

FINAL ENVIRONMENTAL IMPACT REPORT

Volume II

SCH #2004071095

West Haven Specific Plan

(PSP03-006)

APPENDIX C

Biological Resources and Constraints Supporting Documentation:

- **Observed and Expected Fauna**
- **Focused Surveys for Delhi Sands Flower-Loving Fly**

Appendix C

West Haven Specific Plan Ontario, California

Observed and Expected Fauna

Abundance

- C = Common - Observed or expected throughout the Project site in high numbers
 F = Fairly Common - Observed or expected in moderate numbers over the Project site.
 U = Uncommon - Observed or expected in low numbers over the Project site.
 O = Occasional - Observed or expected only sporadically on the site.
 s = Scarce – Observed or expected only rarely.
 + = Presence noted by direct observation, identification of vocalization, observation of diagnostic sign (tracks, scat, burrows, etc.)
 * = Non-Native

Seasonality (birds)

- R = Resident – expected on the Project site any time of year.
 S = Summer – Present only during the summer nesting season.
 W = Winter – Present only during winter, nesting occurs elsewhere.
 V = Visitor – Nests off-site but may occur on the Project site from areas nearby.
 T = Transient – Seen in migration, unlikely to nest on the Project site.

Status Codes

- F2 = Federal Candidate, Category 2 for listing as endangered or threatened.
 F3c = Federal Candidate, Category 3c.
 FE = Federal Endangered
 SE = State Endangered
 CSC = California Species of Concern (CDFG).
 CT = California Threatened.
 SA = CDFG Special Animal

<u>Scientific Name</u>	<u>Common Name</u>	<u>Abundance</u>
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MAMMALS

SORICIDAE – Shrews

<i>Notiosorex crawfordi</i>	Desert Shrew	s
<i>Sorex o. ornatus</i>	Ornate Shrew	s

DIDELPHIDAE - Opossums

<i>Dideelphis marsupialis</i>	Virginia Opossum	F
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TALPIDAE- Moles

<i>Scapanus latimanus</i>	Broad-handed Mole	O
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VESPERTILIONIDAE – Plainnose Bats

<i>Myotis thysanodes</i>	Fringed Myotis (F2)	s
<i>Myotis evotis</i>	Long Eared Myotis	s
<i>Myotis californicus</i>	California Myotis	s
<i>Myotis leibii</i>	Small Footed Myotis (F2)	s
<i>Myotis yumanensis</i>	Yuma Myotis (F2)	s
<i>Myotis volans</i>	Hairy Winged Myotis	s
<i>Lasiurus cinerea</i>	Hoary Bat	s
<i>Lasiurus borealis</i>	Red Bat	s
<i>Pipistrellus Hesperus</i>	Western Pipistrelle	s
<i>Eptesicus fuscus</i>	Big Brown Bat	s
<i>Euderma maculatum</i>	Spotted Bat (CSC, F2)	s
<i>Plecotus townsendi pallascens</i>	Pale big-eared Bat (CSC, F2)	s
<i>Antrozous pallidus</i>	Pallid Bat (CSC)	s

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MOLOSSIDAE- Freetail Bats		
<i>Eumops perotis californicus</i>	California Mastiff Bat (CSC, F2)	s
<i>Tadarida brasiliensis</i>	Brazilian Freetail Bat	s
LEPORIDAE – Hares and Rabbits		
<i>Lepus californicus bennettii</i>	San Diego Black-tailed Hare (CSC, F2)	s
<i>Sylviaugus audubonii</i>	Desert Cottontail	U
SCIURIDAE – Squirrels		
<i>Spermophilus beechyi</i>	California Ground Squirrel	F
GEOMYIDAE – Pocket Gophers		
<i>Thomomys bottae</i>	Botta's pocket Gopher	U
HETEROMYIDAE – Pocket and Kangaroo Mice and Rats		
<i>Perognathus f. fallax</i>	San Diego Pocket Mouse	U
<i>Perognathus longimembris brevinasus</i>	Los Angeles Pocket mouse	s
<i>Perognathus californicus dispar</i>	Californian Pocket Mouse	O
<i>Dipodomys a. agilis</i>	Pacific Kangaroo Rat	s
<i>Dipodomys merriami</i>	Merriam's Kangaroo Rat (FE, SE)	s
CRICETIDAE – Mice, Rats, Lemmings, Voles		
<i>Reithrodontomys megalotis longicaudis</i>	Western Harvest Mouse	O
<i>Peromyscus a. eremicus</i>	Cactus Mouse	O
<i>Peromyscus californicus insignis</i>	Parasitic Mouse	U
<i>Peromyscus maniculatus gambelii</i>	Deer Mouse	U
<i>Peromyscus boylii rowleyi</i>	Brush Mouse	O
<i>Neotome lepida intermedia</i>	Desert Woodrat (F2)	O
<i>Microtus californicus sanctidiegi</i>	California Vole	s
<i>Onychomys torridus Ramona</i>	Southern Grasshopper Mouse (F2)	s
MURIDAE – Old World Rats and Mice		
<i>Rattus norvegicus</i>	Norway Rat	F
<i>Rattus rattus</i>	Black Rat	F
<i>Mus musculus</i>	House Mouse	C
CANIDAE – Dogs, Wolves, Foxes		
<i>Canis latrans ochropus</i>	Coyote	F
<i>Canis familiaris</i>	Domestic Dog	F
<i>Urocyon cinereoargenteus californicus</i>	Gray Fox	S
PROCYONIDAE – Raccoons, Coatis		
<i>Procyon lotor</i>	Raccoon	U
MUSTELIDAE – Weasels, Skunks, Badgers		
<i>Mustela frenata</i>	Long Tailed Weasel	s
<i>Taxidea taxus</i>	American Badger (SA)	s
<i>Spilogale gracilis</i>	Western Spotted Skunk	O
<i>Mephitis mephitis</i>	Striped Skunk	U

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FELIDAE – Cats		
<i>Felis rufus</i>	Bobcat	s
<i>Felis catus</i>	House Cat	O
BOVIDAE – Cattle		
<i>Bos sp.</i>	Cattle	C
<u>AMPHIBIANS</u>		
PLETHODONTIDAE – Slender Salamanders		
<i>Batrachoseps nigriventris</i>	Black Bellied Slender Salamander	O
<i>Batrachoseps pacificus</i>	Pacific Slender Salamander	s
PELOBATIDAE – Spadefoots		
<i>Scaphiopus hammondi</i>	Hammond's Spadefoot (CSC, F2)	s
BUFONIDAE – True Frogs		
<i>Bufo boreas halophilus</i>	Western Toad	O
HYLIDAE – Treefrogs		
<i>Pseudacris regilla</i>	Pacific Treefrog	O
RANIDAE – True Frogs		
* <i>Rana catesbeiana</i>	Bullfrog	O
<u>REPTILES</u>		
EMYDIDAE – Box and Water Turtles		
<i>Actinemys marmorata pallida</i>	Southwestern Pond Turtle (CSC, F2)	s
IGUANIDAE – Iguanids		
<i>Sceloporus occidentalis biseriatus</i>	Western Fence Lizard	F
<i>Uta stansburiana hesperis</i>	California Side Blotched Lizard	F
<i>Phrynosoma coronatum blainvillei</i>	San Diego Coast Horned Lizard (CSC, F2)	s
SCINCIDAE – Skinks		
<i>Eumeces s. skiltonianus</i>	Western Skink	O
<i>Eumeces gilberti</i>	Gilbert's Skink	s
TEIIDAE – Whiptails		
<i>Cnemidophorus tigris multiscutatus</i>	Western Whiptail	s
ANGUIDAE – Alligator Lizards		
<i>Elgaria multicarinatus webbi</i>	San Diego Alligator Lizard	O
ANNIPELLIDAE - California Legless Lizards		
<i>Anniella p. pulchra</i>	Silvery Legless Lizard (CSC, F2)	s
LEPTOYPHLOPIDAE – Slender Blind Snakes		
<i>Leptotyphlops humilis</i>	Western Blind Snake	s

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COLUBRIDAE – Colubrids

<i>Diadophis punctatus modestus</i>	San Bernardino Ringneck Snake (F2)	s
<i>Masticophis flagellum piceus</i>	Red Coachwhip	s
<i>Coluber constrictor morman</i>	Western Yellow-bellied racer	s
<i>Pituophis melanoleucus annectens</i>	San Diego Gopher Snake	U
<i>Salvadora hexalepis virgulata</i>	Coast Patch-nosed Snake (CSC, F2)	s
<i>Lampropeltis getulus californiae</i>	California Kingsnake	O
<i>Rhinocheilus l. lecontei</i>	Western long-nosed Snake	s
<i>Tantilla planiceps</i>	California Black-headed Snake	s
<i>Trimorphodon biscutatus vandenburghi</i>	California Lyre Snake	s
<i>Arizona eglans occidentalis</i>	California Glossy Snake	s

VIPERIDAE- Vipers

<i>Crotalis viridis helleri</i>	Southern Pacific Rattlesnake	s
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BIRDS

PODICIPEDIDAE – Grebes

<i>Podilymbus podiceps</i>	Pied-billed Grebe	F,W/O,S
+ <i>Podiceps nigricollis</i>	Eared Grebe	F,W
<i>Aechmophorus occidentalis</i>	Western Grebe	O,W

PHALACROCORACIDAE – Cormorants

+ <i>Phalacrocorax auritus</i>	Double Crested Cormorant (CSC)	F,W/O,S
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ARDEIDAE – Bitterns and Herons

<i>Ardea herodias</i>	Great Blue Heron (SA)	F,W/O,S
<i>Ardea alba</i>	Great Egret (SA)	F,R
<i>Butorides virescens</i>	Green Heron	U,W/s,S
+ <i>Bubulcus ibis</i>	Cattle Egret	F,R
+ <i>Egretta thula</i>	Snowy Egret (SA)	F,R

THRESKIORNITHIDAE – Ibis

+ <i>Plegadis chihi</i>	White-faced ibis (CSC, F2)	s,W
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ANATIDAE – Swans, Geese and Ducks

<i>Anser albifrons</i>	Greater White-fronted Goose	O,T
<i>Anser caerulescens</i>	Snow Goose	O,W/T
+ <i>Branta Canadensis</i>	Canada Goose	F,W
+ <i>Anas Americana</i>	American Widgeon	C,W
+ <i>Anas crecca</i>	Green-winged Teal	F,W
+ <i>Anas platyrhynchos</i>	Mallard	C,R
+ <i>Anas strepera</i>	Gadwall	U,W
+ <i>Anas acuta</i>	Northern Pintail	O,W
<i>Anas discors</i>	Blue-winged Teal	s,W
+ <i>Anas cyaoptera</i>	Cinnamon Teal	F,T/O,S
<i>Aythya valisineria</i>	Canvasback	O,W
+ <i>Aythya collaris</i>	Ring-necked Duck	F,W
<i>Aythya Americana</i>	Redhead	s,W
<i>Aythya affinis</i>	Lesser Scaup	O,W
<i>Bucephala albeola</i>	Red-breasted Merganser	U,W
+ <i>Oxyura jamaicensis</i>	Ruddy Duck	F,W/O,S

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CATHARTIDAE – New World Vultures

Cathartes aura Turkey Vulture O,W

ACCIPITRIDAE – Hawks

+ *Elanus leucurus* White-tailed Kite (SA, CP) O,R
Circus cyaneus Northern Harrier (CSC) s,W
Accipiter striatus Sharp-shinned Hawk (CSC) U,W/T
Accipiter cooperi Cooper's hawk (CSC) s,W/T
Buteo jamaicensis red-tailed hawk F,R
Buteo swainsoni Swainson's Hawk s,T
Buteo regalis Ferruginous Hawk O,W

FALCONIDAE – Falcons

Falco sparverius American Kestrel F,R
Falco columbarius Merlin (CSC) s,W/T
Falco mexicanus Prairie Falcon s,W

PHASIANIDAE – Grouse and Quail

Callipepla californica California Quail U,R

RALLIDAE – Rails, Gallinules

Rallus limicola Virginia Rail s,W
Porzana carolina Sora O,W
Gallinula chloropus Common Moorhen U,W/s,R
Fulica Americana American Coot C,R

RECURVIROSTRIDAE – Stilts and Avocets

+ *Himantopus mexicans* Black Necked Stilt O,W
+ *Recurvirostra americana* American Avocet O,W

CHARADRIIDAE – Plovers

Pluvialis squatarola Black-bellied Plover U,W
+ *Charadrius vociferous* Killdeer C,R
Charadrius monachus Mountain Plover (CSC, F2) s,W/T

SCOLOPACIDAE – Sandpipers and Phalaropes

+ *Tringa melanoleuca* Greater Yellowlegs U,W
Acutis macularia Spotted Sandpiper O,W
Catoptrophorus semipalmatus Willet O,W
Numenius americanus Long-billed Curlew (CSC) O,W
Limosa fedoa Marbled Godwit U,W
+ *Calidris marui* Western Sandpiper U,T
+ *Calidris minutilla* Least Sandpiper F,W
+ *Limnodromus scolopaceus* Long-billed Dowitcher F,W
Gallinago gallinago Common Snipe O,R

LARIDAE – Gulls and Terns

+ *Larus philadelphia* Bonaparte's Gull F,W
+ *Larus delawarensis* Ring-billed Gull C,W
Sterna caspia Caspian Tern (SA) s,W/U,S
Sterna forsteri Foster's Tern (SA) F,R

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COLUMBIDAE – Doves and Pigeons

<i>+ Columba livia</i>	Rock Dove	C,R
<i>+ Zenaida macroura</i>	Mourning Dove	F/R
<i>Streptopelia chinensis</i>	Spotted Dove	U/R

CUCLIDAE – Cuckoos

<i>Geococcyx americanus</i>	Greater Roadrunner	s/R
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TYTONIDAE – Barn Owls

<i>Tyto alba</i>	Barn Owl	O,R
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STRIGIDAE – Typical Owls

<i>Bubo virginianus</i>	Great-horned Owl	O,R
<i>Athene cunicularia hypugen</i>	Western Burrowing Owl (CSC, F2)	s,R

CAPRIMULGIDAE – Goatsuckers

<i>Chordeiles acutipennis</i>	Lesser Nighthawk	s,S/s,T
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APODIDAE – Swifts

<i>Chaetura vauxi</i>	Vaux's Swift	s,W
<i>Aeronautes saxatalis</i>	White-throated Swift	U,W

TROCHILIDAE- Hummingbirds

<i>Archilochus alexandri</i>	Black-chinned Hummingbird	O,S
<i>Calypte costae</i>	Costa's Hummingbird	O,T
<i>Calypte anna</i>	Anna's Hummingbird	U,R
<i>Selasphorus rufus</i>	Rufous Hummingbird	O,T
<i>Selasphorus sasin</i>	Allen's Hummingbird	O,T

ALCEDINIDAE – Kingfishers

<i>Ceryle alcyon</i>	Belted Kingfisher	O,W
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PICIDAE – Woodpeckers

<i>Melanerpes formicivorus</i>	Acorn Woodpecker	O,R
<i>Sphyrapicus ruber</i>	Red-breasted sapsucker	s,W
<i>Picoides nuttallii</i>	Nuttall's Woodpecker	O,R
<i>Picoides pubescens</i>	Downy Woodpecker	O,W/s,S
<i>Colaptes auratus</i>	Northern Flicker	U,R

TYRANNIDAE – Tyrant Flycatchers

<i>Tyrannus vociferans</i>	Cassin's Kingbird	O,W/F,S
<i>Tyrannus verticalis</i>	Western Kingbird	F,S
<i>Myiarchus cinerascens</i>	Ash-throated Flycatcher	s,W/O,S
<i>+ Sayornis nigricans</i>	Black Phoebe	F,R
<i>Sayornis saya</i>	Say's Phoebe	U,W
<i>Empidonax difficilis</i>	Pacific-slope Flycatcher	O,T

ALAUDIDAE – Larks

<i>Eremophila alpestris</i>	Horned Lark	U,R
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EMBERIZIDAE— Wood Warblers, Blackbirds, Orioles, Tanagers and Sparrows

+ <i>Dendroica coronata</i>	Yellow-rumped Warbler	F, W
<i>Dendroica townsendi</i>	Townsend's Warbler	s, W/O, T
<i>Dendroica nigrescens</i>	Black-throated Gray Warbler	s, W/O, T
<i>Wilsonia pusilla</i>	Wilson's Warbler	s, W/O, T
<i>Vermivora celata</i>	Orange-crowned Warbler	s, W/O, T
<i>Geothlypis trichas</i>	Common Yellowthroat	s, W/O, T
+ <i>Euphagus cyanocephalus</i>	Brewer's Blackbird	C, R
+ <i>Agelaius phoeniceus</i>	Red-winged Blackbird	F, R
<i>Agelaius tricolor</i>	Tri-colored Blackbird (F2, CSC)	s, R
+ <i>Sturnella neglecta</i>	Western Meadowlark	F, R
+ <i>Molothrus ater</i>	Brown-headed Cowbird	F, R
<i>Icterus bullockii</i>	Bullock's Oriole	O, S
<i>Icterus cucullatus</i>	Hooded Oriole	s, S
<i>Quiscalus mexicanus</i>	Great-tailed Grackle	O, R
+ <i>Zonotrichia leucophrys</i>	White-crowned Sparrow	F, W
<i>Zonotrichia atricapilla</i>	Golden-crowned Sparrow	U, W
<i>Chondestes grammacus</i>	Lark Sparrow	U, W
+ <i>Passerculus sandwichensis</i>	Savannah Sparrow	U, W
<i>Pipilo maculatus</i>	Spotted Towhee	O, R
<i>Pipilo crissalis</i>	California Towhee	O, R
<i>Junco hyemalis oreganos</i>	Dark-eyed Junco	U, W

FRINGILIDAE - Finches

+ <i>Carpodacus mexicanus</i>	House Finch	F, R
<i>Carpodacus purpureus</i>	Purple finch	O, W
<i>Carduelis tristis</i>	American Goldfinch	U, R
<i>Carduelis psaltria</i>	Lesser Goldfinch	F, R
<i>Carduelis lawrencei</i>	Lawrence's Goldfinch	s, S

**REPORT OF YEAR 2003 FOCUSED SURVEY FOR
DELHI SANDS FLOWER-LOVING FLY
AT WEST HAVEN SPECIFIC PLAN COMPONENT 6 SITE
SAN BERNARDINO COUNTY, CALIFORNIA**

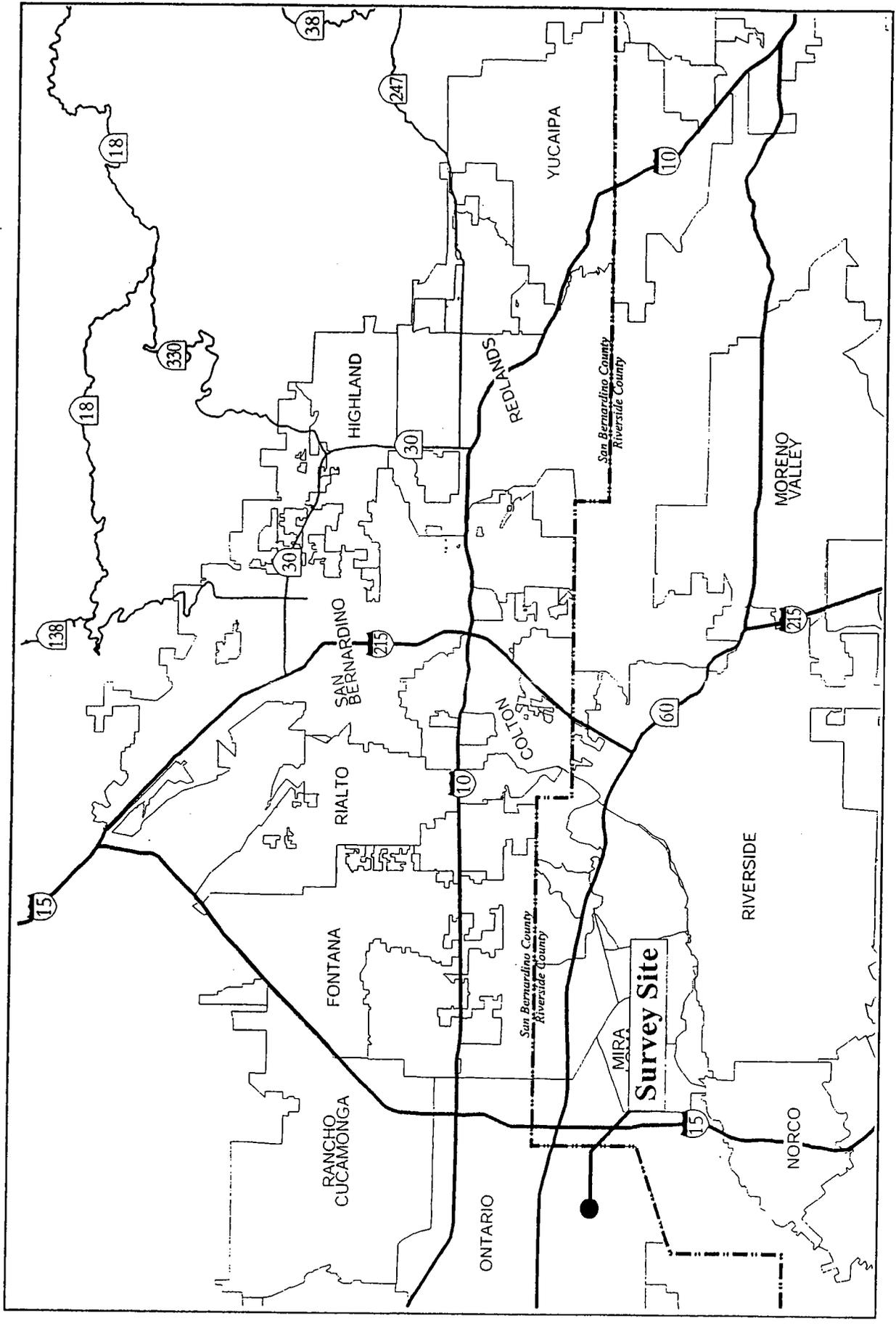
Prepared for:

JMS Turner LLC
P.O. Box 10757
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Prepared by:

Larry Munsey International
220 Commerce, Suite 200
Irvine, California 92618
(714) 508-1255

December 2003

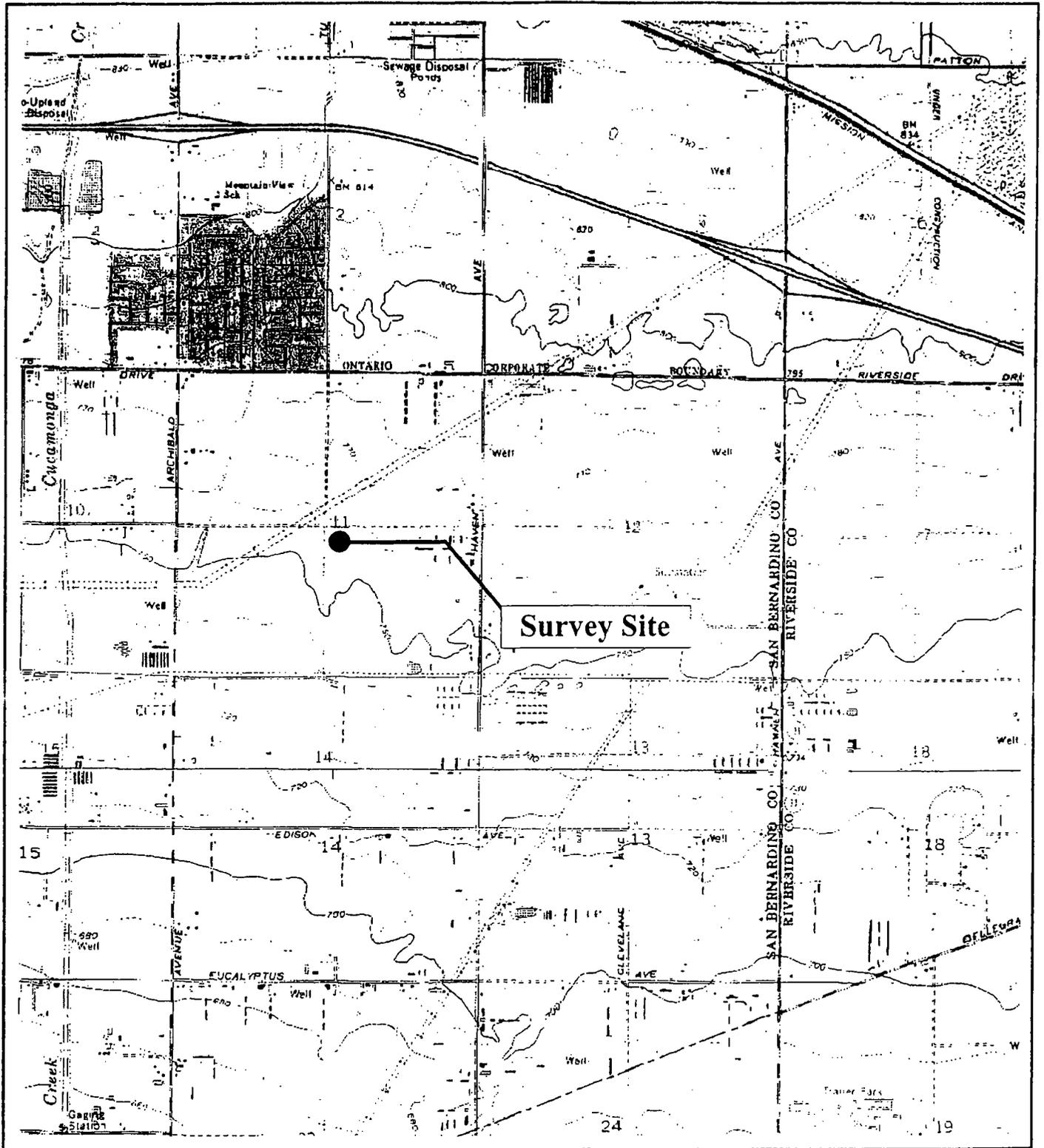


Larry Munsey International



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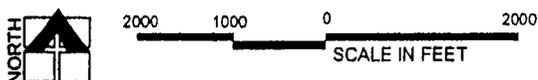
figure 1
Regional Location



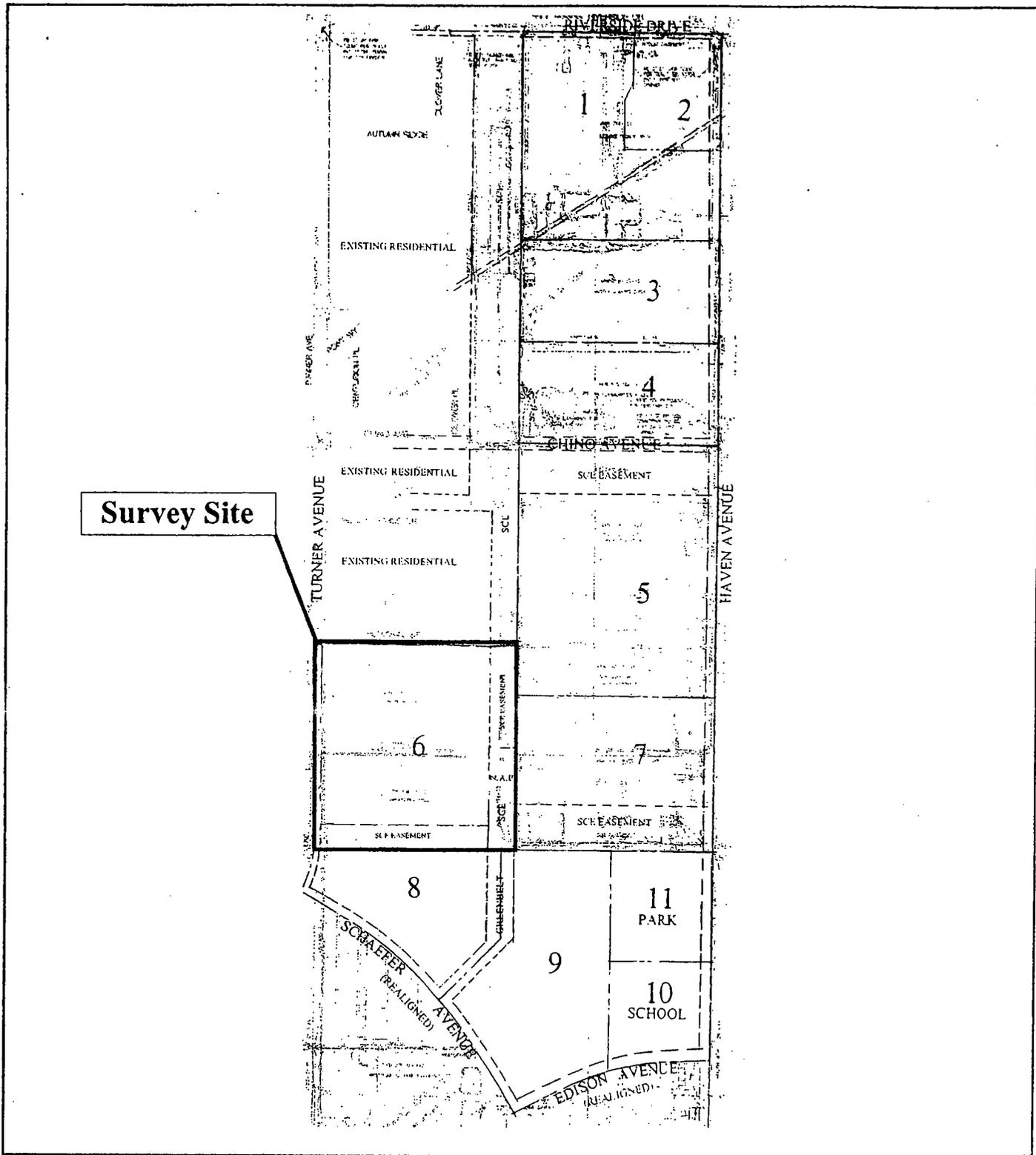
Source: USGS Guastl 7.5' DRG, 1966 - Photo Revised 1981.



figure 2
Area Location



JMS Turner LLC
Year 2003 DSF Survey • West Haven Specific Plan
Component 6



Source: Kaufman Meeks + Partners, 2000.



figure 3
Site Location

Though museum records indicate its historic range likely included the entire expanse of Delhi Sands soils (Ballmer 1989), the current literature indicates the known distribution of the DSF, as of spring 1997, is restricted to 12 disjunct locations totaling approximately 190 ha (450 ac) situated within a 13-km (8-mi) radius reaching from Colton to Mira Loma, California (Ballmer 1992; USFWS 1992, 1993, 1996a, 1997). This represents a small fraction of its former range (USFWS 1996a, 1997). DSF sightings reported from recent surveys suggest the current range of the DSF may actually extend as far west as Ontario.

Much of the Colton Dunes region has been used for agriculture, chiefly grapes and citrus, since the 1800's. More recently, much of the remaining area has been converted to dairies, housing tracts, and commercial/industrial enterprises. Additional habitat has been lost, degraded, and fragmented by sand mining, illegal dumping, off-road vehicle usage, trampling, vegetation clearing for fire prevention, and competitive exclusion of native plants by invasion of exotic species.

The DSF undergoes complete metamorphosis (egg, larva, pupa, and adult). The complete life span of the species is unknown. Under favorable environmental conditions, the life cycle is likely annual, but it is possible that the larval/pupal stages may last two years or longer, depending on availability of food, temperature, rainfall, and other environmental factors. Except for the adult stage, the remainder of the life cycle is spent underground. It is unknown where the larval form of the DSF lives below ground and what its microhabitat requirements may be. It is not clear whether the early stages of *Rhaphiomidas* in general are herbivores, detritivores, or carnivores. The larvae of the closely related genus *Apiocera* have been successfully raised on earthworms in the laboratory (Cazier 1982).

Adult DSF emerge and become active in the late summer. Collection records for the DSF (Ballmer 1989) and current behavioral studies (Kingsley 1996) document a single annual flight period occurring between early August and early to mid-September. The exact adult life span is not known (several days to several weeks has been postulated), but it is documented that adults do not survive beyond the end of the annual flight period (Kiyani 1995).

Adult DSF are active during the warmest portions of the day during periods of direct sunlight, generally when daytime temperatures exceed 27 degrees Celsius (80 degrees Fahrenheit) (Ballmer 1989). Peak activity period is between 1000 and 1300 hours PDT; males are rarely, if ever, observed outside 0900-1500 hours, while females have been observed perched on bushes as early as 0800 hours and after nightfall (Kingsley 1996). Flight has not been observed during cloudy, overcast, or rainy conditions, and only rarely during windy or breezy conditions, such as commonly arise in the afternoons within the DSF's range. During these conditions some observations have been made of perching within vegetation. Oviposition has only been observed in mid- to late afternoon, when temperatures begin to decrease (USFWS 1997).

While aloft, DSF may exhibit at least five distinctive types of behavior, each associated with a markedly different flight pattern (Kiyani 1995; Kingsley 1996). "Cruising" or "patrolling", employed by males only, constitutes slow, near-ground, somewhat erratic flight, sustained for relatively long duration with only momentary rest stops during which plants are circled and examined in search of females. Short-movement flight entails relatively slow, low-level, more-or-less direct-line movement from one perch to another nearby, apparently involving no searching. Rapid (or "rocket") flight proceeds in a straight line at above-ground heights of 2 m or more, and functions for longer-distance movement from one place to another, including probably random dispersal. DSF hover in stationary flight (like a hummingbird) over flowers while feeding. Males exhibit territorial behavior by pursuit flight: short bursts pursuing other DSF males or other species of insects that may fly near their "defended" territory; this pursuit may culminate in midair "wrestling" and tumbling to the ground followed by further pursuit, or by the original pursuer returning to the vicinity where the flight originated.

Mating among members of the DSF genus has been described by Rogers and Mattoni (1993). After mating, the females lay their eggs in suitable sandy soil. Females possess specialized egg-laying organs enabling the placement of eggs a few centimeters beneath the surface of the sand. This adaptation assures that the eggs are placed in a cooler and moister environment than the surface of the sand. Most oviposition takes place in the shade of shrubs, such as telegraph weed (*Heterotheca grandiflora*) (Rogers

and Mattoni 1993). The combination of environmental factors required of suitable ovipositing sites is not known.

Adult DSF have rarely been observed taking nectar from flowers, and have not been seen to take other fluids. The nectaring events observed have been brief, on the order of 2-10 seconds, and the only published accounts have all been restricted to flowers of the California buckwheat (*Eriogonum fasciculatum* (Kingsley 1996; USFWS 1997). Rogers (1996, 1998) has reported nectaring observations also involving tarweed (*Hemizonia fasciculata*) and wreathplant (*Stephanomeria virgata*).

Little is known regarding predators of the DSF. The introduced Argentine ant (*Iridomyrmex humilis*) has been observed to attack and kill a recently emerged adult DSF (Rogers 1993b). Rogers and Mattoni (1993) and Cazier (1985) reported that large robber flies prey upon *Rhaphiomidas* flies. Other predators of the adult flies may include dragonflies and insectivorous birds. Predators of the early DSF stages are unknown, but may include ants, other subterranean predatory insects, and reptiles.

Reliable estimates of DSF population sizes are unavailable. At the San Bernardino County Hospital preserve, the DSF population was estimated at 7 to 10 in 1994, 4 to 9 in 1995, 5 to 13 in 1996, and 5 to 15 in 1997 (Kiyani 1997). Kiyani (1996a,b; 1997) notes a number of assumptions and uncertainties regarding population counts of the DSF, and thus these estimates must be considered tentative. At another site in 1989, a direct count of 13 individuals was made within a half hour over a 10-ac portion of a 150-ac site (Ballmer 1989; USFWS 1997). It has been speculated that typical DSF population densities are likely on the order of 24/ha (10/ac) (USFWS 1997).

Along with other species in the genus, the DSF appears to have very narrow habitat requirements (Rogers and Mattoni 1993); moreover, different microhabitats are selected depending upon sex and specific behaviors involved (Kingsley 1996). The primary habitat requirement for the DSF is sandy substrate with a sparse cover of perennial shrubs and other vegetation. Based upon observations of this and several other members of the *Rhaphiomidas* genus, optimal vegetative cover is probably less than 50 percent, and may be as low as 10-20 percent (USFWS 1997).

The specific species composition and densities of plants preferred by the DSF are currently unknown (Kiyani 1996a). Definitive associations of adults with specific plants have not been established. Typically, the native plant species most consistently found where the DSF occurs (thus commonly considered "indicator species" of suitable habitat) are California buckwheat, telegraph weed, and California croton (*Croton californicus*) (Ballmer 1989; USFWS 1997). Though the former two have been implicated recently as possibly essential to the fly (Kingsley 1996), it has not been conclusively demonstrated whether any of these or other particular plants actually provide resources critical to the DSF, or if they are simply indicators of other, less obvious, habitat factors required by this species. Additional native plants found commonly where the DSF occurs include annual bur-sage (*Ambrosia acanthicarpa*), rancher's fireweed (*Amsinckia menziesii*), vinegar weed (*Lessingia glandulifera*), sapphire eriastrum (*Eriastrum sapphirinum*), and Thurber's spineflower (*Centrostegia thurberi*). Though the foregoing plants are those that occur most commonly in locations where the DSF is found, they also occur where it is not found and their presence does not necessarily imply the presence of the DSF.

Invasive non-native vegetation severely degrades or eliminates the habitat of the DSF (USFWS 1997). Non-native plants especially notorious in this respect include Russian thistle (*Salsola tragus*), horehound (*Marrubium vulgare*), mustard (*Brassica* sp., *Hirschfeldia incana*), cheese weed (*Malva parviflora*), and many species of introduced grasses such as rip gut brome (*Bromus diandrus*) and foxtail chess (*Bromus madritensis* ssp. *rubens*). These exotic plants may alter the amount of soil moisture or make the substrate physically unsuitable for the survival of the DSF and other native subterranean invertebrates.

Notwithstanding the foregoing inferences regarding habitat preferences and requirements, the DSF has been recorded from time to time (albeit in low number and usually fleetingly) in habitats that are substantially degraded and possessed of few apparently favorable attributes for the species. Moreover, the current absence of the DSF on a particular site within its range does not necessarily indicate that future occupation could not occur or re-occur should conditions on the site become more suitable. For example,

the DSF has been recorded recently on certain sites that have been graded or disced repeatedly in the past, after such activity ceased and to some extent the site returned to more natural conditions.

As mandated by the ESA, the USFWS has prepared a recovery plan for the DSF (USFWS 1997). The objective of the recovery plan is to ultimately reduce the risk of DSF extinction to the point that it can be downlisted, *i.e.*, removed from listing as an endangered species. The plan establishes three geographically defined recovery units (RU) known as the Ontario, Jurupa, and Colton RUs. The Survey Site falls within the Colton RU, which contains the majority of currently known populations of DSF.

In order to accomplish its objective, the DSF Recovery Plan predicates that each RU must contain occupied and/or restorable-to-suitable-for-occupation habitat for at least one population of DSF. Further, the plan stipulates that a minimum of eight DSF populations must occur across the 3 RUs, of which four must be in the Colton RU, two each on either side of the east-west running Interstate 10.

EXISTING CONDITIONS

The Survey Site is a roughly square-shaped parcel of partially fenced vacant land surrounded by dairy farm and residential land uses, specifically as follows: N – residential; E – dairy; S – dairy; W – residential. The topography of the site, which has been disced the recent past, is flat. Natural site substrate is classified by soil maps of the U.S. Department of Agriculture (USDA 1980) as Delhi Fine Sand soil formation.

Vegetation on the site consists of a ruderal (weedy) mixture of native and non-native subshrubs, grasses, and forbs (herbs other than grasses) that are good colonizers of disturbed areas. Among these are ripgut brome, Bermuda grass (*Cynodon dactylon*), short-podded mustard, Russian thistle, red-stemmed filaree (*Erodium cicutarium*), and cheese weed. Most of these invasive species are known to be deleterious to the suitability of habitat for the DSF. None of the three plant species (telegraph weed, croton, and California buckwheat) commonly considered indicative of habitat suitable for the DSF is present on the site.

Plant diversity on the site is quite low. A total of 15 species in 9 families was detected (Appendix A); of these, all but three are non-native. Vegetation cover is dense over most of the site.

METHODS

Review of Existing Information

Documentation pertinent to the biology of the DSF and biological resources in the vicinity of the Survey Site was compiled, reviewed, and analyzed. Information reviewed included: (1) Federal Register listing package for the Delhi Sands flower-loving fly; (2) literature pertaining to habitat requirements of the DSF; (3) the Recovery Plan for the DSF (USFWS 1997), and (4) California Natural Diversity Data Base (CNDDB 2000).

Concurrent with this survey, sites within the vicinity of the Survey Site known to be occupied by the DSF were visited to assess directly or by discussion with other surveyors the current status and activity patterns of various DSF populations in the region.

Focused Survey

A focused survey was conducted for the DSF on the Survey Site to assess its presence or absence. The survey was conducted in accordance with USFWS interim general survey guidelines, which recommend 2 replicate surveys per week during the flight period of the DSF (defined by survey guidelines as 1 August through 20 September, but modified by the Service for the current year to commence 15 July), to be performed between the hours of 1000 and 1400 during appropriate weather conditions (USFWS 1996b). Surveys were conducted by Larry Munsey (TE 838741-0).

A total of 20 surveys was performed on the following dates: 13, 15, 20, 22, 27, 29 July; 3, 5, 10, 12, 17, 19, 24, 26, 31 August; and 2, 7, 9, 14, 16 September 2003. Weather conditions during the surveys were generally conducive to high levels of invertebrate activity. Temperatures typically ranged between 27 and

38°C (80-100 °F), reaching a high of 42°C (108 °F) on one occasion. In one instance during the final week of the survey the temperature only at the beginning of the survey period was lower (24 °C [76 °F]). Also, in one instance during the final week of the survey the low temperature failed to exceed 27 °C (80 °F) during the survey period, reaching a maximum of 25 °C (77 °F). Wind speed ranged generally from 0 to 7 km/hr (0 to 4 mi/hr) with infrequent gusts to 16 km/hr (10 mi/hr). Skies were generally clear or with scattered clouds, with a few exceptions when hazy or overcast conditions prevailed.

During the surveys, the Survey Site was walked systematically and deliberately in search of both DSF sexes and discarded pupal cases. The surveys included careful examination of plant flowers, stems, and foliage; open patches of sand; shaded areas at the base of plants; air space in the immediate vicinity of flowering plants; and general air space within unaided vision above the site. Thus, an exhaustive search was accomplished for flying, feeding, perching, or otherwise engaged flies.

All insects encountered during the surveys were identified to the lowest possible taxon, either by sight or, when necessary, by capture and subsequent determination in the laboratory. Only active and exposed macro insect fauna was considered, thus other less obvious groups no doubt also present (e.g., springtails, termites, earwigs, thrips, etc.) were not recorded.

RESULTS AND DISCUSSION

No DSF or DSF sign (*i.e.*, discarded pupal cases) were observed on the Survey Site during the current survey, nor was the DSF detected on the site during the prior year's survey (LMI 2002).

Birds observed or heard on or above the Survey Site included the cattle egret (*Bubulcus ibis*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), rock dove (*Columba livia*), mourning dove (*Zenaidura macroura*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), barn swallow (*Hirundo rustica*), and several species of songbirds. Other vertebrates detected were the side-blotched lizard (*Uta stansburiana*), pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), cottontail (*Sylvilagus audubonii*), and heteromyid rodents (burrows, tracks, and tail drags).

A total of 62 species of insects in 39 families was recorded on the Survey Site during the survey. A full list of insects observed is provided in Appendix B.

Based upon the following factors it may be concluded that the Survey Site is not occupied by the DSF nor is any suitable habitat for the species present:

- no observations of DSF on the site during two consecutive years in which environmental conditions in the region were apparently favorable for DSF emergence and above-ground activity, and during times when adults of the species were reported at other locations within its range;
- very low diversity of plants on the site, and absence of telegraph weed, California croton, and California buckwheat;
- high proportion of non-native invasives in the site's plant composition;
- high density of groundcover over most of the site;
- disturbed condition of site; and
- type and condition of the habitat surrounding the site.

The results of this and the former year's survey as reported herein satisfy the Federal requirement to demonstrate the absence of the DSF on the Survey Site.

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APPENDICES

APPENDIX A PLANTS OBSERVED ON THE PROJECT SITE¹

ANGIOSPERMS (DICOTYLEDONS)

AMARANTHACEAE — AMARANTH FAMILY

- * *Amaranthus* sp. – pigweed

ASTERACEAE — SUNFLOWER FAMILY

- Artemisia californica* – California sagebrush
- Baccharis salicifolia* – mule fat
- * *Sonchus oleraceus* – common sow thistle
- * *Verbesina encelioides* – golden crownbeard

BRASSICACEAE — MUSTARD FAMILY

- * *Hirschfeldia incana* – short-podded mustard

CHENOPODIACEAE — GOOSEFOOT FAMILY

- * *Chenopodium album* – lamb's quarters
- * *Salsola tragus* – Russian thistle

GERANIACEAE — GERANIUM FAMILY

- * *Erodium cicutarium* – red-stemmed filaree

MALVACEAE — MALLOW FAMILY

- * *Malva parviflora* – cheeseweed

SOLANACEAE — NIGHTSHADE FAMILY

Datura wrightii – jimson weed

VITACEAE — GRAPE FAMILY

- * *Vitis vinifera* – cultivated grape

ANGIOSPERMS (MONOCOTYLEDONS)

POACEAE — GRASS FAMILY

- * *Bromus diandrus* – ripgut grass
- * *Cynodon dactylon* – Bermuda grass
- * *Digitaria sanguinalis* – hairy crabgrass

¹ This is not intended as an exhaustive listing of the vegetation occurring on the site; some annual herbs or very uncommon species may not have been detected by the field survey. Floral taxonomy used in this report follows the *Jepson Manual: Higher Plants of California* (Hickman 1993). Additional common plant names are taken from Munz (1974), Beauchamp (1986), Roberts (1989), Abrams (1923, 1944), and Abrams and Ferris (1951, 1960).

* non-native

APPENDIX B
INSECTS OBSERVED ON THE PROJECT SITE ¹

ORDER ODONATA — DRAGONFLIES & DAMSELFLIES

AESHNIDAE — DARNER FAMILY

Aeshna multicolor – multicolored darner
Anax junius – common green darner

LIBELLULIDAE — SKIMMER FAMILY

Libellula saturata – big red skimmer
Sympetrum (Tarnetrum) corruptum – pastel skimmer
Tramea onusta – red saddlebags

COENAGRIONIDAE — NARROW-WINGED DAMSELFLY FAMILY

Enallagma sp. – bluet

ORDER DERMAPTERA — EARWIGS

FORFICULIDAE — COMMON EARWIGS

Forficula auricularia – common European earwig

ORDER ORTHOPTERA — GRASSHOPPERS, KATYDIDS & CRICKETS

ACRIDIDAE — SHORT-HORNED GRASSHOPPER FAMILY

Schistocerca nitens – gray bird grasshopper
Trimerotropis pallidipennis – pallid band-wing

GRYLLIDAE — CRICKET FAMILY

Gryllus sp. – field cricket

ORDER HEMIPTERA — TRUE BUGS

MIRIDAE — PLANT BUG FAMILY

Lygus sp.

PENTATOMIDAE — STINK BUG FAMILY

Chlorochroa uhleri/sayi – Say's stink bug

LYGAEIDAE — SEED BUG FAMILY

Lygaeus kalmii – small milkweed bug

ORDER HOMOPTERA — HOMOPTERANS

CICADELLIDAE — LEAFHOPPER FAMILY

Homalodisca lacerta – smoke tree leafhopper

ORDER NEUROPTERA — NET-WINGED INSECTS

MYRMELEONTIDAE — ANTLION FAMILY

Brachynemurus sp.

ORDER COLEOPTERA — BEETLES

CARABIDAE — GROUND BEETLE FAMILY

1 unidentified species

COCCINELLIDAE — LADYBIRD BEETLE FAMILY

Harmonia sp.
Hippodamia convergens – convergent ladybird beetle

SCARABAEIDAE — SCARAB BEETLE FAMILY

Cotinus texana (mutabilis) – green fruit beetle

TENEBRIONIDAE — DARKLING BEETLE FAMILY

1 unidentified species

CHRYSOMELIDAE — LEAF BEETLE FAMILY

Diabrotica balteata
Diabrotica undecimpunctata – western spotted cucumber beetle

ORDER LEPIDOPTERA — MOTHS AND BUTTERFLIES

SUBORDER HETEROCERA — MOTHS

NOCTUIDAE — MILLERS & CUTWORM FAMILY

1 unidentified species

SUBORDER RHOPALOCERA — BUTTERFLIES

HESPERIIDAE — SKIPPER FAMILY

Hylephila phyleus – fiery skipper
Atalopedes campestris – field skipper
Pyrgus albescens – western checkered skipper

PIERIDAE — WHITES & SULFURS FAMILY

Pieris (Artogeia) rapae – cabbage white
Pieris (Pontia) protodice – checkered white
Colias eurytheme – orange sulfur

NYPHALIDAE — BRUSH-FOOTED BUTTERFLY FAMILY

Cynthia (Vanessa) cardui – painted lady
Junonia (Precis) coenia – buckeye

LYCAENIDAE — HAIRSTREAKS, COPPERS & BLUES FAMILY

Brephidium exilis – pygmy blue
Strymon melinus – gray (common) hairstreak

ORDER DIPTERA — TRUE FLIES

MYDIDAE — MIDAS FLY FAMILY

Nemomidas pantherinus – midas fly

ASILIDAE — ROBBER FLY FAMILY

Efferia albibarbis
Saropogon luteus
Stenopogon brevisculus

BOMBYLIIDAE — BEE FLY FAMILY

Geron sp.
Villa atrata

DOLICHOPODIDAE — LONG-LEGGED FLY FAMILY

Condylostylus philicomis

SYRPHIDAE — HOVER FLY FAMILY

Allograpta obliqua
Eristalis tenax – drone fly
Syrirta pipiens

CONOPIIDAE — THICK-HEADED FLY FAMILY

Physocephala texana

MUSCIDAE — MUSCID FLY FAMILY

Musca domestica – house fly

TACHINIDAE — TACHINID FLY FAMILY

1 unidentified species

CALLIPHORIDAE — BLOW FLY FAMILY

Calliphora sp. – blue bottle fly

SARCOPHAGIDAE — FLESH FLY FAMILY

1 unidentified species

ORDER HYMENOPTERA — ANTS, BEES & WASPS

CHRYSIDIDAE — CUCKOO WASP FAMILY

Parnopes edwardsii – Edwards' cuckoo wasp

MUTILLIDAE — VELVET ANT FAMILY

Dasymutilla coccineohirta – red-haired velvet ant

FORMICIDAE — ANT FAMILY

Pogonomymex californica – red harvester ant

VESPIDAE — PAPER WASP FAMILY

Polistes apachus – paper wasp
Polistes californicus

SPHECIDAE — THREAD-WAISTED AND DIGGER WASP FAMILY

Ammophila sp.
Bembix comata – sand wasp
Chalybion californicus – blue mud wasp
Chlorion cyaneum
Philanthus multimaculata
Sceliphron caementarium – black-and-yellow mud dauber

HALICTIDAE — HALICTID BEE FAMILY

Agapostemon texana – metallic sweat bee

MEGACHILIDAE — LEAFCUTTING BEE FAMILY

Megachile sp.

APIDAE — BUMBLE BEE & HONEY BEE FAMILY

Apis mellifera – honey bee

¹ This list reports insects observed on the site during the surveys for the DSF; it is not intended to represent an exhaustive insect survey.

**REPORT OF YEAR 2003 FOCUSED SURVEY FOR
DELHI SANDS FLOWER-LOVING FLY
ON WEST HAVEN SPECIFIC PLAN COMPONENTS 4 & 7
SAN BERNARDINO COUNTY, CALIFORNIA**

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INTRODUCTION

This report presents the findings of the second year of a two consecutive-year focused survey for the Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*) conducted by Larry Munsey International (LMI) on a site ("Survey Site") in an unincorporated area of San Bernardino County, California (Figure 1). The Survey Site falls within Section 11, Township 2 south, Range 7 west of the U. S. Geological Survey (USGS) "Guasti" 7.5 minute quadrangle (Figure 2). It consists of two parcels, 8 ha (20 ac) and 12 ha (30 ac), located southeast of the City of Ontario south of Riverside Drive adjacent west of Haven Avenue (Figure 3).

The information provided in this report is for use by resource agencies in assessing the potential impact of any contemplated action at the Survey Site upon the Delhi Sands flower-loving fly, and for use by the property owner and other interested parties in anticipating the possible consequences of environmental compliance and permitting requirements upon land use planning.

BACKGROUND

The Delhi Sands flower-loving fly (DSF) is currently listed by the U.S. Fish and Wildlife Service (USFWS) as endangered under the federal Endangered Species Act (ESA). Pursuant to provisions of the ESA, "take" of a federally listed species, such as the DSF, is prohibited by law. The term "take" is defined as any action that would harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect an endangered species, including by alteration of habitat. The USFWS monitors actions that might affect endangered species through its role as a reviewing agency in the land entitlement process. Typically in California the agency's responsibility to minimize adverse impacts upon endangered species is discharged through involvement in the California Environmental Quality Act (CEQA) review and approval process and/or through the courts. In order to demonstrate whether or not and/or to what degree the DSF, as an endangered species, may be a concern related to land use decisions, the USFWS requires that presence/absence surveys for the species, such as that reported herein, be undertaken.

The DSF is a member of a genus of flies, *Rhaphiomidas*, that, along with some members of the Dipteran family Asilidae (robber flies), contains the largest flies known in North America. Though formerly considered a member of the flower-loving fly family Apioceridae (Cole 1969; Peterson 1981; Cazier 1941, 1985), recent taxonomic studies indicate the genus *Rhaphiomidas*, and thus the DSF, actually belongs in the midas fly family Mydidae (Ovchinnikova 1989; Woodley 1989; Sinclair, *et al.* 1994; Yeates 1994).

There are 20 described species of *Rhaphiomidas* flies as of this writing (Cazier 1985; Rogers 1999), including two new species described recently by Rogers (1993a); descriptions of three additional species are currently in preparation (Rogers 1999). Their known distribution is restricted to desert and semidesert regions of California, southern Nevada, Arizona, New Mexico, western Texas, Baja California, and northwestern Mexico (Rogers and Mattoni 1993). Within this region, they are confined to habitats with fine, sandy substrate, such as sand dunes and dry sandy/rocky washes. All species of this genus exhibit relatively short annual flight periods within a particular locality, normally on the order of two to five weeks (Toft and Kimsey 1982; Wharton 1982; Rogers and Mattoni 1993).

The DSF itself is large, approximately 2.5 cm (1 in) in length, orange-brown in color, and has dark brown oval markings on the upper surface of the abdomen. It has a long proboscis for extracting nectar from flowers, and can be easily distinguished by this obvious feature from the few other species of like-appearing flies occurring within its range. It is generally low-flying, and males of the species are capable of extremely fast flight.

The geographic distribution of the DSF is restricted to areas having a specific sandy substrate type classified as Delhi Series soils, commonly known as "Delhi Sands". This white to light brown fine unconsolidated sand and sandy loam soil formation covers approximately 40 square miles in several irregular patches extending from the City of Colton to Ontario and Chino in northwestern Riverside and southwestern San Bernardino counties (USDA 1971, 1980). This region of Delhi series soils, also known as the Colton Dunes, is the largest inland cismontane sand dune formation in southern California. This dune formation has been defined as the Desert Sand-verbena Series in Sawyer (1994).

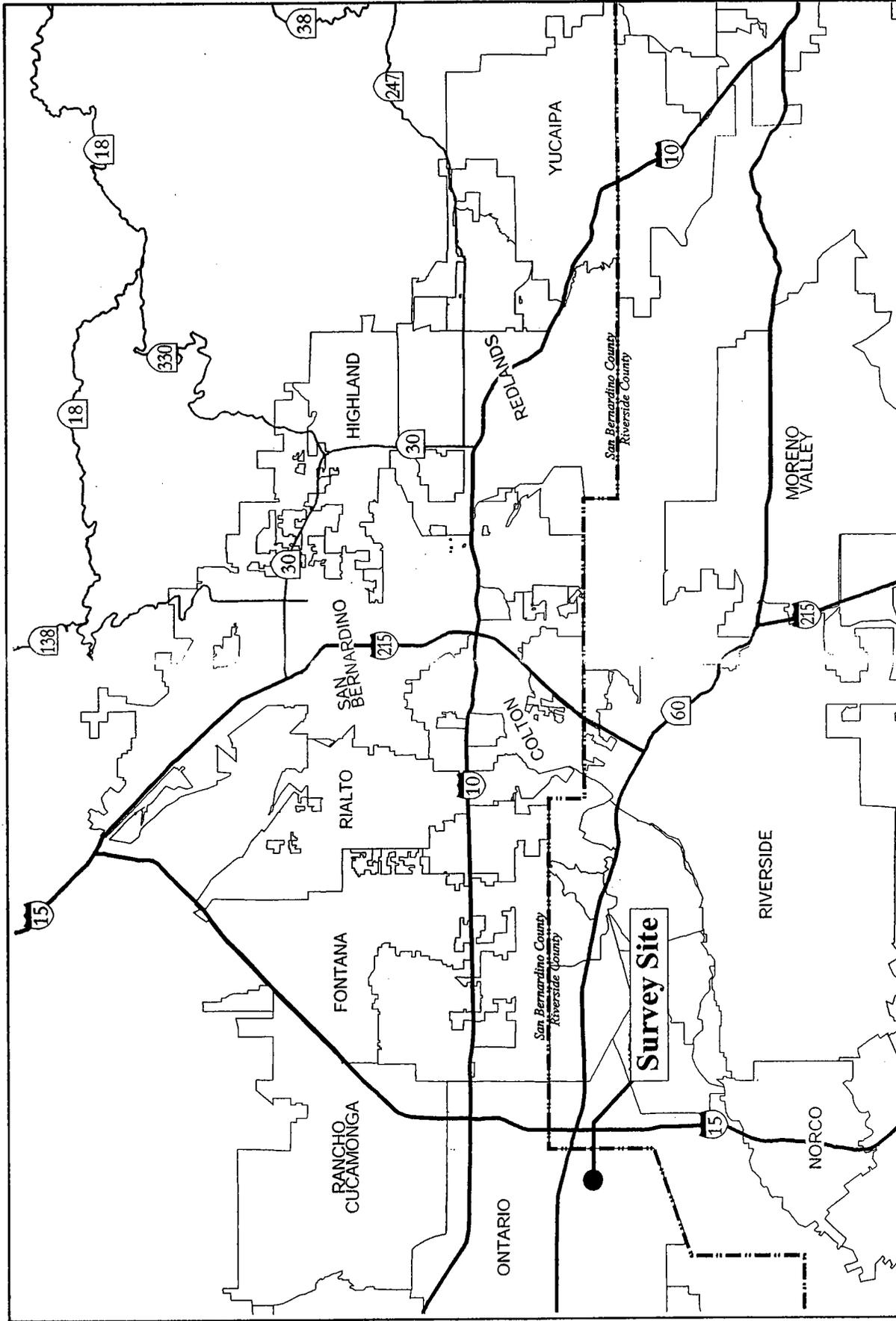
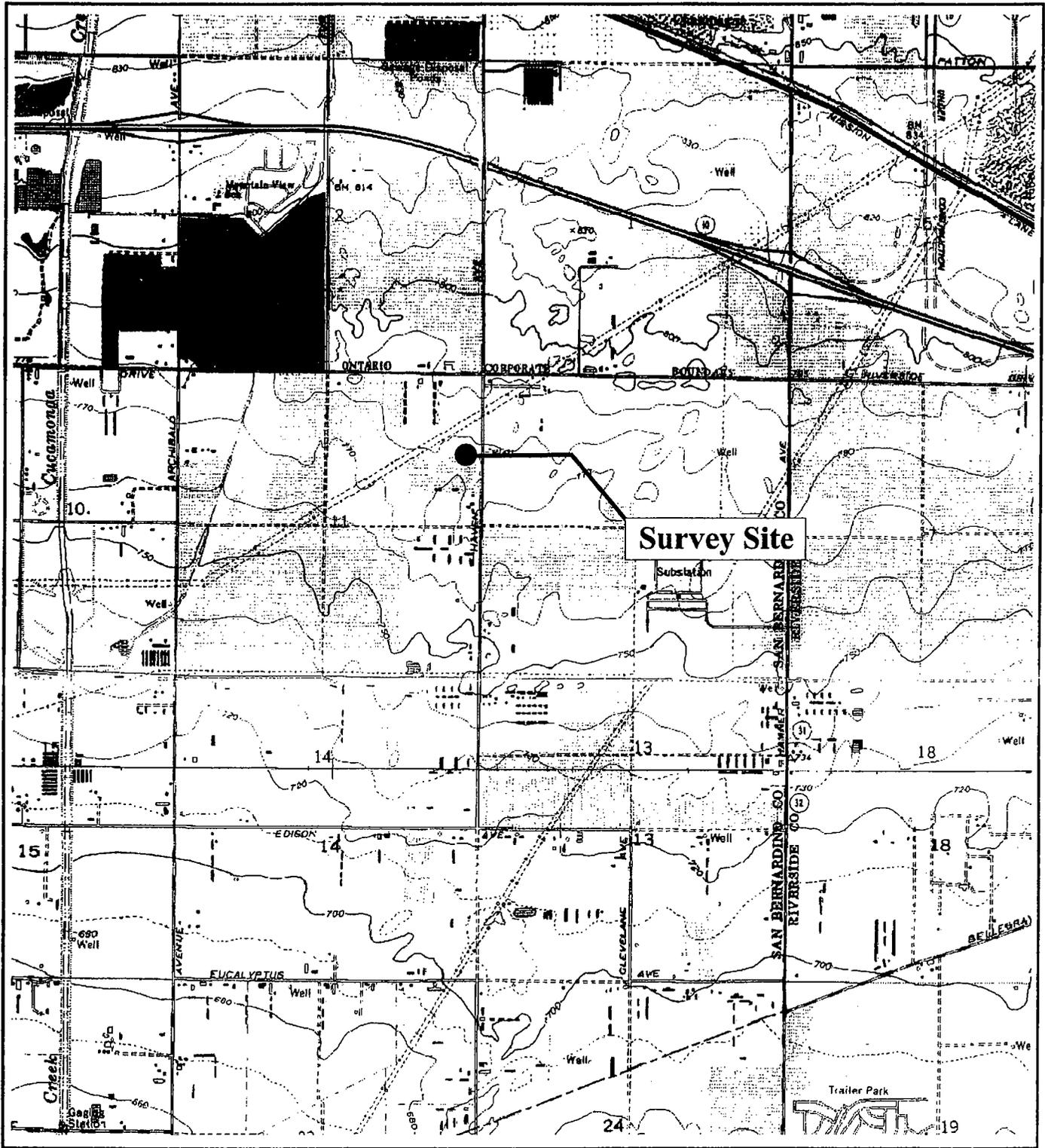


figure 1
Regional Location

Stratham Properties
Year 2003 DSF Survey • West Haven Specific Plan Components 4 & 7





Source: USGS Guastl 7.5' DRG, 1966 - Photo Revised 1981.

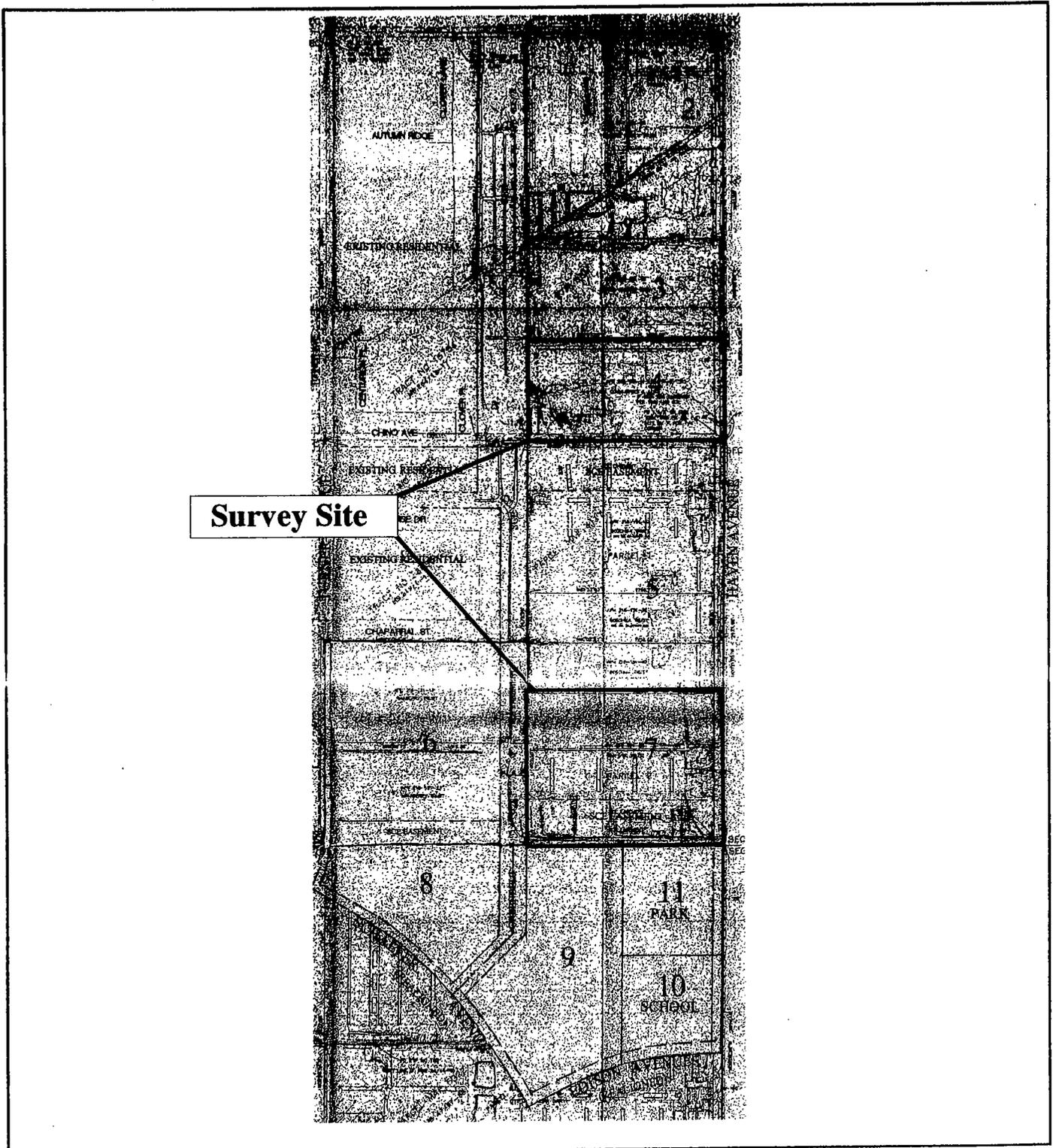


figure 2

Area Location

Stratham Properties
 Year 2003 DSF Survey • West Haven Specific Plan
 Components 4 & 7

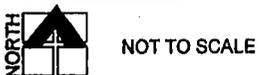




Source: Kaufman Meeks + Partners, 2000.



figure 3
Site Location



Stratham Properties
Year 2003 DSF Survey • West Haven Specific Plan Components 4 & 7

Though museum records indicate its historic range likely included the entire expanse of Delphi Sands soils (Ballmer 1989), the current literature indicates the known distribution of the DSF, as of spring 1997, is restricted to 12 disjunct locations totaling approximately 190 ha (450 ac) situated within a 13-km (8-mi) radius reaching from Colton to Mira Loma, California (Ballmer 1992; USFWS 1992, 1993, 1996a, 1997). This represents a small fraction of its former range (USFWS 1996a, 1997). DSF sightings reported from recent surveys suggest the current range of the DSF may actually extend as far west as Ontario.

Much of the Colton Dunes region has been used for agriculture, chiefly grapes and citrus, since the 1800's. More recently, much of the remaining area has been converted to dairies, housing tracts, and commercial/industrial enterprises. Additional habitat has been lost, degraded, and fragmented by sand mining, illegal dumping, off-road vehicle usage, trampling, vegetation clearing for fire prevention, and competitive exclusion of native plants by invasion of exotic species.

The DSF undergoes complete metamorphosis (egg, larva, pupa, and adult). The complete life span of the species is unknown. Under favorable environmental conditions, the life cycle is likely annual, but it is possible that the larval/pupal stages may last two years or longer, depending on availability of food, temperature, rainfall, and other environmental factors. Except for the adult stage, the remainder of the life cycle is spent underground. It is unknown where the larval form of the DSF lives below ground and what its microhabitat requirements may be. It is not clear whether the early stages of *Rhaphiomidas* in general are herbivores, detritivores, or carnivores. The larvae of the closely related genus *Apiocera* have been successfully raised on earthworms in the laboratory (Cazier 1982).

Adult DSF emerge and become active in the late summer. Collection records for the DSF (Ballmer 1989) and current behavioral studies (Kingsley 1996) document a single annual flight period occurring between early August and early to mid-September. The exact adult life span is not known (several days to several weeks has been postulated), but it is documented that adults do not survive beyond the end of the annual flight period (Kiyani 1995).

Adult DSF are active during the warmest portions of the day during periods of direct sunlight, generally when daytime temperatures exceed 27 degrees Celsius [$^{\circ}\text{C}$] (80 degrees Fahrenheit [$^{\circ}\text{F}$]) (Ballmer 1989). Peak activity period is between 1000 and 1300 hours PDT; males are rarely, if ever, observed outside 0900-1500 hours, while females have been observed perched on bushes as early as 0800 hours and after nightfall (Kingsley 1996). Flight has not been observed during cloudy, overcast, or rainy conditions, and only rarely during windy or breezy conditions, such as commonly arise in the afternoons within the DSF's range. During these conditions some observations have been made of perching within vegetation. Oviposition has only been observed in mid- to late afternoon, when temperatures begin to decrease (USFWS 1997).

While aloft, DSF may exhibit at least five distinctive types of behavior, each associated with a markedly different flight pattern (Kiyani 1995; Kingsley 1996). "Cruising" or "patrolling", employed by males only, constitutes slow, near-ground, somewhat erratic flight, sustained for relatively long duration with only momentary rest stops during which plants are circled and examined in search of females. Short-movement flight entails relatively slow, low-level, more-or-less direct-line movement from one perch to another nearby, apparently involving no searching. Rapid (or "rocket") flight proceeds in a straight line at above-ground heights of 2 m or more, and functions for longer-distance movement from one place to another, including probably random dispersal. DSF hover in stationary flight (like a hummingbird) over flowers while feeding. Males exhibit territorial behavior by pursuit flight: short bursts pursuing other DSF males or other species of insects that may fly near their "defended" territory; this pursuit may culminate in midair "wrestling" and tumbling to the ground followed by further pursuit, or by the original pursuer returning to the vicinity where the flight originated.

Mating among members of the DSF genus has been described by Rogers and Mattoni (1993). After mating, the females lay their eggs in suitable sandy soil. Females possess specialized egg-laying organs enabling the placement of eggs a few centimeters beneath the surface of the sand. This adaptation assures that the eggs are placed in a cooler and moister environment than the surface of the sand. Most oviposition takes place in the shade of shrubs, such as telegraph weed (*Heterotheca grandiflora*) (Rogers and Mattoni 1993). The combination of environmental factors required of suitable ovipositing sites is not known.

Adult DSF have rarely been observed taking nectar from flowers, and have not been seen to take other fluids. The nectaring events observed have been brief, on the order of 2-10 seconds, and the only published accounts have all been restricted to flowers of the California buckwheat (*Eriogonum fasciculatum*) (Kingsley 1996; USFWS 1997). Rogers (1996, 1998) has reported nectaring observations also involving tarweed (*Hemizonia fasciculata*) and wreathplant (*Stephanomeria virgata*).

Little is known regarding predators of the DSF. The introduced Argentine ant (*Iridomyrmex humilis*) has been observed to attack and kill a recently emerged adult DSF (Rogers 1993b). Rogers and Mattoni (1993) and Cazier (1985) reported that large robber flies prey upon *Rhaphiomidas* flies. Other predators of the adult flies may include dragonflies and insectivorous birds. Predators of the early DSF stages are unknown, but may include ants, other subterranean predatory insects, and reptiles.

Reliable estimates of DSF population sizes are unavailable. At the San Bernardino County Hospital preserve, the DSF population was estimated at 7 to 10 in 1994, 4 to 9 in 1995, 5 to 13 in 1996, and 5 to 15 in 1997 (Kiyani 1997). Kiyani (1996a,b; 1997) notes a number of assumptions and uncertainties regarding population counts of the DSF, and thus these estimates must be considered tentative. At another site in 1989, a direct count of 13 individuals was made within a half hour over a 10-ac portion of a 150-ac site (Ballmer 1989; USFWS 1997). It has been speculated that typical DSF population densities are likely on the order of 24/ha (10/ac) (USFWS 1997).

Along with other species in the genus, the DSF appears to have very narrow habitat requirements (Rogers and Mattoni 1993); moreover, different microhabitats are selected depending upon sex and specific behaviors involved (Kingsley 1996). The primary habitat requirement for the DSF is sandy substrate with a sparse cover of perennial shrubs and other vegetation. Based upon observations of this and several other members of the *Rhaphiomidas* genus, optimal vegetative cover is probably less than 50 percent, and may be as low as 10-20 percent (USFWS 1997).

The specific species composition and densities of plants preferred by the DSF are currently unknown (Kiyani 1996a). Definitive associations of adults with specific plants have not been established. Typically, the native plant species most consistently found where the DSF occurs (thus commonly considered "indicator species" of suitable habitat) are California buckwheat, telegraph weed, and California croton (*Croton californicus*) (Ballmer 1989; USFWS 1997). Though the former two have been implicated recently as possibly essential to the fly (Kingsley 1996), it has not been conclusively demonstrated whether any of these or other particular plants actually provide resources critical to the DSF, or if they are simply indicators of other, less obvious, habitat factors required by this species. Additional native plants found commonly where the DSF occurs include annual bur-sage (*Ambrosia acanthicarpa*), rancher's fireweed (*Amsinckia menziesii*), vinegar weed (*Lessingia glandulifera*), sapphire eriastrum (*Eriastrum sapphirinum*), and Thurber's spineflower (*Centrostegia thurberi*). Though the foregoing plants are those that occur most commonly in locations where the DSF is found, they also occur where it is not found and their presence does not necessarily imply the presence of the DSF.

Invasive non-native vegetation severely degrades or eliminates the habitat of the DSF (USFWS 1997). Non-native plants especially notorious in this respect include Russian thistle (*Salsola tragus*), horehound (*Marrubium vulgare*), mustard (*Brassica* sp., *Hirschfeldia incana*), cheese weed (*Malva parviflora*), and many species of introduced grasses such as rip gut brome (*Bromus diandrus*) and foxtail chess (*Bromus madritensis* ssp. *rubens*). These exotic plants may alter the amount of soil moisture or make the substrate physically unsuitable for the survival of the DSF and other native subterranean invertebrates.

Notwithstanding the foregoing inferences regarding habitat preferences and requirements, the DSF has been recorded from time to time (albeit in low number and usually fleetingly) in habitats that are substantially degraded and possessed of few apparently favorable attributes for the species. Moreover, the current absence of the DSF on a particular site within its range does not necessarily indicate that future occupation could not occur or re-occur should conditions on the site become more suitable. For example, the DSF has been recorded recently on certain sites that have been graded or disced repeatedly in the past, after such activity ceased and to some extent the site returned to more natural conditions.

As mandated by the ESA, the USFWS has prepared a recovery plan for the DSF (USFWS 1997). The objective of the recovery plan is to ultimately reduce the risk of DSF extinction to the point that it can be

downlisted, *i.e.*, removed from listing as an endangered species. The plan establishes three geographically defined recovery units (RU) known as the Ontario, Jurupa, and Colton RUs. The Survey Site falls within the Colton RU, which contains the majority of currently known populations of DSF.

In order to accomplish its objective, the DSF Recovery Plan predicates that each RU must contain occupied and/or restorable-to-suitable-for-occupation habitat for at least one population of DSF. Further, the plan stipulates that a minimum of eight DSF populations must occur across the 3 RUs, of which four must be in the Colton RU, two each on either side of the east-west running Interstate 10.

EXISTING CONDITIONS

The Survey Site consists of two neighboring, but not contiguous, rectangularly shaped parcels of land: Parcel 4 is a vacant weed lot; most of Parcel 7 is occupied by an operational dairy farm, the remainder is fallow. Both are surrounded by dairies, power line easements, and residential neighborhoods, except for a nursery to the north of Parcel 4. The topography of the site is essentially flat, except for piles of fertilizer in the southwest corner of Parcel 4. Natural site substrate is classified by soil maps of the U.S. Department of Agriculture (USDA 1980) as Delhi Fine Sand soil formation.

Vegetation on the site consists generally of a ruderal (weedy) mixture of native and non-native subshrubs, grasses, and forbs (herbs other than grasses) that are good colonizers of disturbed areas. Among these are foxtail chess, riggut brome, Bermuda grass (*Cynodon dactylon*), crownbeard (*Verbesina encelioides*), mustard (*Sisymbrium* sp.), Russian thistle, red-stemmed filaree (*Erodium cicutarium*), and cheese weed. Several of these invasive species are known to be deleterious to the suitability of habitat for the DSF. None of the three plant species (telegraph weed, croton, and California buckwheat) commonly considered indicative of habitat suitable for the DSF is present on the site.

Plant diversity on the site is low. A total of 31 species in 14 families was detected (Appendix A); of these, 24 are non-native. Vegetation cover is sparse on Parcel 4, and dense where occurring on Parcel 7.

Parcel 4 has apparently been disced in the recent past, probably within less than 2-3 years. This parcel is littered with household trash and remnants of former infrastructure, such as chunks of concrete curbing, sidewalks, driveways, etc.

METHODS

Review of Existing Information

Documentation pertinent to the biology of the DSF and biological resources in the vicinity of the Survey Site was compiled, reviewed, and analyzed. Information reviewed included: (1) Federal Register listing package for the Delhi Sands flower-loving fly; (2) literature pertaining to habitat requirements of the DSF; (3) the Recovery Plan for the DSF (USFWS 1997), and (4) California Natural Diversity Data Base (CNDDB 2002).

Concurrent with this survey, sites within the vicinity of the Survey Site known to be occupied by the DSF were visited to assess directly or by discussion with other surveyors the current status and activity patterns of various DSF populations in the region.

Focused Survey

A focused survey was conducted for the DSF on the Survey Site to assess its presence or absence. The survey was conducted in accordance with USFWS interim general survey guidelines, which recommend 2 replicate surveys per week during the flight period of the DSF (defined by survey guidelines as 1 August through 20 September, but modified by the Service for the current year to commence 15 July), to be performed between the hours of 1000 and 1400 during appropriate weather conditions (USFWS 1996b). Surveys were conducted by Larry Munsey (TE 838741) and Guy Bruyey (TE 837439).

A total of 20 surveys was performed on the following dates: 16, 20, 22, 27, 30 July; 2, 7, 10, 13, 18, 21, 25, 29 August; and 1, 5, 8, 12, 15, 19, 22 September 2003. Weather conditions during the surveys were generally conducive to high levels of invertebrate activity. Temperatures typically ranged between 27 and 35°C (80-95 °F). On a few occasions temperatures at the beginning of the survey period were lower, ranging in the mid-20s °C (mid-high 70s °F). In two instances in September the low temperature failed to reach 27 °C (80 °F) during the survey period, falling slightly below at 25 and 26 °C (77 and 78 °F). Wind speed ranged generally from 0 to 8 km/hr (0 to 5 mi/hr) with infrequent gusts to 25 km/hr (15 mi/hr). Skies were usually clear, with a few exceptions when scattered clouds or hazy conditions prevailed.

During the surveys, the Survey Site was walked systematically and deliberately in search of both DSF sexes and discarded pupal cases. The surveys included careful examination of plant flowers, stems, and foliage; open patches of sand; shaded areas at the base of plants; air space in the immediate vicinity of flowering plants; and general air space within unaided vision above the site. Thus, an exhaustive search was accomplished for flying, feeding, perching, or otherwise engaged flies.

All insects encountered during the surveys were identified to the lowest possible taxon, either by sight or, when necessary, by capture and subsequent determination in the laboratory. Only active and exposed macro insect fauna was considered, thus other less obvious groups no doubt also present (e.g., springtails, termites, earwigs, thrips, etc.) were not recorded.

RESULTS AND DISCUSSION

No DSF or DSF sign (*i.e.*, discarded pupal cases) were observed on the Survey Site during the current survey, nor was the DSF detected on the site during the prior year's survey (LMI 2002).

Birds observed or heard on or above the site included the cattle egret (*Bubulcus ibis*), turkey vulture (*Cathartes aura*), white-tailed kite (*Elanus leucurus*), Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), kildeer (*Charadrius vociferus*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), burrowing owl (*Speotyto [Athene] cunicularia*), western kingbird (*Tyrannus verticalis*), black phoebe (*Sayornis nigricans*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnis vulgaris*), Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*), and lesser goldfinch (*Carduelis psaltria*). Other vertebrates detected were the western fence lizard (*Sceloporus occidentalis*), side-blotch lizard (*Uta stansburiana*), pocket gopher (*Thomomys bottae*), cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), and heteromyid rodents (burrows, tracks, and tail drags).

A total of 87 species of insects in 53 families was recorded on the Survey Site during the survey. A full list of insects observed is provided in Appendix B.

Based upon the following factors it may be concluded that the Survey Site is not occupied by the DSF nor is any suitable habitat for the species present:

- highly disturbed condition of entire site;
- low diversity of plants;
- high proportion of non-native invasives in the site's plant composition;
- absence of California buckwheat, California croton, and telegraph weed; and
- type and condition of the habitat surrounding the site.

The results of this and the former year's survey as reported herein satisfy the Federal requirement to demonstrate the absence of the DSF on the Survey Site.

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APPENDICES

APPENDIX A
PLANTS OBSERVED ON THE PROJECT SITE

ANGIOSPERMS (DICOTYLEDONS)

AMARANTHACEAE — AMARANTH FAMILY

- * *Amaranthus albus* – tumbling pigweed
- Amaranthus palmeri* – Palmer's amaranth

ASTERACEAE — SUNFLOWER FAMILY

- * *Conyza bonariensis* – flax-leaved horseweed
- * *Conyza canadensis* – horseweed
- * *Verbesina encelioides* – golden crownbeard

BORAGINACEAE — BORAGE FAMILY

Amsinckia menziesii – rancher's fireweed

BRASSICACEAE — MUSTARD FAMILY

- * *Hirschfeldia incana* – short-podded mustard
- * *Lepidium latifolium* – tall whitetop
- * *Raphanus sativus* – radish
- * *Sisymbrium irio* – London rocket

CHENOPODIACEAE — GOOSEFOOT FAMILY

- * *Chenopodium murale* – nettle-leaved goosefoot
- * *Kochia scoparia* – Kochia
- * *Salsola tragus* – Russian thistle

CUSCUTACEAE — DODDER FAMILY

- * *Cuscuta* sp. – dodder

EUPHORBIACEAE — SPURGE FAMILY

Chamaesyce albomarginata – rattlesnake weed
 Eremocarpus setigerus – dove weed

GERANIACEAE — GERANIUM FAMILY

- * *Erodium cicutarium* – red-stemmed filaree

JUGLANDACEAE — WALNUT FAMILY

- * *Juglans regia* – English walnut

MALVACEAE — MALLOW FAMILY

- * *Malva parviflora* – cheeseweed

ROSACEAE — ROSE FAMILY

- * *Rosa* sp. – ornamental rose

SALICACEAE — WILLOW FAMILY

Salix sp. – willow

SOLANACEAE — NIGHTSHADE FAMILY

- * *Datura stramonium* – annual jimson weed
- Datura wrightii* – jimson weed
- Nicotiana quadrivalvis* – Wallace's tobacco

ANGIOSPERMS (MONOCOTYLEDONS)

POACEAE — GRASS FAMILY

- * *Avena barbata* – slender wild oat
- * *Avena fatua* – wild oat
- * *Bromus diandrus* – ripgut grass
- * *Bromus madritensis* ssp. *rubens* – foxtail chess
- * *Bromus* sp. – brome grass
- * *Hordeum murinum* ssp. *leporinum* – white foxtail barley
- * *Schismus barbatus* – Mediterranean grass

¹ This is not intended as an exhaustive listing of the vegetation occurring on the site; some annual herbs or very uncommon species may not have been detected by the field survey. Floral taxonomy used in this report follows the *Jepson Manual: Higher Plants of California* (Hickman 1993). Additional common plant names are taken from Munz (1974), Beauchamp (1986), Roberts (1989), Abrams (1923, 1944), and Abrams and Ferris (1951, 1960).

- * non-native

APPENDIX B
INSECTS OBSERVED ON THE PROJECT SITE ¹

ORDER ODONATA — DRAGONFLIES & DAMSELFLIES

AESHNIDAE — DARNER FAMILY

Aeshna multicolor – multicolored darner

LIBELLULIDAE — SKIMMER FAMILY

Libellula saturata – big red skimmer
Pantala flavescens – globetrotter
Sympetrum (Tametrum) corruptum – pastel skimmer
Tramea onusta – red saddlebags

ORDER DERMAPTERA — EARWIGS

FORFICULIDAE — COMMON EARWIGS

Forficula auricularia – common European earwig

ORDER ORTHOPTERA — GRASSHOPPERS, KATYDIDS & CRICKETS

ACRIDIDAE — SHORT-HORNED GRASSHOPPER FAMILY

Schistocerca sp.
Trimerotropis pallidipennis – pallid band-wing

GRYLLIDAE — CRICKET FAMILY

Acheta sp.

ORDER MANTODEA — MANTIDS & WALKINGSTICKS

MANTIDAE — MANTIS FAMILY

Iris oratoria – Mediterranean mantis

THYSANOPTERA — THRIPS

THIRIPIDAE — THRIPS FAMILY

1 unidentified species

ORDER HEMIPTERA — TRUE BUGS

MIRIDAE — PLANT BUG FAMILY

1 unidentified species

PENTATOMIDAE — STINK BUG FAMILY

Chlorochroa uhleri/sayi – Say's stink bug

LYGAEIDAE — SEED BUG FAMILY

Lygaeus kalmii – small milkweed bug

REDUVIIDAE — ASSASSIN BUG FAMILY

Zelus tetracanthus

ORDER HOMOPTERA — HOMOPTERANS

APHIDIDAE — APHID FAMILY

1 unidentified species

MEMBRACIDAE — TREEHOPPER FAMILY

1 unidentified species

ORDER NEUROPTERA — NET-WINGED INSECTS

CHRYSOPIDAE — GREEN LACEWING FAMILY

Chrysopa sp.

MYRMELEONTIDAE — ANTLION FAMILY

1 unidentified species

ORDER COLEOPTERA — BEETLES

CARABIDAE — GROUND BEETLE FAMILY

1 unidentified species

COCCINELLIDAE — LADYBIRD BEETLE FAMILY

Harmonia axyridis

SCARABAEIDAE — SCARAB BEETLE FAMILY

Cotinus texana (mutabilis) – green fruit beetle

TENEBRIONIDAE — DARKLING BEETLE FAMILY

Eleodes sp.

1 unidentified species

CHRYSOMELIDAE — LEAF BEETLE FAMILY

Diabrotica balteata

Lema trilineata – three-lined potato beetle

CURCULIONIDAE — SNOUT BEETLE FAMILY

1 unidentified species

ORDER LEPIDOPTERA — MOTHS AND BUTTERFLIES

SUBORDER HETEROCERA — MOTHS

SPHINGIDAE — SPHINX OR HAWK MOTH FAMILY

Manduca sexta – tobacco hornworm sphinx moth

ARCTIIDAE — TIGER MOTH FAMILY

Estigmene acrea – acrea sphinx moth

NOCTUIDAE — MILLERS & CUTWORM FAMILY

1 unidentified species

PYRALIDAE — PYRALID MOTH FAMILY

1 unidentified species

SUBORDER RHOPALOCERA — BUTTERFLIES

HESPERIIDAE — SKIPPER FAMILY

Heliopetes ericetorum – large white skipper

Hylephila phyleus – fiery skipper

Lerodea eufala – eufala skipper

Pyrgus albescens – western checkered skipper

PAPILIONIDAE — SWALLOWTAIL FAMILY

Papilio cresphontes – giant swallowtail

PIERIDAE — WHITES & SULFURS FAMILY

Pieris (Artogeia) rapae — cabbage white
Pieris (Pontia) protodice – checkered white
Colias eurytheme – orange sulfur

NYMPHALIDAE — BRUSH-FOOTED BUTTERFLY FAMILY

Danaus gilippus – queen
Cynthia (Vanessa) cardui – painted lady
Cynthia (Vanessa) anabella – west coast lady
Cynthia (Vanessa) virginensis – Virginia lady
Junonia (Precis) coenia – buckeye

LYCAENIDAE — HAIRSTREAKS, COPPERS & BLUES FAMILY

Brephidium exilis – pygmy blue
Leptotes marina – marine blue
Icaricia (Plebejus) acmon – acmon blue
Strymon melinus – gray (common) hairstreak

ORDER DIPTERA — TRUE FLIES

TIPULIDAE — CRANE FLY FAMILY

1 unidentified species

TABANIDAE — HORSE & DEER FLY FAMILY

Tabanus punctifer – big black horse fly

MYDIDAE — MIDAS FLY FAMILY

Nemomydas pantherinus – midas fly

ASILIDAE — ROBBER FLY FAMILY

Efferia albibarbis
Mallophora faulx – bumble bee robber fly
Stenopogon brevisculus
1 unidentified species

BOMBYLIIDAE — BEE FLY FAMILY

Villa atrata
1 unidentified species

DOLICHOPODIDAE — LONG-LEGGED FLY FAMILY

1 unidentified species

SYRPHIDAE — HOVER FLY FAMILY

Copestylum (Volucella) mexicana – cactus fly
Eristalis tenax – drone fly
1 unidentified species

CONOPIIDAE — THICK-HEADED FLY FAMILY

Physocephala texana

MUSCIDAE — MUSCID FLY FAMILY

Musca sp.
Stomoxes calcitrans

TACHINIDAE — TACHINID FLY FAMILY

1 unidentified species

CALLIPHORIDAE — BLOW FLY FAMILY

Calliphora sp. – blue bottle fly

SARCOPHAGIDAE — FLESH FLY FAMILY

1 unidentified species

ORDER HYMENOPTERA — ANTS, BEES & WASPS

ICHNEUMONIDAE — ICHNEUMONID WASP FAMILY

1 unidentified species

CHRYSIDIDAE — CUCKOO WASP FAMILY

Parnopes edwardsii – Edwards' cuckoo wasp

MUTILLIDAE — VELVET ANT FAMILY

Dasymutilla sp.

FORMICIDAE — ANT FAMILY

Pogonomyrmex californica – red harvester ant

POMPILIDAE — SPIDER WASP FAMILY

1 unidentified species

VESPIDAE — PAPER WASP FAMILY

Eumenes bolli

Polistes apachus – paper wasp

SPHECIDAE — THREAD-WAISTED AND DIGGER WASP FAMILY

Ammophila sp.

Bembix comata – sand wasp

Chalybion californicus – blue mud wasp

Chlorion aerarium

Philanthus sp.

Prionyx sp.

Sceliphron caementarium – black-and-yellow mud dauber

1 unidentified species

HALICTIDAE — HALICTID BEE FAMILY

Agapostemon texana – metallic sweat bee

MEGACHILIDAE — LEAFCUTTING BEE FAMILY

1 unidentified species

ANTHOPHORIDAE — DIGGER BEE FAMILY

1 unidentified species

APIDAE — BUMBLE BEE & HONEY BEE FAMILY

Apis mellifera – honey bee

Xylocopa varipuncta – valley carpenter bee

¹ This list reports insects observed on the site during the surveys for the DSF; it is not intended to represent an exhaustive insect survey.

**REPORT OF YEAR 2002 FOCUSED SURVEY FOR
DELHI SANDS FLOWER-LOVING FLY
ON WEST HAVEN SPECIFIC PLAN COMPONENTS 4 & 7
SAN BERNARDINO COUNTY, CALIFORNIA**

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INTRODUCTION

This report presents the findings of the first year of an intended two consecutive-year focused survey for the Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*) conducted by Larry Munsey International (LMI) on a site ("Survey Site") in an unincorporated area of San Bernardino County, California (Figure 1). The Survey Site falls within Section 11, Township 2 south, Range 7 west of the U. S. Geological Survey (USGS) "Guasti" 7.5 minute quadrangle (Figure 2). It consists of two parcels, 8 ha (20 ac) and 12 ha (30 ac), located southeast of the City of Ontario south of Riverside Drive adjacent west of Haven Avenue (Figure 3).

The information provided in this report is for use by resource agencies in assessing the potential impact of any contemplated action at the Survey Site upon the Delhi Sands flower-loving fly, and for use by the property owner and other interested parties in anticipating the possible consequences of environmental compliance and permitting requirements upon land use planning.

BACKGROUND

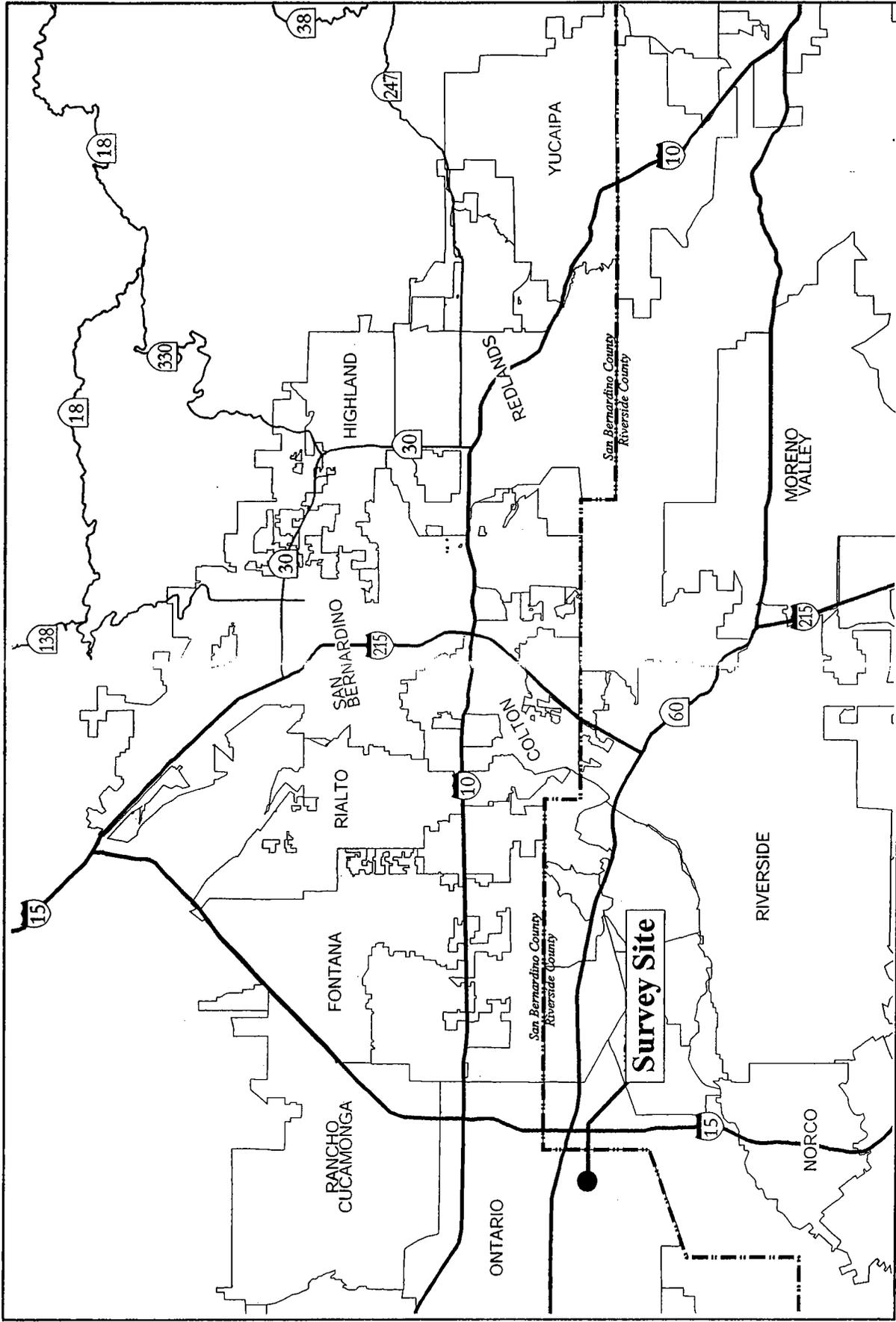
The Delhi Sands flower-loving fly (DSF) is currently listed by the U.S. Fish and Wildlife Service (USFWS) as endangered under the federal Endangered Species Act (ESA). Pursuant to provisions of the ESA, "take" of a federally listed species, such as the DSF, is prohibited by law. The term "take" is defined as any action that would harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect an endangered species, including by alteration of habitat. The USFWS monitors actions that might affect endangered species through its role as a reviewing agency in the land entitlement process. Typically in California the agency's responsibility to minimize adverse impacts upon endangered species is discharged through involvement in the California Environmental Quality Act (CEQA) review and approval process and/or through the courts. In order to demonstrate whether or not and/or to what degree the DSF, as an endangered species, may be a concern related to land use decisions, the USFWS requires that presence/absence surveys for the species, such as that reported herein, be undertaken.

The DSF is a member of a genus of flies, *Rhaphiomidas*, that, along with some members of the Dipteran family Asilidae (robber flies), contains the largest flies known in North America. Though formerly considered a member of the flower-loving fly family Apioceridae (Cole 1969; Peterson 1981; Cazier 1941, 1985), recent taxonomic studies indicate the genus *Rhaphiomidas*, and thus the DSF, actually belongs in the midas fly family Mydidae (Ovchinnikova 1989; Woodley 1989; Sinclair, *et al.* 1994; Yeates 1994).

There are 20 described species of *Rhaphiomidas* flies as of this writing (Cazier 1985; Rogers 1999), including two new species described recently by Rogers (1993a); descriptions of three additional species are currently in preparation (Rogers 1999). Their known distribution is restricted to desert and semidesert regions of California, southern Nevada, Arizona, New Mexico, western Texas, Baja California, and northwestern Mexico (Rogers and Mattoni 1993). Within this region, they are confined to habitats with fine, sandy substrate, such as sand dunes and dry sandy/rocky washes. All species of this genus exhibit relatively short annual flight periods within a particular locality, normally on the order of two to five weeks (Toft and Kimsey 1982; Wharton 1982; Rogers and Mattoni 1993).

The DSF itself is large, approximately 2.5 cm (1 in) in length, orange-brown in color, and has dark brown oval markings on the upper surface of the abdomen. It has a long proboscis for extracting nectar from flowers, and can be easily distinguished by this obvious feature from the few other species of like-appearing flies occurring within its range. It is generally low-flying, and males of the species are capable of extremely fast flight.

The geographic distribution of the DSF is restricted to areas having a specific sandy substrate type classified as Delhi Series soils, commonly known as "Delhi Sands". This white to light brown fine unconsolidated sand and sandy loam soil formation covers approximately 40 square miles in several irregular patches extending from the City of Colton to Ontario and Chino in northwestern Riverside and southwestern San Bernardino counties (USDA 1971, 1980). This region of Delhi series soils, also known as the Colton Dunes, is the largest inland cismontane sand dune formation in southern California. This dune formation has been defined as the Desert Sand-verbena Series in Sawyer (1994).



Larry Munsey International

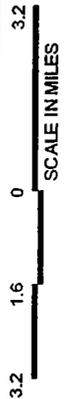
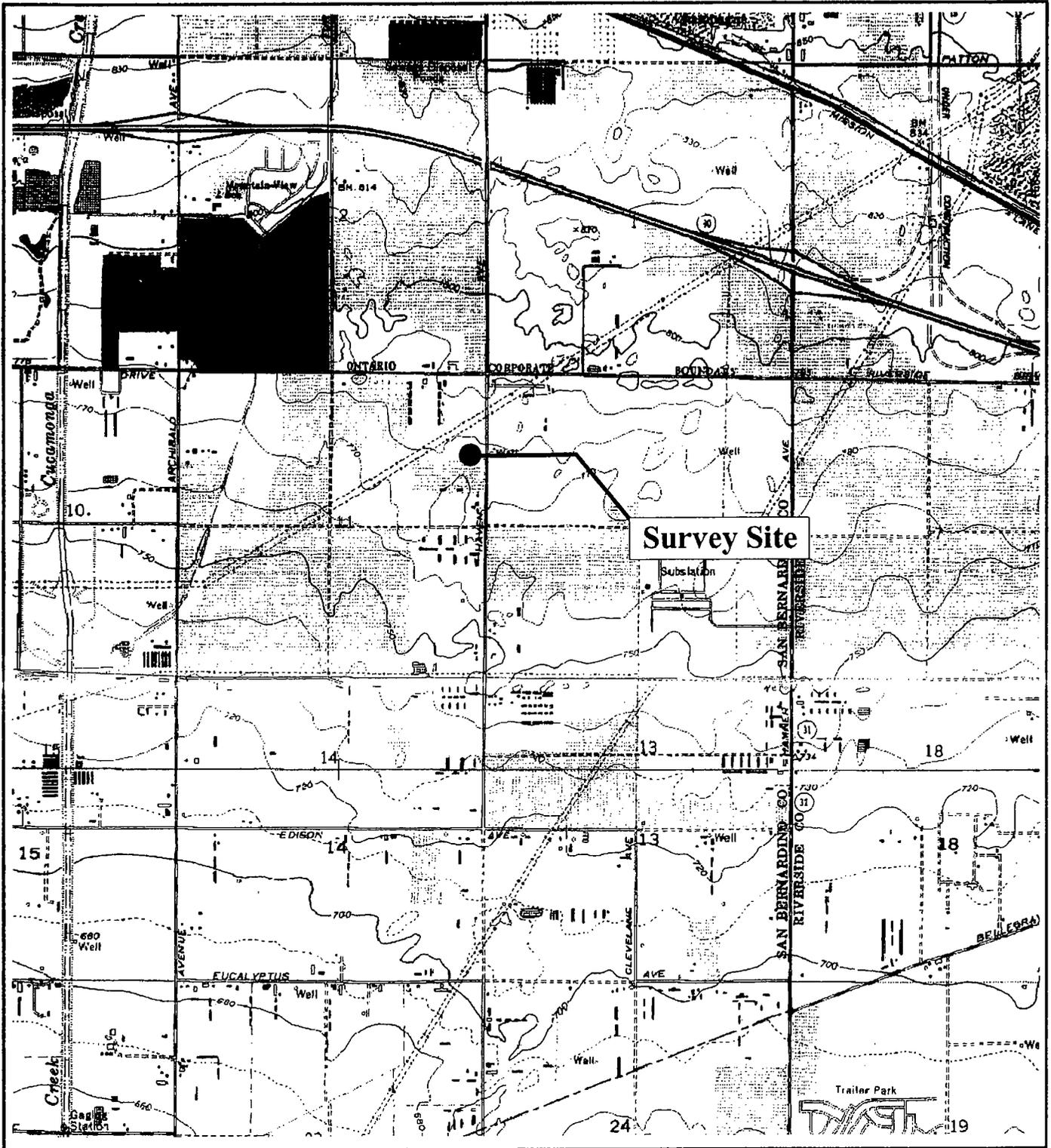


figure 1
Regional Location

Stratham Properties
Year 2002 DSF Survey • West Haven Specific Plan Components 4 & 7



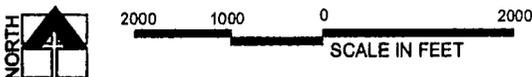
Source: USGS Guasti 7.5' DRG, 1966 - Photo Revised 1981.

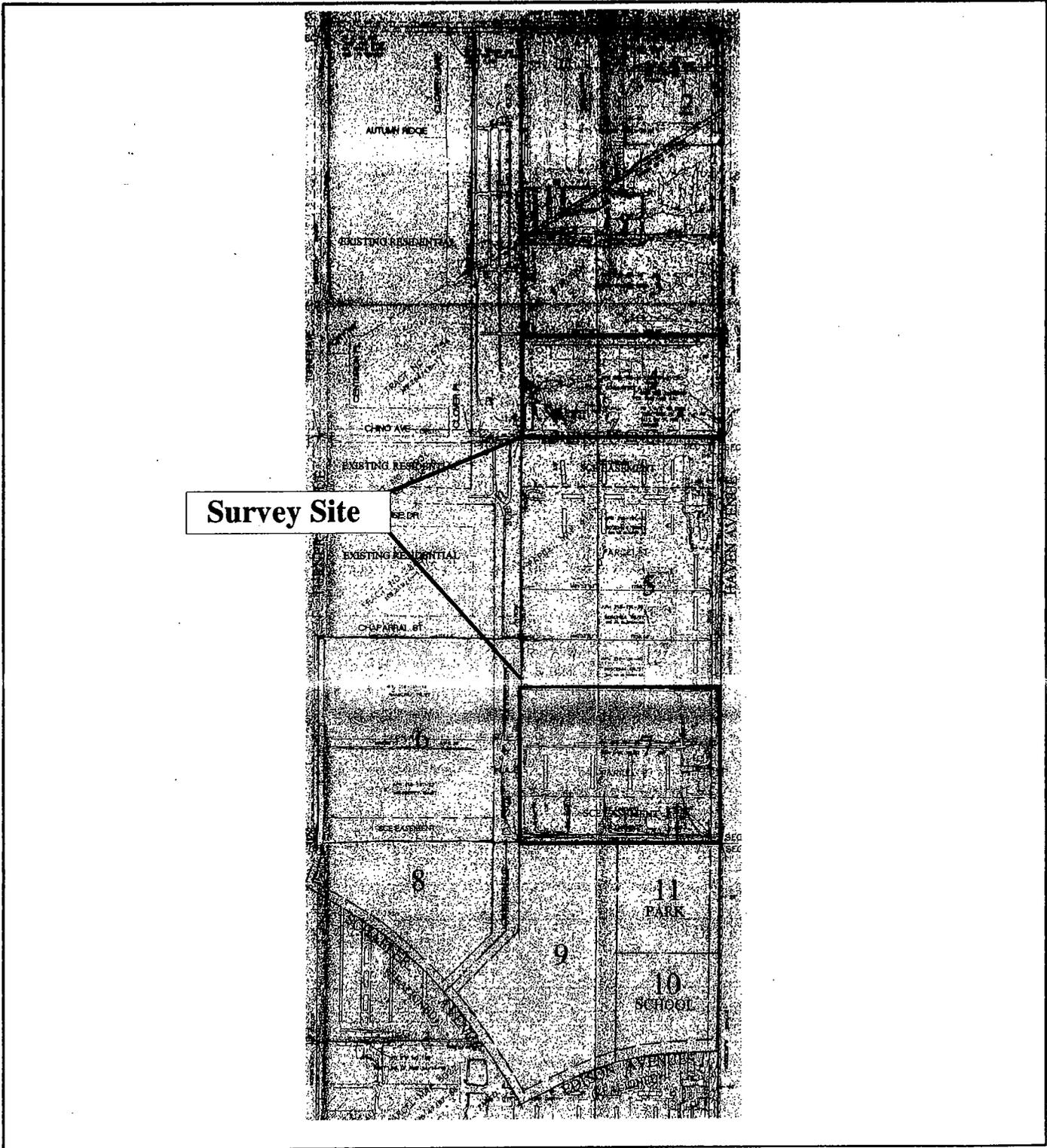


figure 2

Area Location

Stratham Properties
 Year 2002 DSF Survey • West Haven Specific Plan
 Components 4 & 7





Source: Kaufman Meeks + Partners, 2000.



figure 3
Site Location



NOT TO SCALE

Stratham Properties
Year 2002 DSF Survey • West Haven Specific Plan Components 4 & 7

Though museum records indicate its historic range likely included the entire expanse of Delhi Sands soils (Ballmer 1989), the current literature indicates the known distribution of the DSF, as of spring 1997, is restricted to 12 disjunct locations totaling approximately 190 ha (450 ac) situated within a 13-km (8-mi) radius reaching from Colton to Mira Loma, California (Ballmer 1992; USFWS 1992, 1993, 1996a, 1997). This represents a small fraction of its former range (USFWS 1996a, 1997). DSF sightings reported from recent surveys suggest the current range of the DSF may actually extend as far west as Ontario.

Much of the Colton Dunes region has been used for agriculture, chiefly grapes and citrus, since the 1800's. More recently, much of the remaining area has been converted to dairies, housing tracts, and commercial/industrial enterprises. Additional habitat has been lost, degraded, and fragmented by sand mining, illegal dumping, off-road vehicle usage, trampling, vegetation clearing for fire prevention, and competitive exclusion of native plants by invasion of exotic species.

The DSF undergoes complete metamorphosis (egg, larva, pupa, and adult). The complete life span of the species is unknown. Under favorable environmental conditions, the life cycle is likely annual, but it is possible that the larval/pupal stages may last two years or longer, depending on availability of food, temperature, rainfall, and other environmental factors. Except for the adult stage, the remainder of the life cycle is spent underground. It is unknown where the larval form of the DSF lives below ground and what its microhabitat requirements may be. It is not clear whether the early stages of *Rhaphiomidas* in general are herbivores, detritivores, or carnivores. The larvae of the closely related genus *Apiocera* have been successfully raised on earthworms in the laboratory (Cazier 1982).

Adult DSF emerge and become active in the late summer. Collection records for the DSF (Ballmer 1989) and current behavioral studies (Kingsley 1996) document a single annual flight period occurring between early August and early to mid-September. The exact adult life span is not known (several days to several weeks has been postulated), but it is documented that adults do not survive beyond the end of the annual flight period (Kiyani 1995).

Adult DSF are active during the warmest portions of the day during periods of direct sunlight, generally when daytime temperatures exceed 27 degrees Celsius [$^{\circ}\text{C}$](80 degrees Fahrenheit [$^{\circ}\text{F}$]) (Ballmer 1989). Peak activity period is between 1000 and 1300 hours PDT; males are rarely, if ever, observed outside 0900-1500 hours, while females have been observed perched on bushes as early as 0800 hours and after nightfall (Kingsley 1996). Flight has not been observed during cloudy, overcast, or rainy conditions, and only rarely during windy or breezy conditions, such as commonly arise in the afternoons within the DSF's range. During these conditions some observations have been made of perching within vegetation. Oviposition has only been observed in mid- to late afternoon, when temperatures begin to decrease (USFWS 1997).

While aloft, DSF may exhibit at least five distinctive types of behavior, each associated with a markedly different flight pattern (Kiyani 1995; Kingsley 1996). "Cruising" or "patrolling", employed by males only, constitutes slow, near-ground, somewhat erratic flight, sustained for relatively long duration with only momentary rest stops during which plants are circled and examined in search of females. Short-movement flight entails relatively slow, low-level, more-or-less direct-line movement from one perch to another nearby, apparently involving no searching. Rapid (or "rocket") flight proceeds in a straight line at above-ground heights of 2 m or more, and functions for longer-distance movement from one place to another, including probably random dispersal. DSF hover in stationary flight (like a hummingbird) over flowers while feeding. Males exhibit territorial behavior by pursuit flight: short bursts pursuing other DSF males or other species of insects that may fly near their "defended" territory; this pursuit may culminate in midair "wrestling" and tumbling to the ground followed by further pursuit, or by the original pursuer returning to the vicinity where the flight originated.

Mating among members of the DSF genus has been described by Rogers and Mattoni (1993). After mating, the females lay their eggs in suitable sandy soil. Females possess specialized egg-laying organs enabling the placement of eggs a few centimeters beneath the surface of the sand. This adaptation assures that the eggs are placed in a cooler and moister environment than the surface of the sand. Most oviposition takes place in the shade of shrubs, such as telegraph weed (*Heterotheca grandiflora*) (Rogers and Mattoni 1993). The combination of environmental factors required of suitable ovipositing sites is not known.

Adult DSF have rarely been observed taking nectar from flowers, and have not been seen to take other fluids. The nectaring events observed have been brief, on the order of 2-10 seconds, and the only published accounts have all been restricted to flowers of the California buckwheat (*Eriogonum fasciculatum*) (Kingsley 1996; USFWS 1997). Rogers (1996, 1998) has reported nectaring observations also involving tarweed (*Hemizonia fasciculata*) and wreathplant (*Stephanomeria virgata*).

Little is known regarding predators of the DSF. The introduced Argentine ant (*Iridomyrmex humilis*) has been observed to attack and kill a recently emerged adult DSF (Rogers 1993b). Rogers and Mattoni (1993) and Cazier (1985) reported that large robber flies prey upon *Rhaphiomidas* flies. Other predators of the adult flies may include dragonflies and insectivorous birds. Predators of the early DSF stages are unknown, but may include ants, other subterranean predatory insects, and reptiles.

Reliable estimates of DSF population sizes are unavailable. At the San Bernardino County Hospital preserve, the DSF population was estimated at 7 to 10 in 1994, 4 to 9 in 1995, 5 to 13 in 1996, and 5 to 15 in 1997 (Kiyani 1997). Kiyani (1996a,b; 1997) notes a number of assumptions and uncertainties regarding population counts of the DSF, and thus these estimates must be considered tentative. At another site in 1989, a direct count of 13 individuals was made within a half hour over a 10-ac portion of a 150-ac site (Ballmer 1989; USFWS 1997). It has been speculated that typical DSF population densities are likely on the order of 24/ha (10/ac) (USFWS 1997).

Along with other species in the genus, the DSF appears to have very narrow habitat requirements (Rogers and Mattoni 1993); moreover, different microhabitats are selected depending upon sex and specific behaviors involved (Kingsley 1996). The primary habitat requirement for the DSF is sandy substrate with a sparse cover of perennial shrubs and other vegetation. Based upon observations of this and several other members of the *Rhaphiomidas* genus, optimal vegetative cover is probably less than 50 percent, and may be as low as 10-20 percent (USFWS 1997).

The specific species composition and densities of plants preferred by the DSF are currently unknown (Kiyani 1996a). Definitive associations of adults with specific plants have not been established. Typically, the native plant species most consistently found where the DSF occurs (thus commonly considered "indicator species" of suitable habitat) are California buckwheat, telegraph weed, and California croton (*Croton californicus*) (Ballmer 1989; USFWS 1997). Though the former two have been implicated recently as possibly essential to the fly (Kingsley 1996), it has not been conclusively demonstrated whether any of these or other particular plants actually provide resources critical to the DSF, or if they are simply indicators of other, less obvious, habitat factors required by this species. Additional native plants found commonly where the DSF occurs include annual bur-sage (*Ambrosia acanthicarpa*), rancher's fireweed (*Amsinckia menziesii*), vinegar weed (*Lessingia glandulifera*), sapphire eriastrum (*Eriastrum sapphirinum*), and Thurber's spineflower (*Centrostegia thurberi*). Though the foregoing plants are those that occur most commonly in locations where the DSF is found, they also occur where it is not found and their presence does not necessarily imply the presence of the DSF.

Invasive non-native vegetation severely degrades or eliminates the habitat of the DSF (USFWS 1997). Non-native plants especially notorious in this respect include Russian thistle (*Salsola tragus*), horehound (*Marrubium vulgare*), mustard (*Brassica* sp., *Hirschfeldia incana*), cheese weed (*Malva parviflora*), and many species of introduced grasses such as rip gut brome (*Bromus diandrus*) and foxtail chess (*Bromus madritensis* ssp. *rubens*). These exotic plants may alter the amount of soil moisture or make the substrate physically unsuitable for the survival of the DSF and other native subterranean invertebrates.

Notwithstanding the foregoing inferences regarding habitat preferences and requirements, the DSF has been recorded from time to time (albeit in low number and usually fleetingly) in habitats that are substantially degraded and possessed of few apparently favorable attributes for the species. Moreover, the current absence of the DSF on a particular site within its range does not necessarily indicate that future occupation could not occur or re-occur should conditions on the site become more suitable. For example, the DSF has been recorded recently on certain sites that have been graded or disced repeatedly in the past, after such activity ceased and to some extent the site returned to more natural conditions.

As mandated by the ESA, the USFWS has prepared a recovery plan for the DSF (USFWS 1997). The objective of the recovery plan is to ultimately reduce the risk of DSF extinction to the point that it can be

downlisted, *i.e.*, removed from listing as an endangered species. The plan establishes three geographically defined recovery units (RU) known as the Ontario, Jurupa, and Colton RUs. The Survey Site falls within the Colton RU, which contains the majority of currently known populations of DSF.

In order to accomplish its objective, the DSF Recovery Plan predicates that each RU must contain occupied and/or restorable-to-suitable-for-occupation habitat for at least one population of DSF. Further, the plan stipulates that a minimum of eight DSF populations must occur across the 3 RUs, of which four must be in the Colton RU, two each on either side of the east-west running Interstate 10.

EXISTING CONDITIONS

The Survey Site consists of two neighboring, but not contiguous, rectangularly shaped parcels of land: Parcel 4 is a vacant weed lot; most of Parcel 7 is occupied by an operational dairy farm, the remainder is fallow. Both are surrounded by dairies, power line easements, and residential neighborhoods, except for a nursery to the north of Parcel 4. The topography of the site is essentially flat, except for piles of fertilizer in the southwest corner of Parcel 4. Natural site substrate is classified by soil maps of the U.S. Department of Agriculture (USDA 1980) as Delhi Fine Sand soil formation.

Vegetation on the site consists generally of a ruderal (weedy) mixture of native and non-native subshrubs, grasses, and forbs (herbs other than grasses) that are good colonizers of disturbed areas. Among these are riggut brome, Bermuda grass (*Cynodon dactylon*), crownbeard (*Verbesina encelioides*), mustard (*Sisymbrium* sp.), Russian thistle, red-stemmed filaree (*Erodium cicutarium*), and cheese weed. Some of these invasive species are known to be deleterious to the suitability of habitat for the DSF. None of the three plant species (telegraph weed, croton, and California buckwheat) commonly considered indicative of habitat suitable for the DSF is present on the site.

Plant diversity on the site is very low. A total of 10 species in 10 families was detected (Appendix A); of these, eight are non-native. Vegetation cover is sparse on Parcel 4, and dense where occurring on Parcel 7.

Parcel 4 has apparently been disced in the recent past, probably within less than 2 years. This parcel is littered with household trash and remnants of former infrastructure, such as chunks of concrete curbing, sidewalks, driveways, etc.

METHODS

Review of Existing Information

Documentation pertinent to the biology of the DSF and biological resources in the vicinity of the Survey Site was compiled, reviewed, and analyzed. Information reviewed included: (1) Federal Register listing package for the Delhi Sands flower-loving fly; (2) literature pertaining to habitat requirements of the DSF; (3) the Recovery Plan for the DSF (USFWS 1997), and (4) California Natural Diversity Data Base (CNDDB 2000).

Concurrent with this survey, sites within the vicinity of the Survey Site known to be occupied by the DSF were visited to assess directly or by discussion with other surveyors the current status and activity patterns of various DSF populations in the region.

Focused Survey

A focused survey was conducted for the DSF on the Survey Site to assess its presence or absence. The survey was conducted in accordance with USFWS interim general survey guidelines, which recommend 2 replicate surveys per week during the flight period of the DSF (defined by survey guidelines as 1 August through 20 September, but modified by the Service for the current year to commence 15 July), to be performed between the hours of 1000 and 1400 during appropriate weather conditions (USFWS 1996b). Surveys were conducted by Larry Munsey (TE 838741) and Guy Bruyey (TE 837439).

A total of 20 surveys was performed on the following dates: 16, 21, 23, 27, 30 July; 4, 6, 11, 13, 18, 20, 25, 27 August; and 1, 3, 8, 10, 15, 17, 20 September 2002. Weather conditions during the surveys were generally conducive to high levels of invertebrate activity. Temperatures typically ranged between 27 and 38°C (80-100 °F). On some occasions temperatures at the beginning of the survey period were lower, ranging in the 20s °C (70s °F). Wind speed ranged generally from 0 to 16 km/hr (0 to 10 mi/hr) with infrequent gusts to 25 km/hr (15 mi/hr). Skies were usually clear, with a few exceptions when scattered clouds or hazy conditions prevailed.

During the surveys, the Survey Site was walked systematically and deliberately in search of both DSF sexes and discarded pupal cases. The surveys included careful examination of plant flowers, stems, and foliage; open patches of sand; shaded areas at the base of plants; air space in the immediate vicinity of flowering plants; and general air space within unaided vision above the site. Thus, an exhaustive search was accomplished for flying, feeding, perching, or otherwise engaged flies.

All insects encountered during the surveys were identified to the lowest possible taxon, either by sight or, when necessary, by capture and subsequent determination in the laboratory. Only active and exposed macro insect fauna was considered, thus other less obvious groups no doubt also present (e.g., springtails, termites, earwigs, thrips, etc.) were not recorded.

RESULTS AND DISCUSSION

No DSF or DSF sign (*i.e.*, discarded pupal cases) were observed on the Survey Site during the survey.

Birds observed or heard on or above the Survey Site included the cattle egret (*Bubulcus ibis*), white-faced ibis (*Plegadis chihi*), turkey vulture (*Cathartes aura*), mallard (*Anas platyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), burrowing owl (*Athene cunicularia*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), western kingbird (*Tyrannus verticalis*), American crow (*Corvus brachyrhynchos*), barn swallow (*Hirundo rustica*), cliff swallow (*Hirundo pyrrhonota*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnis vulgaris*), brown-headed cowbird (*Molothrus ater*), and several species of songbirds. Other vertebrates detected were the side-blotched lizard (*Uta stansburiana*), western fence lizard (*Sceloporus occidentalis*), pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), and heteromyid rodents (burrows, tracks, and tail drags).

A total of 71 species of insects in 42 families was recorded on the Survey Site during the survey. A full list of insects observed is provided in Appendix B.

The following factors indicate the presence of the DSF on the Survey Site is unlikely:

- highly disturbed condition of entire site;
- low diversity of plants;
- high proportion of non-native invasives in the site's plant composition;
- absence of California buckwheat, California croton, and telegraph weed; and
- type and condition of the habitat surrounding the site.

By USFWS regulation, a second consecutive year of surveys with negative results is required to confirm the absence of the DSF on the site.

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APPENDICES

APPENDIX A PLANTS OBSERVED ON THE PROJECT SITE¹

ANGIOSPERMS (DICOTYLEDONS)

AMARANTHACEAE — AMARANTH FAMILY

- * *Amaranthus* sp. – pigweed

ASTERACEAE — SUNFLOWER FAMILY

- * *Verbesina encelioides* – golden crownbeard

BRASSICACEAE — MUSTARD FAMILY

- * *Sisymbrium* sp. – mustard

CHENOPODIACEAE — GOOSEFOOT FAMILY

- * *Salsola tragus* – Russian thistle

GERANIACEAE — GERANIUM FAMILY

- * *Erodium cicutarium* – red-stemmed filaree

MALVACEAE — MALLOW FAMILY

- * *Malva parviflora* – cheeseweed

ROSACEAE — ROSE FAMILY

- * *Rosa* sp. – ornamental rose

SALICACEAE — WILLOW FAMILY

- Salix* sp. – willow

SOLANACEAE — NIGHTSHADE FAMILY

- Nicotiana quadrivalvis* – Wallace's tobacco

ANGIOSPERMS (MONOCOTYLEDONS)

POACEAE — GRASS FAMILY

- * *Cynodon dactylon* – Bermuda grass

¹ This is not intended as an exhaustive listing of the vegetation occurring on the site; some annual herbs or very uncommon species may not have been detected by the field survey. Floral taxonomy used in this report follows the *Jepson Manual: Higher Plants of California* (Hickman 1993). Additional common plant names are taken from Munz (1974), Beauchamp (1986), Roberts (1989), Abrams (1923, 1944), and Abrams and Ferris (1951, 1960).

- * non-native

APPENDIX B
INSECTS OBSERVED ON THE PROJECT SITE¹

ORDER ODONATA — DRAGONFLIES & DAMSELFLIES

AESHNIDAE — DARNER FAMILY

Anax junius – common green darner

LIBELLULIDAE — SKIMMER FAMILY

Libellula saturata – big red skimmer
Pantala flavescens – globetrotter
Parithemis intensa
Sympetrum (Tametrum) corruptum – pastel skimmer
Tramea lacerata – black skimmer

COENAGRIONIDAE — NARROW-WINGED DAMSELFLY FAMILY

Argia sp.

ORDER ORTHOPTERA — GRASSHOPPERS, KATYDIDS & CRICKETS

ACRIDIDAE — SHORT-HORNED GRASSHOPPER FAMILY

Trimerotropis pallidipennis – pallid band-wing
Trimerotropis sp.

GRYLLIDAE — CRICKET FAMILY

Gryllus sp. – field cricket

ORDER MANTODEA — MANTIDS & WALKINGSTICKS

MANTIDAE — MANTIS FAMILY

Iris oratoria – Mediterranean mantis

ORDER HEMIPTERA — TRUE BUGS

LYGAEIDAE — SEED BUG FAMILY

Lygaeus kalmii – small milkweed bug

REDUVIIDAE — ASSASSIN BUG FAMILY

Zelus tetracanthus

ORDER HOMOPTERA — HOMOPTERANS

APHIDIDAE — APHID FAMILY

1 unidentified species

ORDER NEUROPTERA — NET-WINGED INSECTS

MYRMELEONTIDAE — ANTLION FAMILY

Brachynemurus sp.
Myrmeleon sp.

ORDER COLEOPTERA — BEETLES

COCCINELLIDAE — LADYBIRD BEETLE FAMILY

Harmonia axyridis
Hippodamia convergens – convergent ladybird beetle

SCARABAEIDAE — SCARAB BEETLE FAMILY

Cotinus texana (mutabilis) – green fruit beetle

TENEBRIONIDAE — DARKLING BEETLE FAMILY

1 unidentified species

CHRYSOMELIDAE — LEAF BEETLE FAMILY

Diabrotica balteata

Diabrotica undecimpunctata – western spotted cucumber beetle

ORDER LEPIDOPTERA — MOTHS AND BUTTERFLIES

SUBORDER HETEROCERA — MOTHS

ARCTIIDAE — TIGER MOTH FAMILY

Estigmene acrea – acrea sphinx moth

NOCTUIDAE — MILLERS & CUTWORM FAMILY

1 unidentified species

PYRALIDAE — PYRALID MOTH FAMILY

1 unidentified species

SUBORDER RHOPALOCERA — BUTTERFLIES

HESPERIIDAE — SKIPPER FAMILY

Hylephila phyleus – fiery skipper

Atalopedes campestris – field skipper

Lerodea eufala – eufala skipper

Pyrgus albescens – western checkered skipper

PIERIDAE — WHITES & SULFURS FAMILY

Pieris (Artogeia) rapae – cabbage white

Pieris (Pontia) protodice – checkered white

Colias eurytheme – orange sulfur

NYMPHALIDAE — BRUSH-FOOTED BUTTERFLY FAMILY

Cynthia (Vanessa) cardui – painted lady

Cynthia (Vanessa) anabella – west coast lady

LYCAENIDAE — HAIRSTREAKS, COPPERS & BLUES FAMILY

Brephidium exilis – pygmy blue

Strymon melinus – gray (common) hairstreak

ORDER DIPTERA — TRUE FLIES

APIOCERIDAE — FLOWER-LOVING FLY FAMILY

Apiocera chrysolasia – flower-loving fly

MYDIDAE — MIDAS FLY FAMILY

Nemomidas pantherinus – midas fly

ASILIDAE — ROBBER FLY FAMILY

Efferia albibarbis

Saropogon luteus

Stenopogon brevisculus

BOMBYLIIDAE — BEE FLY FAMILY

Villa atrata

DOLICHOPODIDAE — LONG-LEGGED FLY FAMILY

Condylostylus philicornis

SYRPHIDAE — HOVER FLY FAMILY

Allograpta obliqua
Eristalis tenax – drone fly

CONOPIIDAE — THICK-HEADED FLY FAMILY

Physocephala texana

MUSCIDAE — MUSCID FLY FAMILY

Musca domestica – house fly

TACHINIDAE — TACHINID FLY FAMILY

1 unidentified species

SARCOPHAGIDAE — FLESH FLY FAMILY

1 unidentified species

ORDER HYMENOPTERA — ANTS, BEES & WASPS

BRACONIDAE — BRACONID WASP FAMILY

1 unidentified species

ICHNEUMONIDAE — ICHNEUMONID WASP FAMILY

1 unidentified species

CHRYSIDIDAE — CUCKOO WASP FAMILY

Pamopes edwardsii – Edwards' cuckoo wasp

MUTILLIDAE — VELVET ANT FAMILY

Dasymutilla coccineohirta – red-haired velvet ant

FORMICIDAE — ANT FAMILY

Pogonomyrmex californica – red harvester ant
Solenopsis sp.

VESPIDAE — PAPER WASP FAMILY

Polistes apachus – paper wasp

SPHECIDAE — THREAD-WAISTED AND DIGGER WASP FAMILY

Ammophila sp.
Bembix comata – sand wasp
Chalybion californicus – blue mud wasp
Chlorion cyaneum
Microbembix californica
Oxybellus sp.
Podalonia sp.
Philanthus multimaculata
Philanthus ventilabris – bee killer wasp
Prionyx foxi
Sceliphron caementarium – black-and-yellow mud dauber

HALICTIDAE — HALICTID BEE FAMILY

Agapostemon texana – metallic sweat bee

MEGACHILIDAE — LEAFCUTTING BEE FAMILY

Megachile sp.

ANTHOPHORIDAE — DIGGER BEE FAMILY

Melessodes sp.

APIDAE — BUMBLE BEE & HONEY BEE FAMILY

Apis mellifera – honey bee

¹ This list reports insects observed on the site during the surveys for the DSF; it is not intended to represent an exhaustive insect survey.

APPENDIX A PLANTS OBSERVED ON THE PROJECT SITE¹

ANGIOSPERMS (DICOTYLEDONS)

AMARANTHACEAE — AMARANTH FAMILY

- * *Amaranthus* sp.

ANACARDIACEAE — SUMAC OR CASHEW FAMILY

- * *Schinus molle* — Peruvian pepper tree

BRASSICACEAE — MUSTARD FAMILY

- * *Hirschfeldia incana* — short-podded mustard
- * *Sisymbrium* sp. — mustard

CHENOPODIACEAE — GOOSEFOOT FAMILY

- * *Chenopodium album* — lamb's quarters
- * *Salsola tragus* — Russian thistle

EUPHORBIACEAE — SPURGE FAMILY

- * *Ricinus communis* — castorbean

GERANIACEAE — GERANIUM FAMILY

- * *Erodium cicutarium* — red-stemmed filaree

MALVACEAE — MALLOW FAMILY

- * *Malva parviflora* — cheeseweed

MORACEAE — MULBERRY FAMILY

- * *Morus* sp. — mulberry

POLYGONACEAE — BUCKWHEAT FAMILY

- * *Polygonum arenastrum* — common knotweed

SOLANACEAE — NIGHTSHADE FAMILY

- * *Solanum* sp. — nightshade

URTICACEAE — NETTLE FAMILY

- * *Urtica urens* — dwarf nettle

ANGIOSPERMS (MONOCOTYLEDONS)

ARECACEAE — PALM FAMILY

- * *Archontophoenix cunninghamiana* — king palm

POACEAE — GRASS FAMILY

- * *Bromus diandrus* — ripgut grass
- * *Cynodon dactylon* — Bermuda grass
- * *Digitaria sanguinalis* — hairy crabgrass
- * *Hordeum murinum* ssp. *leporinum* — white foxtail barley
- * *Sorghum halepense* — Johnsongrass

¹ This is not intended as an exhaustive listing of the vegetation occurring on the site; some annual herbs or very uncommon species may not have been detected by the field survey. Floral taxonomy used in this report follows the *Jepson Manual: Higher Plants of California* (Hickman 1993). Additional common plant names are taken from Munz (1974), Beauchamp (1986), Roberts (1989), Abrams (1923, 1944), and Abrams and Ferris (1951, 1960).

* non-native

APPENDIX B
INSECTS OBSERVED ON THE PROJECT SITE

ORDER ODONATA — DRAGONFLIES & DAMSELFLIES

AESHNIDAE — DARNER FAMILY

Aeshna multicolor – multicolored darner

LIBELLULIDAE — SKIMMER FAMILY

Libellula saturata – big red skimmer

Pantala flavescens – globetrotter

Sympetrum (Tarnetrum) corruptum – pastel skimmer

ORDER DERMAPTERA — EARWIGS

1 unidentified species

ORDER ORTHOPTERA — GRASSHOPPERS, KATYDIDS & CRICKETS

ACRIDIDAE — SHORT-HORNED GRASSHOPPER FAMILY

Trimerotropis pallidipennis – pallid band-wing

Schistocerca sp.

GRYLLIDAE — CRICKET FAMILY

Gryllus sp. – field cricket

ORDER HEMIPTERA — TRUE BUGS

MIRIDAE — PLANT BUG FAMILY

Lygus sp.

PENTATOMIDAE — STINK BUG FAMILY

Chlorochroa uhleri/sayi – Say's stink bug

Murgantia histrionica – harlequin bug

REDUVIIDAE — ASSASSIN BUG FAMILY

Zelus tetracanthus

1 unidentified species

ORDER HOMOPTERA — HOMOPTERANS

CICADELLIDAE — LEAFHOPPER FAMILY

1 unidentified species

APHIDIDAE — APHID FAMILY

1 unidentified species

ORDER NEUROPTERA — NET-WINGED INSECTS

MYRMELEONTIDAE — ANTLION FAMILY

1 unidentified species

ORDER COLEOPTERA — BEETLES

CARABIDAE — GROUND BEETLE FAMILY

1 unidentified species

COCCINELLIDAE — LADYBIRD BEETLE FAMILY

Hippodamia convergens – convergent ladybird beetle

SCARABAEIDAE — SCARAB BEETLE FAMILY

Cotinus texana (mutabilis) – green fruit beetle

TENEBRIONIDAE — DARKLING BEETLE FAMILY

Eleodes sp. – stink beetle

CHRYSOMELIDAE — LEAF BEETLE FAMILY

Diabrotica undecimpunctata – western spotted cucumber beetle
Lema trilineata – three-lined potato beetle

ORDER LEPIDOPTERA — MOTHS AND BUTTERFLIES

SUBORDER HETEROCERA — MOTHS

NOCTUIDAE — MILLERS & CUTWORM FAMILY

1 unidentified species

PYRALIDAE — PYRALID MOTH FAMILY

1 unidentified species

SUBORDER RHOPALOCERA — BUTTERFLIES

HESPERIIDAE — SKIPPER FAMILY

Hylephila phyleus – fiery skipper

PIERIDAE — WHITES & SULFURS FAMILY

Pieris (Artogeia) rapae – cabbage white
Pieris (Pontia) protodice – checkered white
Colias eurytheme – orange sulfur

NYPHALIDAE — BRUSH-FOOTED BUTTERFLY FAMILY

Cynthia (Vanessa) cardui – painted lady
Cynthia (Vanessa) anabella – west coast lady
Junonia (Precis) coenia – buckeye

LYCAENIDAE — HAIRSTREAKS, COPPERS & BLUES FAMILY

Brephidium exilis – pygmy blue
Icaricia (Plebejus) acmon – acmon blue
Strymon melinus – gray (common) hairstreak

ORDER DIPTERA — TRUE FLIES

MYDIDAE — MIDAS FLY FAMILY

Nemomidas pantherinus – midas fly

ASILIDAE — ROBBER FLY FAMILY

Efferia albibarbis
Stenopogon brevisculus

BOMBYLIIDAE — BEE FLY FAMILY

Villa atrata
2 unidentified species

SYRPHIDAE — HOVER FLY FAMILY

Allograpta obliqua
Copestylum (Volucella) mexicana – cactus fly
Eristalis tenax – drone fly

CONOPIDAE — THICK-HEADED FLY FAMILY

Physocephala texana

MUSCIDAE — MUSCID FLY FAMILY

Musca domestica – house fly

CALLIPHORIDAE — BLOW FLY FAMILY

Phaenicia sericata – green bottle fly

SARCOPHAGIDAE — FLESH FLY FAMILY

Sarcophaga haemorrhoidalis – flesh fly

ORDER HYMENOPTERA — ANTS, BEES & WASPS

ICHNEUMONIDAE — ICHNEUMONID WASP FAMILY

1 unidentified species

CHRYSIDIDAE — CUCKOO WASP FAMILY

Parnopes edwardsii – Edwards' cuckoo wasp

FORMICIDAE — ANT FAMILY

Pogonomyrmex californica – red harvester ant

VESPIDAE — PAPER WASP FAMILY

Polistes apachus – paper wasp

SPHECIDAE — THREAD-WAISTED AND DIGGER WASP FAMILY

Ammophila sp.

Bembix comata – sand wasp

Chalybion californicus – blue mud wasp

Microbembix californica

Philanthus ventilabris – bee killer wasp

Prionyx foxi

Sceliphron caementarium – black-and-yellow mud dauber

3 unidentified species

HALICTIDAE — HALICTID BEE FAMILY

Agapostemon texana – metallic sweat bee

MEGACHILIDAE — LEAFCUTTING BEE FAMILY

Megachile sp.

ANTHOPHORIDAE — DIGGER BEE FAMILY

Melessodes sp.

APIDAE — BUMBLE BEE & HONEY BEE FAMILY

Apis mellifera – honey bee

¹ This list reports insects observed on the site during the surveys for the DSF; it is not intended to represent an exhaustive insect survey.

**REPORT OF YEAR 2003 FOCUSED SURVEY FOR
DELHI SANDS FLOWER-LOVING FLY
AT WEST HAVEN SPECIFIC PLAN COMPONENT 1 SITE
SAN BERNARDINO COUNTY, CALIFORNIA**

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INTRODUCTION

This report presents the findings of the second year of a two consecutive-year focused survey for the Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*) conducted by Larry Munsey International (LMI) on a site ("Survey Site") in an unincorporated area of San Bernardino County, California (Figure 1). The Survey Site falls within Section 11, Township 2 south, Range 7 west of the U. S. Geological Survey (USGS) "Guasti" 7.5 minute quadrangle (Figure 2). It is a 10.5-ha (26.2-ac) parcel of land located southeast of the City of Ontario adjacent south of Riverside Drive and adjacent west of Haven Avenue (Figure 3).

The information provided in this report is for use by resource agencies in assessing the potential impact of any contemplated action at the Survey Site upon the Delhi Sands flower-loving fly, and for use by the property owner and other interested parties in anticipating the possible consequences of environmental compliance and permitting requirements upon land use planning.

BACKGROUND

The Delhi Sands flower-loving fly (DSF) is currently listed by the U.S. Fish and Wildlife Service (USFWS) as endangered under the federal Endangered Species Act (ESA). Pursuant to provisions of the ESA, "take" of a federally listed species, such as the DSF, is prohibited by law. The term "take" is defined as any action that would harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect an endangered species, including by alteration of habitat. The USFWS monitors actions that might affect endangered species through its role as a reviewing agency in the land entitlement process. Typically in California the agency's responsibility to minimize adverse impacts upon endangered species is discharged through involvement in the California Environmental Quality Act (CEQA) review and approval process and/or through the courts. In order to demonstrate whether or not and/or to what degree the DSF, as an endangered species, may be a concern related to land use decisions, the USFWS requires that presence/absence surveys for the species, such as that reported herein, be undertaken.

The DSF is a member of a genus of flies, *Rhaphiomidas*, that, along with some members of the Dipteran family Asilidae (robber flies), contains the largest flies known in North America. Though formerly considered a member of the flower-loving fly family Apioceridae (Cole 1969; Peterson 1981; Cazier 1941, 1985), recent taxonomic studies indicate the genus *Rhaphiomidas*, and thus the DSF, actually belongs in the midas fly family Mydidae (Ovchinnikova 1989; Woodley 1989; Sinclair, *et al.* 1994; Yeates 1994).

There are 20 described species of *Rhaphiomidas* flies as of this writing (Cazier 1985; Rogers 1999), including two new species described recently by Rogers (1993a); descriptions of three additional species are currently in preparation (Rogers 1999). Their known distribution is restricted to desert and semidesert regions of California, southern Nevada, Arizona, New Mexico, western Texas, Baja California, and northwestern Mexico (Rogers and Mattoni 1993). Within this region, they are confined to habitats with fine, sandy substrate, such as sand dunes and dry sandy/rocky washes. All species of this genus exhibit relatively short annual flight periods within a particular locality, normally on the order of two to five weeks (Toft and Kimsey 1982; Wharton 1982; Rogers and Mattoni 1993).

The DSF itself is large, approximately 2.5 cm (1 in) in length, orange-brown in color, and has dark brown oval markings on the upper surface of the abdomen. It has a long proboscis for extracting nectar from flowers, and can be easily distinguished by this obvious feature from the few other species of like-appearing flies occurring within its range. It is generally low-flying, and males of the species are capable of extremely fast flight.

The geographic distribution of the DSF is restricted to areas having a specific sandy substrate type classified as Delhi Series soils, commonly known as "Delhi Sands". This white to light brown fine unconsolidated sand and sandy loam soil formation covers approximately 40 square miles in several irregular patches extending from the City of Colton to Ontario and Chino in northwestern Riverside and southwestern San Bernardino counties (USDA 1971, 1980). This region of Delhi series soils, also known as the Colton Dunes, is the largest inland cismontane sand dune formation in southern California. This dune formation has been defined as the Desert Sand-verbena Series in Sawyer (1994).

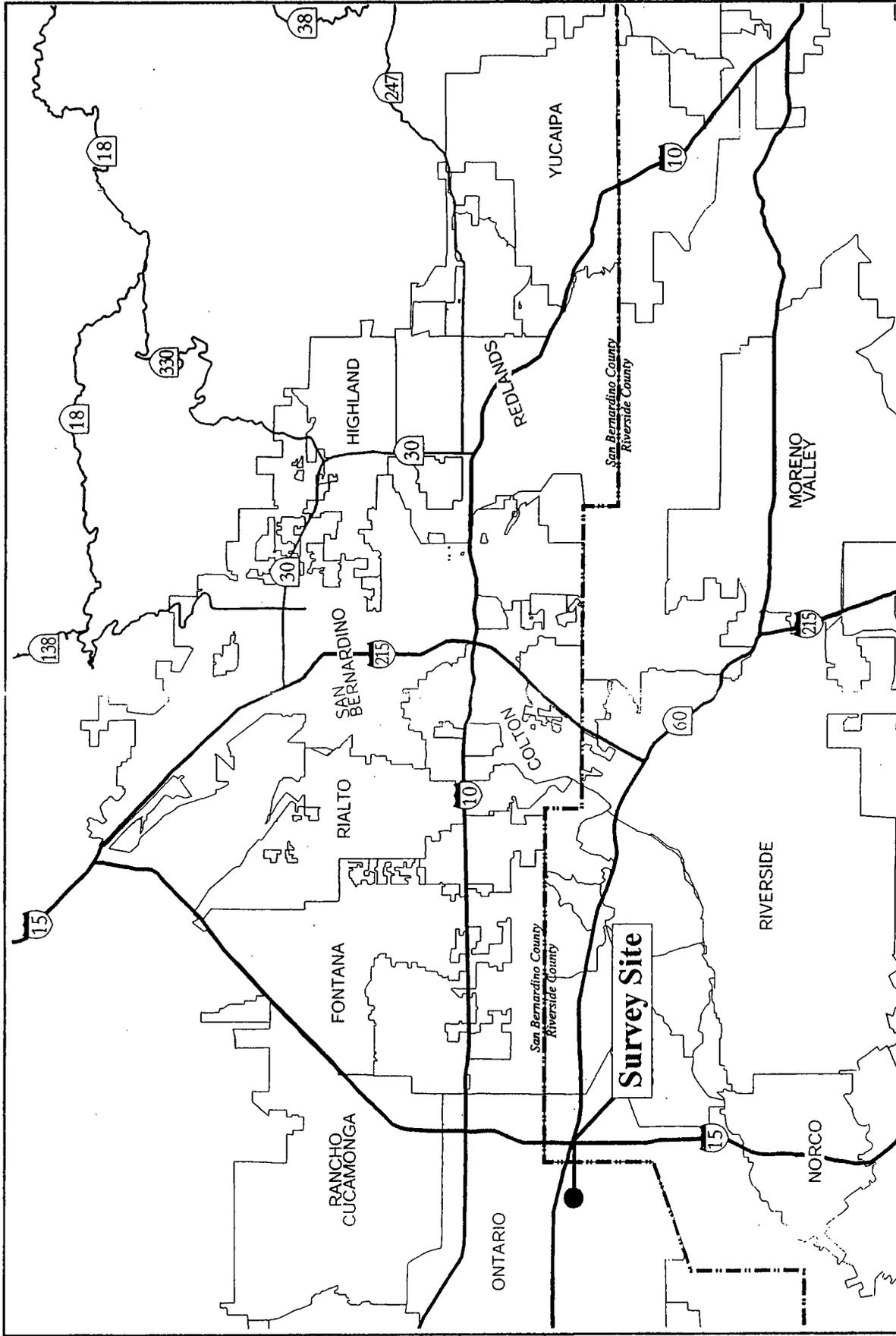
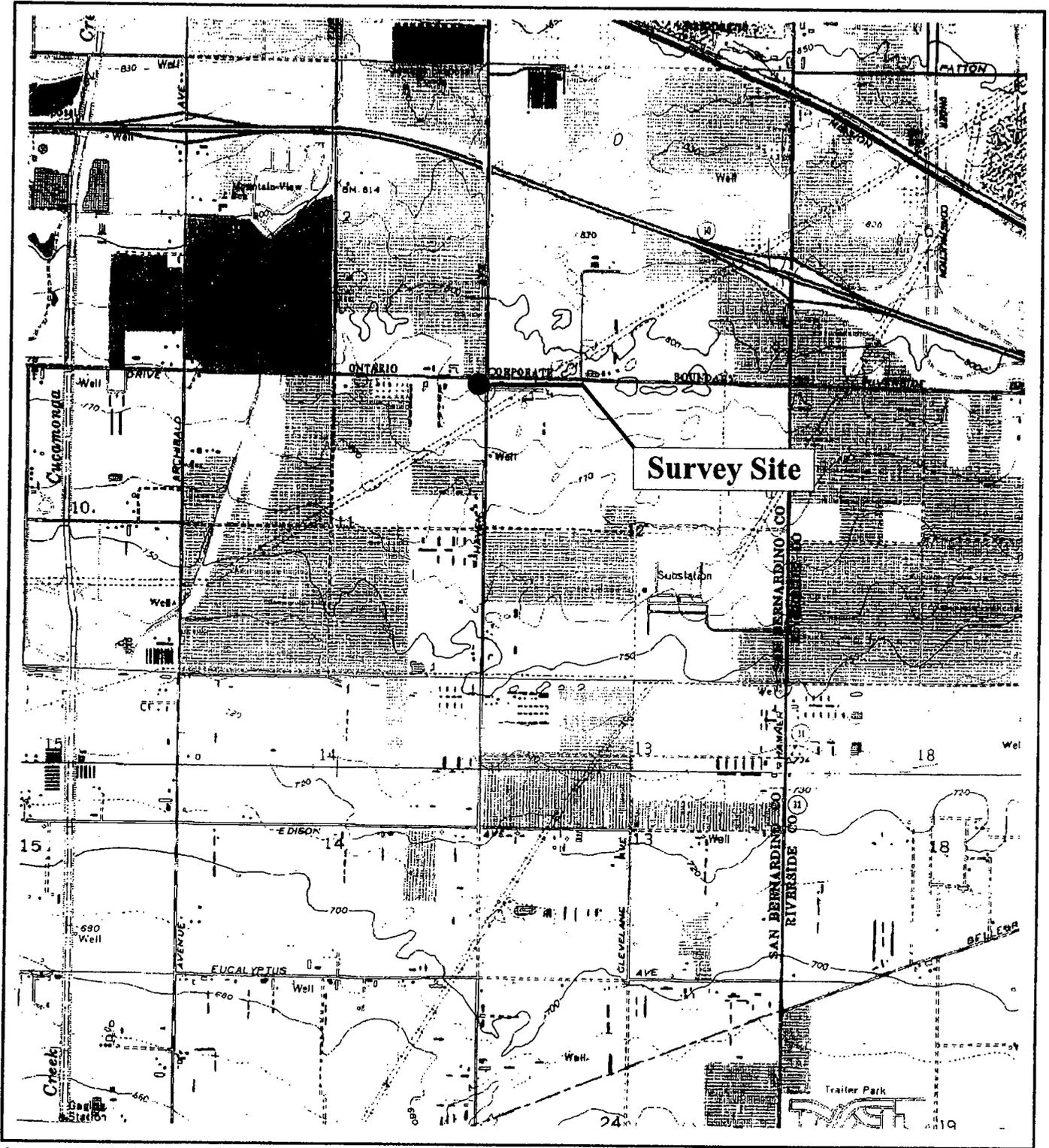


figure 1
Regional Location



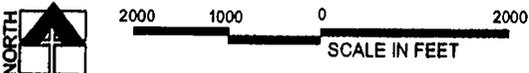


Source: USGS Guastli 7.5' DRG, 1966 - Photo Revised 1981.



figure 2
Area Location

Centex Homes
Year 2003 DSF Survey • West Haven Specific Plan
Component 1



Though museum records indicate its historic range likely included the entire expanse of Delhi Sands soils (Ballmer 1989), the current literature indicates the known distribution of the DSF, as of spring 1997, is restricted to 12 disjunct locations totaling approximately 190 ha (450 ac) situated within a 13-km (8-mi) radius reaching from Colton to Mira Loma, California (Ballmer 1992; USFWS 1992, 1993, 1996a, 1997). This represents a small fraction of its former range (USFWS 1996a, 1997). DSF sightings reported from recent surveys suggest the current range of the DSF may actually extend as far west as Ontario (Woulfe 2000; Osborne 2000; Wilcox 2003).

Much of the Colton Dunes region has been used for agriculture, chiefly grapes and citrus, since the 1800's. More recently, much of the remaining area has been converted to dairies, housing tracts, and commercial/industrial enterprises. Additional habitat has been lost, degraded, and fragmented by sand mining, illegal dumping, off-road vehicle usage, trampling, vegetation clearing for fire prevention, and competitive exclusion of native plants by invasion of exotic species.

The DSF undergoes complete metamorphosis (egg, larva, pupa, and adult). The complete life span of the species is unknown. Under favorable environmental conditions, the life cycle is likely annual, but it is possible that the larval/pupal stages may last two years or longer, depending on availability of food, temperature, rainfall, and other environmental factors. Except for the adult stage, the remainder of the life cycle is spent underground. It is unknown where the larval form of the DSF lives below ground and what its microhabitat requirements may be. It is not clear whether the early stages of *Rhaphiomidas* in general are herbivores, detritivores, or carnivores. The larvae of the closely related genus *Apiocera* have been successfully raised on earthworms in the laboratory (Cazier 1982).

Adult DSF emerge and become active in the late summer. Collection records for the DSF (Ballmer 1989) and current behavioral studies (Kingsley 1996) document a single annual flight period occurring between early August and early to mid-September. The exact adult life span is not known (several days to several weeks has been postulated), but it is documented that adults do not survive beyond the end of the annual flight period (Kiyani 1995).

Adult DSF are active during the warmest portions of the day during periods of direct sunlight, generally when daytime temperatures exceed 27 degrees Celsius [$^{\circ}$ C](80 degrees Fahrenheit [$^{\circ}$ F]) (Ballmer 1989). Peak activity period is between 1000 and 1300 hours PDT; males are rarely, if ever, observed outside 0900-1500 hours, while females have been observed perched on bushes as early as 0800 hours and after nightfall (Kingsley 1996). Flight has not been observed during cloudy, overcast, or rainy conditions, and only rarely during windy or breezy conditions, such as commonly arise in the afternoons within the DSF's range. During these conditions some observations have been made of perching within vegetation. Oviposition has only been observed in mid- to late afternoon, when temperatures begin to decrease (USFWS 1997).

While aloft, DSF may exhibit at least five distinctive types of behavior, each associated with a markedly different flight pattern (Kiyani 1995; Kingsley 1996). "Cruising" or "patrolling", employed by males only, constitutes slow, near-ground, somewhat erratic flight, sustained for relatively long duration with only momentary rest stops during which plants are circled and examined in search of females. Short-movement flight entails relatively slow, low-level, more-or-less direct-line movement from one perch to another nearby, apparently involving no searching. Rapid (or "rocket") flight proceeds in a straight line at above-ground heights of 2 m or more, and functions for longer-distance movement from one place to another, including probably random dispersal. DSF hover in stationary flight (like a hummingbird) over flowers while feeding. Males exhibit territorial behavior by pursuit flight: short bursts pursuing other DSF males or other species of insects that may fly near their "defended" territory; this pursuit may culminate in midair "wrestling" and tumbling to the ground followed by further pursuit, or by the original pursuer returning to the vicinity where the flight originated.

Mating among members of the DSF genus has been described by Rogers and Mattoni (1993). After mating, the females lay their eggs in suitable sandy soil. Females possess specialized egg-laying organs enabling the placement of eggs a few centimeters beneath the surface of the sand. This adaptation assures that the eggs are placed in a cooler and moister environment than the surface of the sand. Most oviposition takes place in the shade of shrubs, such as telegraph weed (*Heterotheca grandiflora*) (Rogers

and Mattoni 1993). The combination of environmental factors required of suitable ovipositing sites is not known.

Adult DSF have rarely been observed taking nectar from flowers, and have not been seen to take other fluids. The nectaring events observed have been brief, on the order of 2-10 seconds, and the only published accounts have all been restricted to flowers of the California buckwheat (*Eriogonum fasciculatum*) (Kingsley 1996; USFWS 1997). Rogers (1996, 1998) has reported nectaring observations also involving tarweed (*Hemizonia fasciculata*) and wreathplant (*Stephanomeria virgata*).

Little is known regarding predators of the DSF. The introduced Argentine ant (*Iridomyrmex humilis*) has been observed to attack and kill a recently emerged adult DSF (Rogers 1993b). Rogers and Mattoni (1993) and Cazier (1985) reported that large robber flies prey upon *Rhaphiomidas* flies. Other predators of the adult flies may include dragonflies and insectivorous birds. Predators of the early DSF stages are unknown, but may include ants, other subterranean predatory insects, and reptiles.

Reliable estimates of DSF population sizes are unavailable. At the San Bernardino County Hospital preserve, the DSF population was estimated at 7 to 10 in 1994, 4 to 9 in 1995, 5 to 13 in 1996, and 5 to 15 in 1997 (Kiyani 1997). Kiyani (1996a,b; 1997) notes a number of assumptions and uncertainties regarding population counts of the DSF, and thus these estimates must be considered tentative. At another site in 1989, a direct count of 13 individuals was made within a half hour over a 10-ac portion of a 150-ac site (Ballmer 1989; USFWS 1997). It has been speculated that typical DSF population densities are likely on the order of 24/ha (10/ac) (USFWS 1997).

Along with other species in the genus, the DSF appears to have very narrow habitat requirements (Rogers and Mattoni 1993); moreover, different microhabitats are selected depending upon sex and specific behaviors involved (Kingsley 1996). The primary habitat requirement for the DSF is sandy substrate with a sparse cover of perennial shrubs and other vegetation. Based upon observations of this and several other members of the *Rhaphiomidas* genus, optimal vegetative cover is probably less than 50 percent, and may be as low as 10-20 percent (USFWS 1997).

The specific species composition and densities of plants preferred by the DSF are currently unknown (Kiyani 1996a). Definitive associations of adults with specific plants have not been established. Typically, the native plant species most consistently found where the DSF occurs (thus commonly considered "indicator species" of suitable habitat) are California buckwheat, telegraph weed, and California croton (*Croton californicus*) (Ballmer 1989; USFWS 1997). Though the former two have been implicated recently as possibly essential to the fly (Kingsley 1996), it has not been conclusively demonstrated whether any of these or other particular plants actually provide resources critical to the DSF, or if they are simply indicators of other, less obvious, habitat factors required by this species. Additional native plants found commonly where the DSF occurs include annual bur-sage (*Ambrosia acanthicarpa*), rancher's fireweed (*Amsinckia menziesii*), vinegar weed (*Lessingia glandulifera*), sapphire eriastrum (*Eriastrum sapphirinum*), and Thurber's spineflower (*Centrostegia thurberi*). Though the foregoing plants are those that occur most commonly in locations where the DSF is found, they also occur where it is not found and their presence does not necessarily imply the presence of the DSF.

Invasive non-native vegetation severely degrades or eliminates the habitat of the DSF (USFWS 1997). Non-native plants especially notorious in this respect include Russian thistle (*Salsola tragus*), horehound (*Marrubium vulgare*), mustard (*Brassica* sp., *Hirschfeldia incana*), cheese weed (*Malva parviflora*), and many species of introduced grasses such as rip gut brome (*Bromus diandrus*) and foxtail chess (*Bromus madritensis* ssp. *rubens*). These exotic plants may alter the amount of soil moisture or make the substrate physically unsuitable for the survival of the DSF and other native subterranean invertebrates.

Notwithstanding the foregoing inferences regarding habitat preferences and requirements, the DSF has been recorded from time to time (albeit in low number and usually fleetingly) in habitats that are substantially degraded and possessed of few apparently favorable attributes for the species. Moreover, the current absence of the DSF on a particular site within its range does not necessarily indicate that future occupation could not occur or re-occur should conditions on the site become more suitable. For example,

the DSF has been recorded recently on certain sites that have been graded or disced repeatedly in the past, after such activity ceased and to some extent the site returned to more natural conditions.

As mandated by the ESA, the USFWS has prepared a recovery plan for the DSF (USFWS 1997). The objective of the recovery plan is to ultimately reduce the risk of DSF extinction to the point that it can be downlisted, *i.e.*, removed from listing as an endangered species. The plan establishes three geographically defined recovery units (RU) known as the Ontario, Jurupa, and Colton RUs. The Survey Site falls within the Colton RU, which contains the majority of currently known populations of DSF.

In order to accomplish its objective, the DSF Recovery Plan predicates that each RU must contain occupied and/or restorable-to-suitable-for-occupation habitat for at least one population of DSF. Further, the plan stipulates that a minimum of eight DSF populations must occur across the 3 RUs, of which four must be in the Colton RU, two each on either side of the east-west running Interstate 10.

EXISTING CONDITIONS

The Survey Site is an L-shaped parcel of land occupied by an operational dairy farm, several water detention basins, and a fallow field. It is surrounded by the following land uses: north – residential; east – dairy; south – nursery; west – power line. The topography of most of the site is essentially flat, with the exception of the detention basins in the southern portion, which are steep-sided depressions within elevated berms. Natural site substrate is classified by soil maps of the U.S. Department of Agriculture (USDA 1980) as Delhi Fine Sand soil formation. The organic content of this substrate over most of the site has been greatly increased above its natural condition by activities associated with the dairy operation.

The northern approximate two-thirds of the site is occupied by feedlots with milk cows, hay bale storage bays, and office/residential buildings with associated landscaping. The remaining one-third in the south is shared about equally by detention basins and a weedy field. Vegetation in the latter area consists of a few species of ruderal (weedy) non-native grasses and forbs (herbs other than grasses) that are good colonizers of disturbed areas. Among these are riggut brome, Bermuda grass (*Cynodon dactylon*), crabgrass (*Digitaria sanguinalis*), Russian thistle, short-podded mustard, red-stemmed filaree (*Erodium cicutarium*), and cheese weed. Most of these invasive species are known to be deleterious to the suitability of habitat for the DSF. None of the three plant species (telegraph weed, croton, and California buckwheat) commonly considered indicative of habitat suitable for the DSF is present on the site.

Plant diversity on the site is very low. A total of 19 species in 13 families was detected (Appendix A); all of which are non-native. Where vegetation cover occurs on the site, it is typically dense.

METHODS

Review of Existing Information

Documentation pertinent to the biology of the DSF and biological resources in the vicinity of the Survey Site was compiled, reviewed, and analyzed. Information reviewed included: (1) Federal Register listing package for the Delhi Sands flower-loving fly; (2) literature pertaining to habitat requirements of the DSF; (3) the Recovery Plan for the DSF (USFWS 1997), and (4) California Natural Diversity Data Base (CNDDB 2000).

Concurrent with this survey, sites within the vicinity of the Survey Site known to be occupied by the DSF were visited to assess directly or by discussion with other surveyors the current status and activity patterns of various DSF populations in the region.

Focused Survey

A focused survey was conducted for the DSF on the Survey Site to assess its presence or absence. The survey was conducted in accordance with USFWS interim general survey guidelines, which recommend 2 replicate surveys per week during the flight period of the DSF (defined by survey guidelines as 1 August through 20 September, but modified by the Service for the current year to commence 15 July), to be

performed between the hours of 1000 and 1400 during appropriate weather conditions (USFWS 1996b). Surveys were conducted by Larry Munsey (TE 838741-0).

A total of 20 surveys was performed on the following dates: 13, 15, 17, 19, 20, 22, 24, 26, 27, 29, 31 July; 2, 3, 5, 7, 9, 10, 12, 14, 16, 17, 19, 21, 23, 24, 26, 28, 30, 31 August; and 2, 4, 6, 7, 9, 11, 13, 14, 16, 18, 20 September 2003. Weather conditions during the surveys were generally conducive to high levels of invertebrate activity. Temperatures typically ranged between 27 and 38°C (80-100 °F), reaching a high of 41°C (106 °F) on one occasion. On a few occasions temperatures at the beginning of the survey period were lower, ranging in the mid-20s °C (mid-high 70s °F). In three instances, one in July and two in the final week of the survey, the low temperature failed to exceed 27 °C (80 °F) during the survey period, ranging between 24 and 26 °C (76-79 °F). Wind speed ranged generally from 0 to 16 km/hr (0 to 10 mi/hr) with infrequent gusts to 25 km/hr (15 mi/hr). Skies were generally clear or with scattered clouds, with a few exceptions when hazy or overcast conditions prevailed.

During the surveys, the Survey Site was walked systematically and deliberately in search of both DSF sexes and discarded pupal cases. The surveys included careful examination of plant flowers, stems, and foliage; open patches of sand; shaded areas at the base of plants; air space in the immediate vicinity of flowering plants; and general air space within unaided vision above the site. Thus, an exhaustive search was accomplished for flying, feeding, perching, or otherwise engaged flies.

All insects encountered during the surveys were identified to the lowest possible taxon, either by sight or, when necessary, by capture and subsequent determination in the laboratory. Only active and exposed macro insect fauna was considered, thus other less obvious groups no doubt also present (e.g., springtails, termites, earwigs, thrips, etc.) were not recorded.

RESULTS AND DISCUSSION

No DSF or DSF sign (i.e., discarded pupal cases) were observed on the Survey Site during the current survey, nor was the DSF detected on the site during the prior year's survey (LMI 2002).

Birds observed or heard on or above the Survey Site included the cattle egret (*Bubulcus ibis*), turkey vulture (*Cathartes aura*), killedeer (*Charadrius vociferus*), rock dove (*Columba livia*), mourning dove (*Zenaidura macroura*), American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnis vulgaris*), and a few species of songbirds. Other vertebrates detected were the side-blotch lizard (*Uta stansburiana*), pocket gopher (*Thomomys bottae*), cottontail (*Sylvilagus audubonii*), California ground squirrel (*Spermophilus beecheyi*), and heteromyid rodents (burrows, tracks, and tail drags).

Other vertebrates detected were the western fence lizard (*Sceloporus occidentalis*), side-blotch lizard (*Uta stansburiana*), pocket gopher (*Thomomys bottae*), cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), and heteromyid rodents (burrows, tracks, and tail drags).

A total of 65 species of insects in 39 families was recorded on the site during the survey. A full list of insects observed is provided in Appendix B.

Based upon the following factors it may be concluded that the Survey Site is not occupied by the DSF nor is any suitable habitat for the species present:

- highly disturbed condition of entire site;
- low diversity of plants;
- absence of native plant species;
- absence of California buckwheat, California croton, and telegraph weed; and
- type and condition of the habitat surrounding the site.

The results of this and the former year's survey as reported herein satisfy the Federal requirement to demonstrate the absence of the DSF on the Survey Site.

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CITY OF ONTARIO

Agenda Report
September 10, 2002

SECTION:
PUBLIC HEARINGS

SUBJECT: CONSIDERATION OF A REQUEST TO AMEND THE CITY OF ONTARIO SPHERE OF INFLUENCE GENERAL PLAN AMENDMENT (FILE NO. PGPA02-003) TO PROVIDE FOR THE RELOCATION OF THE 145-ACRE WATERFOWL AND RAPTOR CONSERVATION AREA (WRCA) PROPOSED WITHIN THE NEW MODEL COLONY TO OFF-SITE LOCATIONS WITHIN THE CHINO/EL PRADO BASIN AREA.

RECOMMENDATION:

- 1) **Planning Commission** - That the Planning Commission recommend approval of the General Plan Amendment to the City Council.
- 2) **City Council** – That the City Council approve the General Plan Amendment.

COUNCIL GOALS: Invest in the Growth and Evolution of the City's Economy

- Implement the general plan policies to achieve a high quality, sustainable community in the newly annexed area of the City.

FISCAL IMPACT: None - The development of the WRCA, whether on-site or off-site, will be paid for from the collection of development mitigation/impact fees.

BACKGROUND: On January 7, 1998, the City adopted the Sphere of Influence General Plan Amendment for 8,200 acres of land generally bounded on the north by Riverside Drive, on the south by Bellegrave and Merrill Avenues, on the east by Milliken/Hammer Avenue, and on the west by Euclid Avenue. The General Plan Amendment established the land use designations for the Sphere of Influence, more recently referred to as the New Model Colony ("NMC"). The General Plan land use designations will guide the long-term development of the area as it transitions from agricultural use to urban development, including residential, commercial, business park, public facilities, and open space uses.

STAFF MEMBER PRESENTING: Jerry L. Blum, Planning Director

Prepared by: Scott Murphy
Department: Planning
City Manager
Approval: _____

Submitted to Council/O.R.A./O.H.A. _____
Approved: _____
Continued to: _____
Denied: _____

In conjunction with the NMC General Plan Amendment ("NMC GPA"), the City also certified the related Program Environmental Impact Report ("EIR"). During the review process, the EIR identified potential impacts to wildlife and plant species resulting from the conversion of land from agricultural to urban uses. To mitigate the potential impacts to wildlife, particularly waterfowl and raptors, the EIR included provisions that provide for the establishment of 305 acres of waterfowl and raptor habitat. The EIR specified that the City would work with the U.S. Corp of Engineers and other agencies to retain 160 acres of waterfowl habitat in the El Prado Basin. Also, a 145-acre waterfowl and raptor conservation area ("WRCA") would be provided within the NMC adjacent to the flood control detention basins located on the south side of Chino Avenue, west of Archibald Avenue.

Following the City's approval of the General Plan Amendment and EIR, a lawsuit was filed by The Endangered Habitat's League and the Sierra Club ("the Petitioners") challenging the adequacy of the EIR. As part of the legal proceedings, the City and the Petitioners were engaged in court-ordered settlement discussions to determine if the lawsuit could be resolved amicably without proceeding to trial. After numerous meetings to discuss various alternatives, an agreement was reached between the City and the Petitioners wherein all or part of the WRCA, previously anticipated within the NMC, could be relocated to the El Prado Basin. The El Prado Basin was defined in the settlement agreement as that area generally bounded on the north by Riverside Drive, on the south by SR 91, on the east by Interstate 15, and on the west by SR 71, Kimball Avenue, and Euclid Avenue. To provide the necessary funding for the acquisition, restoration and/or rehabilitation of waterfowl habitat, a mitigation fee would be charged on a "per acre" basis. The monies collected from the mitigation fee would be placed into a trust account to be used for the waterfowl habitat. The settlement agreement stated that the funds would be managed by a land trust, conservancy or other, similar, non-profit organization selected by the City and the Petitioners.

STAFF ANALYSIS: As noted above, the settlement agreement between the City and the Petitioners allows the relocation of the 145-acre WRCA from the area adjacent to the flood control detention basins to El Prado Basin. As a result of this potential relocation, the NMC GPA needs to be amended to be consistent with the terms of the settlement agreement. The two main areas of modification to the GPA are 1) New Model Colony General Plan Policy 18.1.12 and Implementation Measure I-6, and 2) the New Model Colony General Plan land use designation previously designated for the WRCA.

- A. New Model Colony General Plan Policy 18.1.12 and Implementation Measure I-6 – Under the current NMC General Plan, Policy 18.1.12 and Implementation Measure I-6 state that a 145-acre WRCA should be provided adjacent to the Chino Basin flood control ponds, located south of Chino Avenue, north of Schaefer Avenue, east of Whispering Lakes Lane and west of Archibald Avenue. The Policy 18.1.12 goes on to provide two approaches for establishing the WRCA 1) working with the landowners to form a mitigation land bank or 2) purchasing the property through development mitigation/impact fees.

As mentioned previously, the settlement agreement provides for the potential relocation of all or part of the WRCA off-site to El Prado Basin. There are already many parcels within the El Prado area that have been set aside as open space. Allowing the habitat to be moved off-site will provide an opportunity to protect additional open space, sensitive habitat, wetlands, and view sheds through purchase of larger parcels of land that are more biologically suitable for species. These parcels might not be able to be obtained if habitat impacts were mitigated on a project-by-project basis. The lands to be purchased in the El Prado area have a biologically functioning relationship to the New Model Colony. Also, acquiring mitigation lands in this area will be more cost effective than purchasing more expensive lands in the NMC. The acquisition, restoration and/or rehabilitation of lands in the El Prado will provide expanded open space and habitat for many sensitive, threatened, and endangered wildlife species, while allowing development within the NMC.

B. Land Use Designation - Under the approved GPA, the WRCA was to be located adjacent to the flood control detention basins on the south side of Chino Avenue, west of Archibald Avenue. The land use map depicts the WRCA on both the east and west sides of the Cucamonga Creek Channel in order to provide the 145 acres stipulated in the EIR. In reviewing the history of these two areas, staff found that they were originally designated as Residential - Low Density ("RLD"), which provides for residential development at an average density of 4.6 dwelling units per acre. The RLD was selected to be compatible with the surrounding properties that are also designated for RLD development.

Because the site was originally designated as RLD, the studies conducted as part of the EIR, including the traffic study, were all based on these properties being developed at an average density of 4.6 dwelling units per acre. It was only at the end of the EIR process that the site was identified for the WRCA, resulting in the creation of an "overlay" on the land use map. Therefore, appropriate and adequate environmental analysis was previously completed and is contained in the certified EIR. No further environmental analysis is required to change the land use designation back to RLD.

From a land use perspective, there have been no changes in land use designations in or around the subject property since the original GPA approval. The areas to the north, south, and west of the subject sites are within the NMC and are designated RLD. The property to the east of the subject site was previously developed with single family residences as part of the Archibald Ranch project. Designating the subject properties as RLD would be compatible with the Low Density Residential designation of Archibald Ranch, which permits one to five dwelling units per acre. This area would be included as part of the area contained in Specific Plan Subarea 5.

ENVIRONMENTAL ASSESSMENT: In reviewing the EIR prepared for the NMC GPA, staff noted that the site identified for the WRCA was originally analyzed for single family residential development (Residential - Low Density, 4.6 dwelling units per acre). As a result, no further environmental review is required for the land use change from Waterfowl/Raptor Habitat to Residential - Low Density ("RLD").

CONCLUSION: Staff believes that the relocation of the WRCA to the Chino/El Prado Basin is a "win-win" for all parties. The relocation of the WRCA off-site will allow development to occur, will provide for a more comprehensive, responsible, regional approach to mitigation of impacts associated with development, and will enhance and expand an environmentally sensitive area. As a result, staff recommends approval of File No. GPA02-003 and issuance of a Negative Declaration.