaphiomidas terminatus* ? time sex numbers .

Other arthropods (general) Bombyliids Asilids
 Mydids Apiocerids Sphecids
 Pompillids Scoliids Chrysidids

Other insects of note A. convergens n > 20 Brachidium, P.c., 12, 6 phila

Vertebrates:

Comments:

Delhi sands flower-loving fly – General Field Form

Date 9/20/18 Overall Time 122-156 Job AlcornSurveyor KIA Osborne Survey Partner(s) 0Mileage 5830

Weather:

Time (24 hr)	% Cloud	Sky	Winds (mph)	Temp (F)
Start <u>122</u>	<u>C</u>	<u>clear</u> patchy overcast drizzle shower	<u>2-4</u>	<u>90</u>
		clear patchy overcast drizzle shower		
		clear patchy overcast drizzle shower		
Stop <u>156</u>		clear patchy overcast drizzle shower	<u>2-5</u>	<u>91</u>

Biological elements:

Rhaphiomidas terminatus ? _____ time _____ sex _____ numbers _____

Other arthropods (general) Bombyliids Asilids _____
 Mydids _____ Apiocerids _____ Sphecids _____
 Pompillids _____ Scoliids _____ Chrysidids _____
 Other insects of note Hydrophilin, Megaloptera, Bruchidina, Styracis
V. molitor

Vertebrates: _____

Comments:
