



***2016 Focused Survey for Delhi Sands Flower-loving Fly
(Rhaphiomidas terminatus abdominalis)***

±18.5-acre Site

Site Location:

City of Rialto
San Bernardino County, California
"San Bernardino South" USGS 7.5-minute Quadrangle Map
Township 1 South, Range 5 West, Section 23

Prepared for:

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Total Area Surveyed:

±18.5 acres

Surveys Conducted by:

Scott Cameron (TE-808242-8)

Report Date:

November 16, 2016

2016 Focused Survey for the Delhi Sands Flower-loving Fly
(*Rhaphiomidas terminatus abdominalis*)

±18.5-acre Site, City of Rialto
San Bernardino County, California

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Report Summary

- A 2016 focused protocol survey was conducted to evaluate the presence/absence of the federally listed endangered Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*-DSFF) on a ± 18.5 -acre site located in the City of Rialto, California. Although existing site conditions were not generally considered optimal to support DSFF (as described later in this report), a portion of the site is mapped as containing Delhi soils. Therefore some potential for DSFF to occur exists on site. The focused surveys were conducted in 2016 between July 1 and September 20 following recommended federal survey protocol. **No DSFF or DSFF sign was recorded during the focused surveys.**

Introduction

This report presents findings of focused protocol surveys conducted to evaluate the presence/absence of the Delhi Sands flower-loving fly (herein DSFF) on an ± 18.5 -acre site located in San Bernardino County. Results detailed in this report are also intended to provide project specific biological information to the project applicant and resource agencies regarding the findings of focused DSFF surveys conducted on the site. Pursuant to federal permit conditions, a copy of this report would also be provided to the U.S. Fish and Wildlife Service (USFWS or Service).

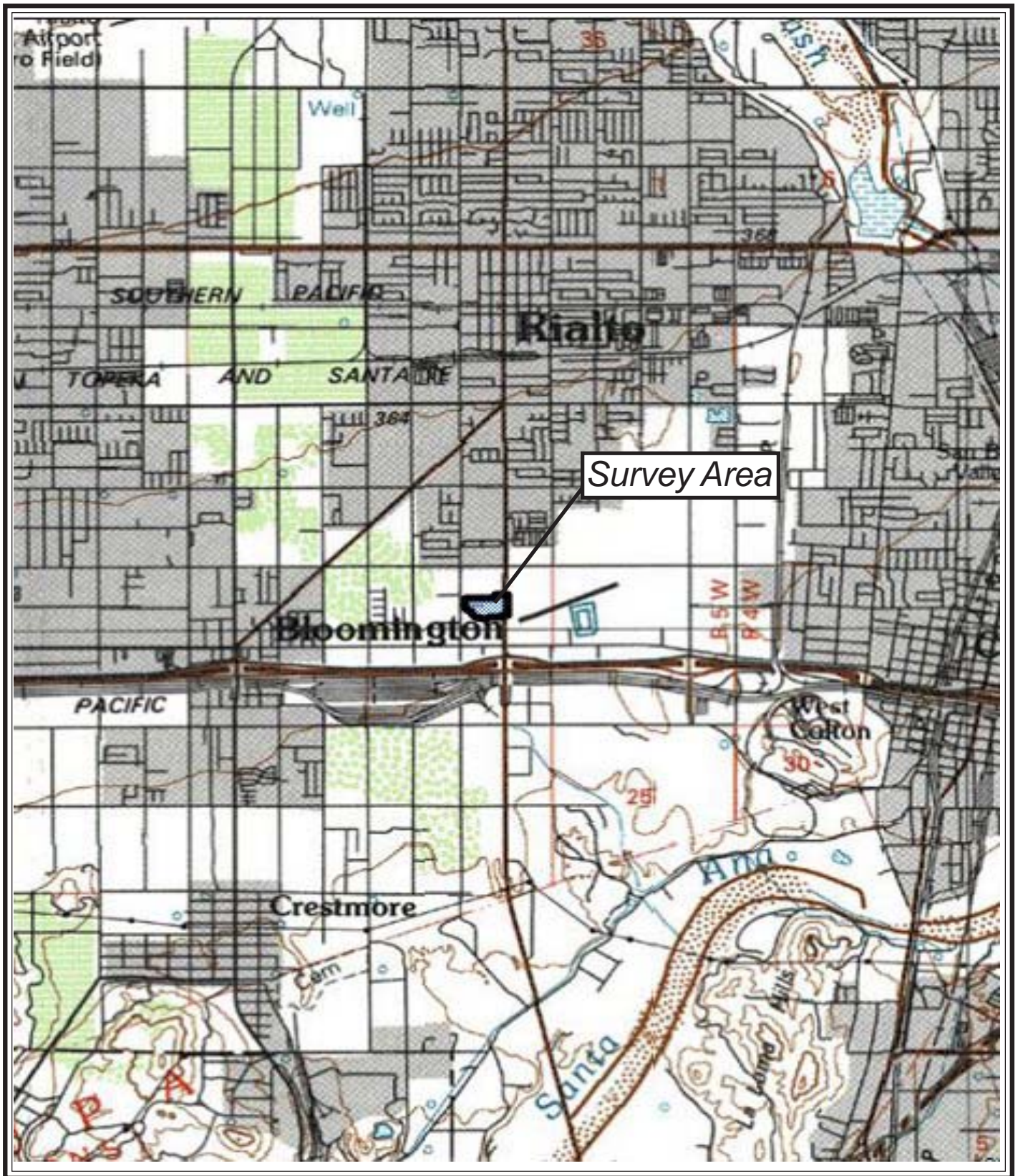
The project site is located in San Bernardino County, California (**Plate 1**). Specifically, the site is located in the City of Rialto (City), south of San Bernardino Avenue, north of Valley Boulevard, east of Willow Avenue, and west of Riverside Avenue. The site occurs on the "San Bernardino South" USGS 7.5-minute quadrangle map, Township 1 South, Range 5 West, comprising a portion of Section 23 (**Plate 2**).

As part of the environmental review process, projects proposed within the range of DSFF (southwestern San Bernardino and northwestern Riverside counties) that contain potentially suitable DSFF habitat must demonstrate to reviewing agencies that potential project-related impacts to this sensitive taxon are avoided or minimized. In order to meet necessary environmental documentation and review requirements, potentially occurring sensitive biological resources such as the DSFF must be addressed prior to development to demonstrate the applicant's conformance to California Environmental Quality Act (CEQA) and the federal Endangered Species Act (Act) of 1973, as amended. The Service reviews environmental documentation for proposed development projects in the area, and as such, will recommend that any impacts to DSFF be adequately mitigated (if applicable to the subject site) pursuant to the Act and CEQA.

Species Overview

Delhi Sands Flower-Loving Fly

The Service listed the DSFF as an endangered species on September 23, 1993 (USFWS 1993). This species is only known to occur in association with Delhi sand deposits, primarily on twelve disjunct sites (USFWS 1997) within a radius of about eight miles in the cities of Colton, Rialto, and Fontana located in southwestern San Bernardino and northwestern Riverside counties. However, more recent survey data (1997-2003) indicates that DSFF occur in low numbers in the Ontario area as well, and also in sub-optimal habitat conditions. The DSFF is restricted to the Colton Dunes, which covers approximately 40 square miles. More than 95 percent of the formerly known habitat has been converted to human uses or severely affected by human activities, rendering it apparently unsuitable for occupation by the species (USFWS 1996a in Kingsley 1996).



November 2016

plate 1

Regional Site Location

City of Rialto

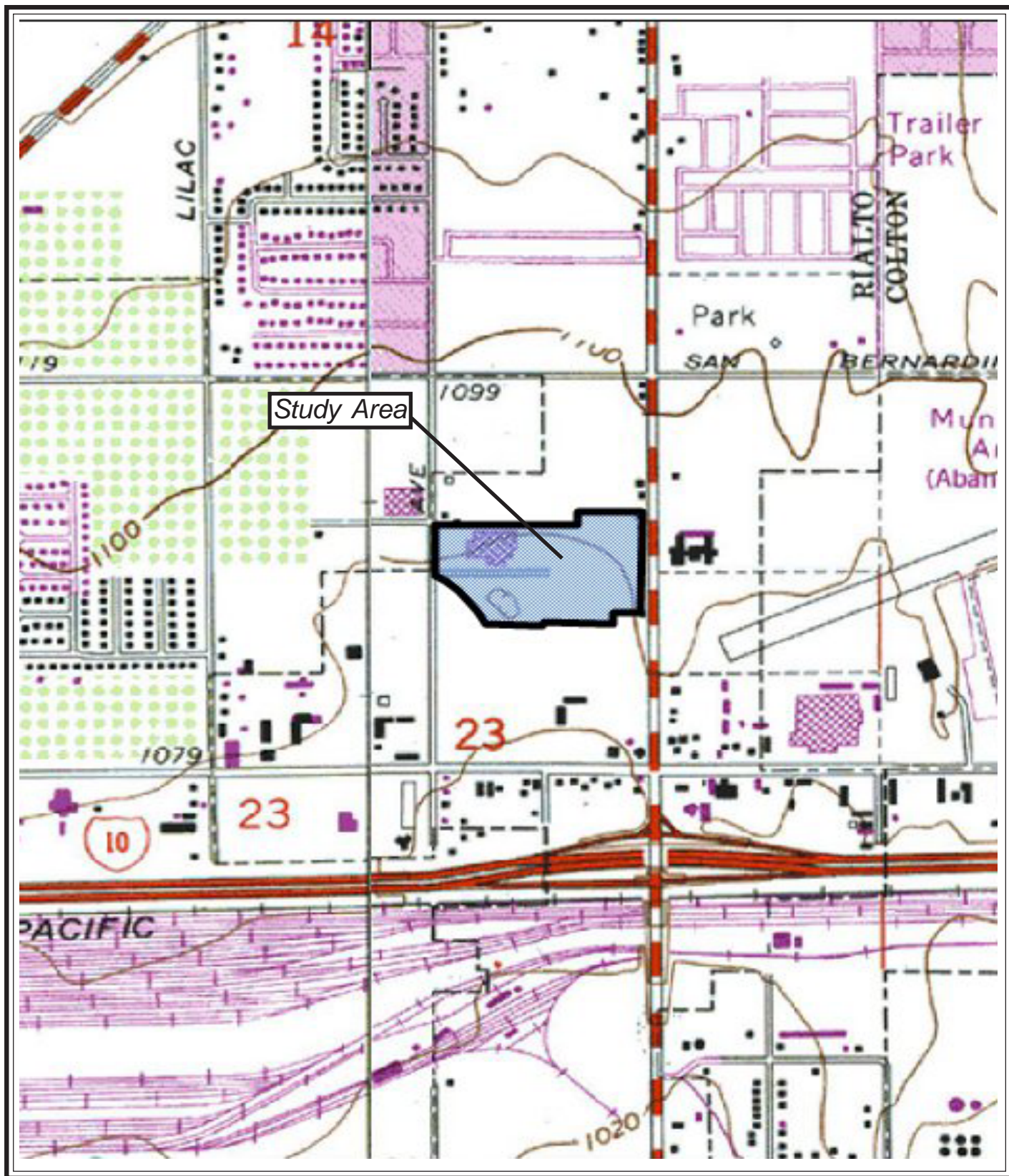


plate 2



November 2016

Site Vicinity

City of Rialto

Flies of the genus *Rhaphiomidas* prefer arid habitats and are typically large (up to 1.25-inches in body length). The underground life cycle of this taxon is not well understood. Under favorable environmental conditions, the life cycle of DSFF is likely annual, and as such, DSFF would be expected to emerge during appropriate circumstances. However, it is possible that the underground phase (i.e., larval/pupal stages) may last two years or longer depending upon availability of food, and other environmental factors such as temperature and rainfall (USFWS 1997). DSFF spend all but their adult stage underground. Adults do not survive beyond the end of their single annual flight period (Kiyani 1995).

General Habitat Characteristics

Areas containing sandy substrates with a sparse cover of perennial shrubs and other vegetation constitute the primary habitat requirements for *Rhaphiomidas* flies (USFWS 1997). Potential habitat for the DSFF is typically defined as areas comprised of sandy soil (Delhi series) in open areas commonly dominated by three primary indicator plant species: California buckwheat (*Eriogonum fasciculatum*), California croton (*Croton californica*), and telegraph weed (*Heterotheca grandiflora*). Annual bur-sage (*Ambrosia acanthicarpa*), Rancher's fiddleneck (*Amsinckia menziesii*), autumn vinegar weed (*Lessingia glandulifera*), sapphire eriastrum (*Eriastrum sapphirinum*), primrose (*Oenothera* sp.), and Thurber's buckwheat (*Eriogonum thurberi*) are also commonly present at occupied DSFF sites. Important DSFF insect indicator species such as *Apiocera* and *Nemomydas* are also usually present on occupied habitats in relatively large numbers. However, DSFF have been recorded in certain habitats that do not support these species, and presence/absence of DSFF is not necessarily determined by indicator species. Rather, these indicator species exhibit a strong correlation to habitats occupied by DSFF. A gradient of habitat suitability exists for DSFF, composed of varying degrees of both natural and artificial conditions. Moreover, the microhabitat and life history requirements of DSFF are only poorly understood and the underlying soil environment may be the most determinative factor of whether an area can provide suitable habitat to support a DSFF population. Key factors regulating DSFF populations have not been fully identified.

Federal Regulatory Background

Because the DSFF is a federally listed endangered species, it is protected under the Act. Federal law prohibits "take" of listed species. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. In some cases, habitat modification can constitute prohibitive "take". A section 10(a) permit is required for projects where a determination of "take" is likely to occur during a proposed non-federal activity. Prior to determining whether a permit is needed, the applicant should consider whether take could be avoided. This is sometimes possible through relocation of facilities or other measures depending on the nature and extent of project-related impacts to endangered species. If "take" of DSFF cannot be avoided, the Service will recommend that an incidental take permit [Section 10(a)] be obtained. However, issuance of a Section 10(a) permit must not "appreciably reduce" the likelihood of the survival and recovery of the species in the wild. Should an applicant not obtain a permit, and unauthorized take attributable to project activities occur, the responsible entity would be liable under the enforcement provisions of the Act. Types of potential habitat mitigation include, but are not limited to: (1) acquisition of existing habitat; (2) protection of existing habitat through conservation easements or other legal instruments; (3) enhancement or restoration of disturbed or former habitats; (4) prescriptive management of habitats to achieve specific biological characteristics; and (5) creation of new habitats. Still, certain caveats may apply to each of these strategies (USFWS/NMFS 1996).

DSFF Recovery Units / Proposed Core Reserves

Sub-regional areas encompassing smaller areas known to be inhabited by the DSFF or encompassing areas that contain restorable habitat for the DSFF have been grouped into three Recovery Units (RUs) by the Service based on geographic proximity, similarity of habitat, and potential genetic exchange (USFWS 1997). The subject site is located within an area designated as the Colton RU. The Colton RU contains several areas that currently support DSFF populations, and additional areas have been proposed for restoration in the DSFF Recovery Plan. DSFF will continue to exist in the Colton RU only with land conservation, a cessation of current habitat-degrading land management practices and recreational uses, and/or a restoration or natural reversion of ecologically damaged lands back to an ecological community typical of Delhi sands formations.

Additional data will be needed on reproduction and mortality rates, dispersal, and habitat variables before further refinement of RU boundaries, development of alternative RU preserve designs, and analyses of population can be made (USFWS 1997). Until such data is obtained, the highest priority will be to protect existing populations of the DSFF (USFWS 1997). To achieve down-listing, areas containing occupied and/or restorable habitat and dispersal corridors need to be evaluated relative to the extent of distribution patterns necessary to support secure populations. Sites to be protected should be selected based on habitat needs of adults and larvae, and willingness of landowners to participate in recovery efforts (USFWS 1997). Several "Core Reserve Areas" have been initially identified by the Service, but to our knowledge, the actual extent of the proposed reserve areas have not been finalized. Occupied and/or potentially restorable habitat in the RUs includes only those areas that, at a minimum, contain Delhi Series soils. Further, RUs do not include residential and commercial development, or areas that have been otherwise permanently altered by human actions (USFWS 1997).

Development in the region has been cumulatively reducing the amount of open areas. Such conversions have been and will continue to lead to the permanent loss of the amount of land available for DSFF. When viewed individually, it may be possible for each project to mitigate potential project-specific impacts through the implementation of habitat replacement programs and the requirements of the regulatory processes to which each project may be subject (e.g., CEQA). Cumulative impacts are expected to be addressed through participation and implementation of the Valley Wide Multiple Species Habitat Conservation Plan (as initially outlined in the 1995 Memorandum of Understanding (MOU) between the Service, other resource agencies, and local jurisdictions). Additionally, regional and/or sub-regional DSFF habitat conservation plans currently proposed for the area would also be expected to address this issue. We understand that the City is currently negotiating with the Service to develop a mutually acceptable process for implementing portions of the DSFF Recovery Plan developed by the Service. We further understand that it is the intent of the City to continue to accommodate essential DSFF habitat in their long-range development plans.

Focused DSFF Survey Guidelines

The Service prepared Interim Presence/Absence Survey Guidelines for the DSFF in December 1996 (USFWS 1996b) with revisions in April 2004. In general, the 2004 guidelines maintain that in order to more fully determine the presence or absence of DSFF such that the results are acceptable to the Service, a survey following these guidelines must be conducted. The guidelines currently require that surveys be conducted in all areas containing Delhi sands twice weekly (two days per week) during the single annual flight period from July 1 to September 20. However, at the discretion of the Service, survey guidelines may be modified depending upon individual site circumstances (e.g., highly degraded sites that don't support constituent elements of potential DSFF habitat or early seasonal emergence periods). As with previous years, surveys would not be conducted during adverse weather conditions, as environmental conditions such as temperature, wind, and cloud cover may affect the behavior of DSFF on a daily basis.

Methodology

Pertinent Literature Review

Documentation pertinent to the biological resources in the vicinity of the site was reviewed and analyzed. Information reviewed included: (1) the Federal Register listing package for the federally listed endangered DSFF (USFWS 1993); (2) the DSFF Recovery Plan (USFWS 1997), (3) Ecological Sciences unpublished data (e.g., various field notations/observations/maps) and other unpublished literature pertaining to DSFF habitat requirements, (4) the California Natural Diversity Data Base (CNDDB 2016) information for the San Bernardino South, California, USGS 7.5-minute topographic quadrangle, and (5) review of available reports from this and other sites located in the general vicinity of the survey area.

Field Surveys

2016 Focused DSFF Surveys

Ecological Sciences initiated surveys on the subject property following notification to the Service in June 2016. Surveys of the site were conducted at least twice a week from July 1 to September 20. The focused DSFF surveys were conducted following recommended federal survey guidelines (2004). Survey areas were covered at a relatively slow pace with special care taken to avoid harassing DSFF (if present). Survey areas that contained at least some Delhi sands (or similar) were closely examined for adult animals and exuviae (pupal “skins”). The surveys were conducted between the hours of 10:00 a.m. to 2:00 p.m. Pacific Daylight Time (PDT) per protocol.

Data recorded included soil composition, vegetation, insect community composition, land management practices, surrounding land condition, proximity of other known populations of DSFF, survey location, vertebrate wildlife species, time of day, surveyor, and general weather conditions. In addition, some insects (other than DSFF) were sampled for later identification. Weather conditions included both partly cloudy and clear skies and winds of 1-9 m.p.h. Survey temperatures ranged from approximately 73 °F to 102 °F throughout the survey period.

Important indicators of potential DSFF habitat noted during the survey effort included: presence and abundance of loose or unconsolidated Delhi sands; presence and abundance of sand associated plants such as *Croton californicus*, *Oenothera*, *Heterotheca grandiflora*, *Eriogonum thurberi*, and *Eriogonum fasciculatum*. Presence, abundance, and regularity of DSFF and Delhi sands associated insects such as *Apiocera convergens*, *Apiocera chrysolasia*, and *Nemomydas pantherinus* to a lesser extent, serve as DSFF indicators. In addition, potential for DSFF to occupy the site was further evaluated on the basis of overall diversity and abundance of other insects, which inhabit loose or friable sands.

Focused DSFF surveys were conducted on the site by Ecological Sciences, Inc. Principal Biologist, Scott D. Cameron. Surveys were conducted under the authority of a federal Section 10(a) permit issued to Mr. Cameron (TE-808242-8). General plant and wildlife species present at the site were recorded during focused DSFF survey efforts to provide a qualitative assessment of the overall habitat value. Surveys were initiated on July 2-3. Subsequent surveys were performed on July 9-10, 16-17, 23-24, 30-31; August 6-7, 13-14, 20-21, 27-28; September 3-4, and September 10-11. Total surveys performed over an 11-week period were 22.

Existing Site Conditions

The site is characterized as a highly disturbed area exposed to routine discing activities throughout much of the parcel. A demolished structure is present in the northwestern part of the site along with debris piles from the demolition. Heavy equipment is parked on site. Some of the site in the western half has been scraped barren. The eastern area of the site (along Riverside Drive) has been discing presumably in association with ongoing infrastructure development. **Plates 3a-3b** illustrate existing site conditions. **Plate 4** aerially illustrates site features and surrounding land uses.

Vegetation

Non-native plant species present on site included foxtail chess (*Bromus madritensis ssp. rubens*), ripgut grass (*Bromus diandrus*), Mediterranean grass (*Schismus barbatus*), short-pod mustard (*Hirschfeldia incana*), Russian thistle (*Salsola tragus*), pigweed (*Chenopodium album*), puncture vine (*Tribulus terrestris*), Jimson weed (*Datura stramonium*), castor bean (*Ricinus communis*), fleabane (*Conyza bonariensis*), Spanish clover (*Desmodium incanum*), tocalote (*Centaurea melitensis*), and golden crownbeard (*Verbesina encelioides*). Native species recorded included telegraph weed, annual bur-sage (*Ambrosia acanthicarpa*), Holly-leaved cherry (*Prunus ilicifolia*), dove weed (*Croton setiger*), and fiddleneck (*Amsinckia menziesii*), and annual sunflower (*Helianthus annuus*). Landscaping trees included a few tree-of-heaven (*Ailanthus altissima*) and other ornamentals such as gum (*Eucalyptus* sp.).



View to south



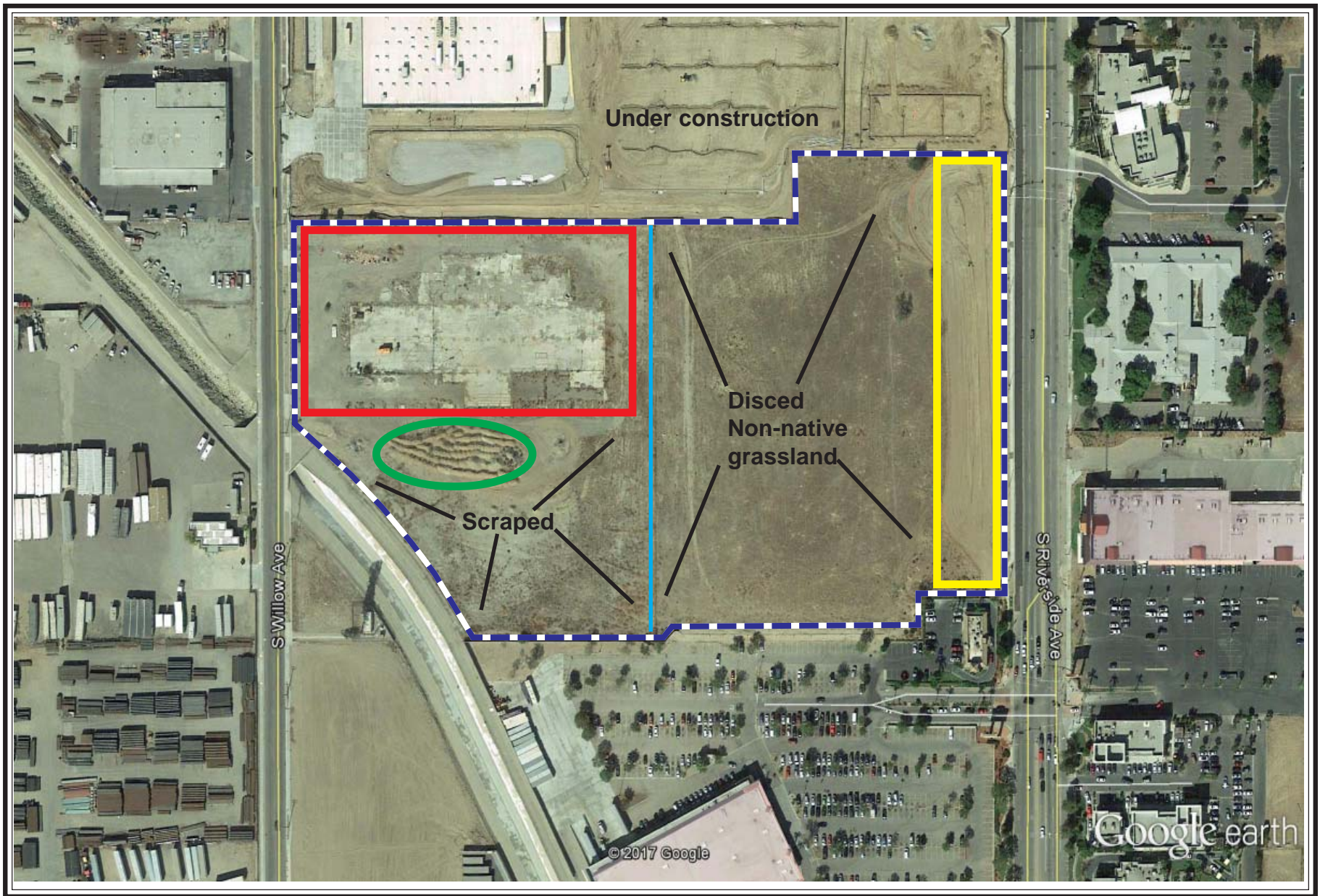
View to east



View to north



View to west



Wildlife

A general list of invertebrate species observed on site during focused DSFF surveys is included as **Appendix A**. A list of common vertebrate species observed during the focused surveys is presented in **Appendix B**.

General Soils Analysis / Soil Conservation Map Review

A review of soil maps prepared for the area by the Natural Resource Conservation Service (NRCS 2016) website for San Bernardino County, Southwestern Part, California indicate that the subject site is located within an area entirely mapped as containing Delhi fine sand (Db) and Tujunga gravelly loamy sand (Tvc). **Plate 5** illustrates site vicinity soils.

DSFF Survey Results

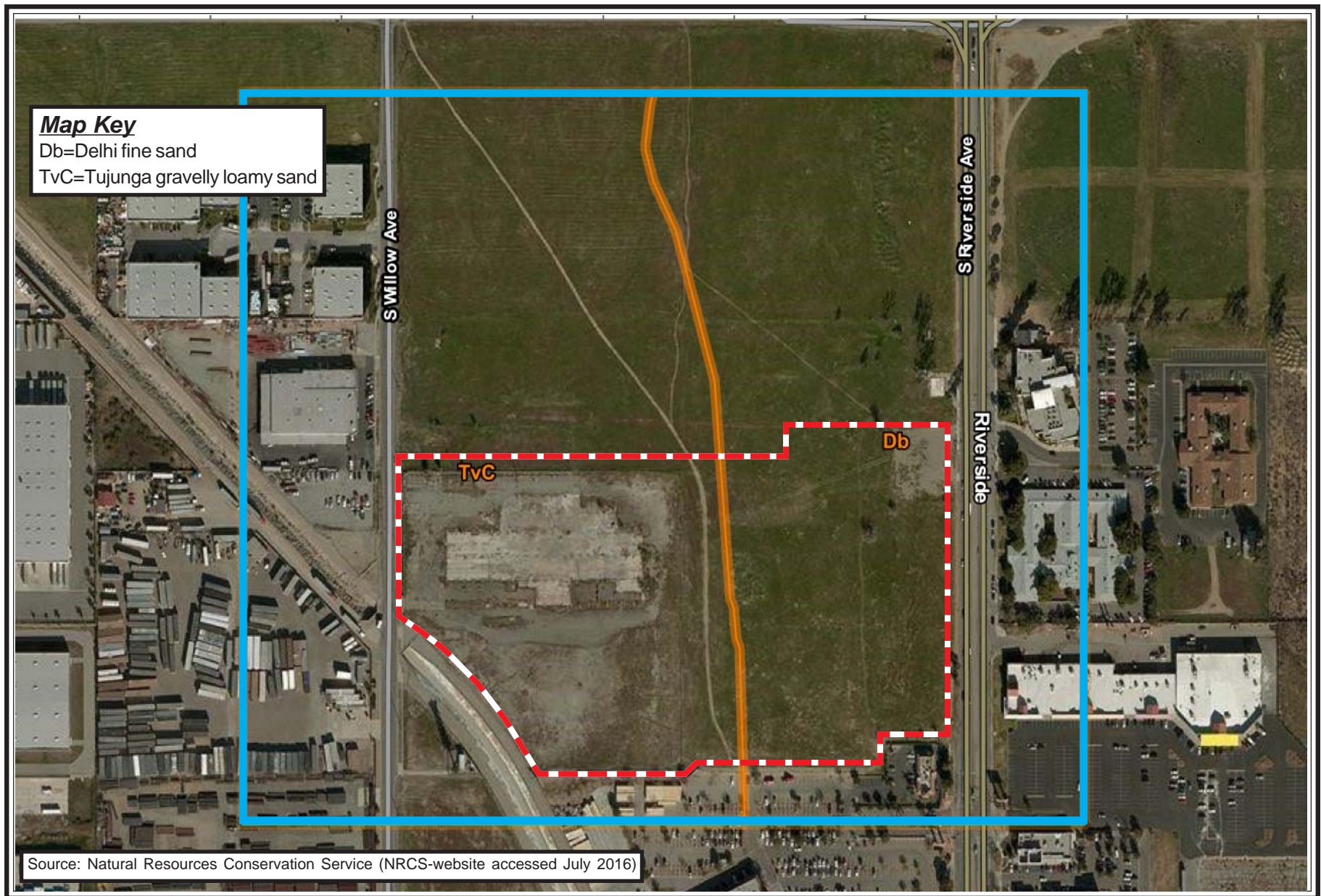
No DSFF were observed during focused surveys of the ± 18.5 -acre site conducted in July-September 2016. In addition, no other sign of recent DSFF occupation was detected (e.g., pupal skins). *Apiocera* were not recorded (taxa may be a potentially important DSFF habitat indicator species). Sand or soil inhabiting species such as bee flies (Bombyliidae) and Sphecids wasps (Sphecidae) were also observed. Overall abundance and diversity of wasps, flies, and beetles was lower than would be expected on unconsolidated Delhi sands or dune formations..

Discussion

It has long been established that a gradient of suitability exists composed of varying degrees of natural and artificial conditions. A variety of microhabitat characteristics generally comprise potential DSF habitat (e.g., vegetation composition, soil chemistry, topography, percent vegetative cover, frequency of non-native plant species, exposure to disturbances, etc.). Observations such as the DSFF's apparent avoidance of dense (both native and non-native) vegetation (>75% coverage) or general avoidance of vegetation that is sparse or not present at all (<5% coverage) appear to suggest that DSFF generally select habitats with a combination of some vegetation, including several species of plants, and some open space with bare sand (Kiyani 1996). While there is a correlation of DSF occurrence with these habitat indicators, the habitat indicators alone do not assure the presence or absence of DSFF. Microhabitat and life history requirements of DSFF are only poorly understood and the underlying soil environment may be the most determinative factor of whether an area can provide suitable habitat to support a DSFF population; specifically, sandy soil (usually Delhi series) in open areas with a sparse cover of perennial shrubs. However, key factors regulating DSFF populations have not been fully identified.

Although individual DSFF have been recorded from sites supporting mostly ruderal, non-native vegetation, most known DSFF-occupied sites contain areas, or are adjacent to areas, of relatively undisturbed exposed patches of friable, sandy soils in association with native plant species. History of DSFF colony sites indicates that previously disturbed (by grading, agriculture, etc.) Delhi sands formations may revert over a few years (through erosion, aeolian processes, fossorial animal activity, and natural vegetative succession) back to conditions capable of supporting DSFF populations. However, these natural processes are dependent upon a cessation of disturbance-related land uses and the presence of certain ecological components such as Delhi sands formations on or adjacent to the site. Current site and surrounding land use conditions do not appear to be conducive for the natural reestablishment of a more characteristic Delhi sand community. Approaches to artificial habitat restoration will vary from simple, relatively inexpensive, and predictably successful (in cases of enhancing partially occupied sites that are weed overgrown) to complex, costly, and unpredictable (USFWS 1997).

The site is located in the general vicinity of an area (or areas) known to either currently or historically support DSFF ($\pm 1,600$ feet to the east across Riverside Drive) and others located further east.



Dispersal patterns of adult DSFF are not well understood. Variables such as the length, width, and structural characteristics of dispersal corridors are not fully understood. While this species likely has the capability of dispersing over relatively large distances of seemingly unsuitable habitats under certain circumstances, it would be reasonable to assume based on the highly fragmented nature of habitats in the site vicinity and our current knowledge of the species that the likelihood of DSFF dispersing to the study area from any known occupied sites would be considered low.

Conclusion

Based on field survey results of the 2016 focused DSFF surveys, existing conditions at the subject ± 18.5 -acre site are generally not consistent with those expected to support extant DSFF populations in the region. Exposure to recurring and long-standing anthropogenic disturbances (discing, development) point toward the conclusion that the subject site does not likely contain habitat currently suitable to sustain a viable DSFF population, and is unlikely to support DSFF in the future as currently managed. These activities have presumably altered microhabitat conditions, which greatly reduce or eliminate the potential use of the site by DSFF. While some friable soils consistent with Delhi were recorded on site, the context in which these conditions occur does not constitute an extensive nor significant Delhi sands community most often associated with occupied DSFF habitat.

The subject site would also not likely be considered an important or viable property for preservation or restoration due to the overall absence of suitable habitat on or directly adjacent to the site and surrounding industrial land uses that have long since fragmented potential habitats in the area. In view of the negative 2016 survey results, highly degraded site conditions, and analysis of correlative habitat information from a wide range (e.g., relatively disturbed to more natural habitats) of occupied DSFF habitats in the region, the occurrence potential for DSFF on the subject site would be considered low. To make a more definitive conclusion, focused surveys conducted in 2017 would be required.

Φ

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

Ecological Sciences, Inc.



Scott D. Cameron
Principal Biologist

References

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Appendix A

General Insect Species List*

±18.5-acre Site
2016

<u>ORDER</u>	<u>FAMILY</u>	<u>GENUS or SPECIES</u>
DIPTERA	Bombyliidae	<i>Villa atrata</i>
	Bombyliidae	<i>Toxophora</i> sp.
	Calliphoridae	<i>Phaenicia sericata</i>
	Muscidae	<i>Musca domestica</i>
	Tabanidae	<i>Tabanus punctifer</i>
HYMENOPTERA	Apidae	<i>Apis mellifera</i>
	Formicidae	<i>Pogonomyrmex californica</i>
	Formicidae	<i>Formica</i> sp.
	Halictidae	<i>Agapostemon</i> sp.
	Ichneumonidae	<i>Ichneumon</i> sp.
	Pompilidae	<i>Pepsis</i> sp.
	Sphecidae	<i>Bembix comata</i>
	Vespidae	<i>Polistes</i> sp.
HEMIPTERA	Reduviidae	<i>Zelus tetracanthus</i>
NEUROPTERA	Myrmeleontidae	<i>Myrmeleon</i> sp.
COLEOPTERA	Coccinellidae	<i>Hippodamia convergens</i>
	Scarabaeidae	<i>Cotinus mutibilis</i>
LEPIDOPTERA	Pieridae	<i>Pieris protodice</i>
	Pieridae	<i>Pieris rapae</i>
	Pieridae	<i>Pontia protodice</i>
	Lycaenidae	<i>Strymon melinus</i>
	Hesperiidae	<i>Pyrgus communis</i>
ODONATA	Aeshnidae	<i>Aeshna muticolor</i>
ORTHOPTERA	Acrididae	<i>Trimerotropis palladipennis</i>
	Acrididae	<i>Schistocerca</i> sp..

Note: this list not intended to represent an exhaustive insect survey of the subject site. List compiled during focused Delhi Sands flower-loving fly surveys conducted between July-September 2016 by Ecological Sciences on the subject ±18.5-acre site located in San Bernardino County, California.

Appendix B
Common Wildlife Species List¹
±18.5-acre Site
2016

FAMILY

Scientific Name²

Common Name²

REPTILES

IGUANIDAE

Sceloporus occidentalis
Uta stansburiana

Western fence lizard
Side-blotched lizard

BIRDS

COLUMBIDAE

Zenaida macroura
Columba livia

Mourning dove
Rock dove

TYRANNIDAE

Tyrannis verticalis

Western kingbird

CORVIDAE

Corvus brachyrhynchos
Corvus corax

American crow
Common raven

MIMIDAE

Mimus polyglottos

Northern mockingbird

STURNIDAE

Sturnus vulgaris

European starling

FRINGILLIDAE

Carpodacus mexicanus

House finch

PASSERIDAE

Passer domesticus

House sparrow

MAMMALS

CANIDAE

Canis familiaris

Domestic dog

GEOMYIDAE

Thomomys bottae

Botta's pocket gopher

SCIURIDAE

Spermophilus beecheyi

California ground squirrel

KEY:

¹ Observed during focused surveys in July-September 2016 on the subject ±18.5-acre project site located in San Bernardino County, California. Not intended to represent an exhaustive list of vertebrate species; ² Scientific nomenclature and common names follow Collins et al. (1990); American Ornithologists' Union (1989); and Hall (1981).

