Biological Monitoring Report

for the

Tijuana River Valley Regional Park

(Monitoring Year 2009)

Prepared for

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Glossary of Terms and Acronyms

Adaptive Management – In the context of biological resources management, adaptive management is dealing with complex systems by using applied science to take action in the face of uncertainty. Adaptive management requires an explicitly experimental scientific approach to managing conservation and incorporates research into conservation and management actions. Specifically, it is the integration of design, management, and monitoring to systematically test assumptions in order to adapt management actions.

CBI – Conservation Biology Institute

CDFG – California Department of Fish and Game

CNDDB – California Natural Diversity Database

CNPS – California Native Plant Society

EMP – TransNet Environmental Mitigation Program; a transportation tax-funded environmental conservation program that includes funding for conservation land acquisitions and management programs.

Forbs – Plants without significant woody tissues above or at the ground. Includes herbs, vines and ferns, but not grasses or sedges.

Functional Group – Functionally related vegetation communities (e.g., scrub communities, grassland communities, riparian communities) as ecological indicators for the purpose of habitat monitoring.

Grasses – In the context of the vegetation monitoring section of this report, "grasses" include grasses in the family Poaceae, sedges (Family: *Cyperaceae*), and rushes (*Juncaceae*).

MHPA – Multiple Habitat Planning Area

MSCP – Multiple Species Conservation Program

NRCS – Natural Resource Conservation Service

Percent Cover – Percentage of an area covered by a given plant species.

Pitfall Array – A trapping method used to sample reptiles and amphibians, consisting of pitfall traps (buried five-gallon buckets) and terminal box traps connected by drift fences laid out in a "Y" pattern.

Point Counts – A method for conducting bird surveys in which a selected number of stations (points) are established from which to conduct timed surveys. Survey data may include a list of species observed, number of birds, and behavior.

Point Intercept – A method used to estimate percent plant cover in an area. A wooden dowel (or similar object) is held vertically along a transect at specific intervals and plant species touching the dowel are recorded.

Quadrat sampling – A square or rectangular sampling unit used for vegetation surveys. For this report, quadrats are defined as a one-meter square measuring unit made of ½ inch PVC pipe.

Restricted randomization sampling – Sampling locations are placed randomly, but must meet specific criteria (greater than 50 meters from a road, for example).

SANDAG – San Diego Association of Governments

SDNHM – San Diego Natural History Museum

SDSU – San Diego State University

Species Richness – The number of species in a given area.

TAIC – Technology Associates International Corporation

TRVRP – Tijuana River Valley Regional Park

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

Vines – A climbing or twining plant with relatively long stems. In the context of the vegetation monitoring section of this report, woody vines are included in the "shrubs" (native or non-native) functional groups, and non-woody vines are included in the "forbs" (native or non-native) functional groups.

Executive Summary

The County of San Diego's Tijuana River Valley Regional Park (TRVRP) is part of the South County Multiple Species Conservation program (MSCP) and managed by the County of San Diego Department of Parks and Recreation (DPR) pursuant to management and monitoring guidelines identified in the MSCP and in the TRVRP Area Specific Management Directives (ASMDs). A baseline survey conducted in 2005 collected biological data in the Park. This report details results of the monitoring surveys conducted in 2009, and provides analysis and conclusions relative to habitat conditions and species-specific management recommendations.

MSCP monitoring guidelines are currently being updated, revised and developed. Regional monitoring approaches and specific habitat monitoring protocols are being studied by researchers of San Diego State University (SDSU); animal monitoring protocols are being drafted by the U.S. Fish and Wildlife Service (USFWS) and U.S. Geological Survey (USGS), the latter of which is also researching specific monitoring protocols for sensitive plants. In lieu of the availability of preserve-specific monitoring protocols, monitoring methods for the 2009 surveys either used established protocols or draft regional MSCP monitoring protocols adapted for preserve-level monitoring. The following monitoring surveys were performed in 2009: vegetation communities mapping, general wildlife, habitat monitoring, herpetological pitfall array, and wildlife corridor/movement surveys.

TRVRP consists of a mosaic of native and non-native habitats and agricultural as well as recreational land uses. The international border fence, a triple fence that was being constructed at the time of the 2009 monitoring surveys, and associated Boarder Patrol access roads extend along the top of the southern mesas. The 150 to 300-foot wide federal easement on the U.S. side along the International Border is excluded from the County's management mandate. The San Diego County Water Authority is planning the development of a 60-acre riparian/wetlands mitigation bank in the west-central portion of TRVRP, immediately south of the Tijuana River floodplain, which the County will continue to own and manage.

TRVRP is home to a number of sensitive species covered by the City of San Diego's MSCP and the bird species diversity is high. The slopes along the southern mesas contain sensitive maritime succulent scrub and southern maritime chaparral occupied by wart-stemmed ceanothus (*Ceanothus verrucosus*), coast (San Diego) barrel cactus (*Ferocactus viridescens* var. *viridescens*) and California gnatcatchers (*Pelioptila*

californica californica). The Orcutt's bird's beak (*Cordylanthus orcuttianusi*) could not be confirmed during 2009 surveys. The mesa tops and valley areas outside the floodplain are dominated by non-native habitats, specifically broadleaf-dominated non-native grassland overgrown with crown daisy (*Chrysanthmum coronarium*). Invasive tamarisk (*Tamarix* spp.) and arundo (*Arundo donax*) are intermixed with the riparian habitats around the Tijuana River floodplain, where parasitic cowbirds (*Molothrus ater*) occur in low numbers. Least Bell's vireos (*Vireo bellii pusillus*) nest in these riparian habitats, but the southwestern willow flycatcher (*Empidonax traillii extimus*) is absent, although the little willow flycatcher (*Empidonax traillii brewsteri*) occurs here. The Dairy Mart ponds have historically provided cover for the light-footed clapper rail (*Rallus longirostris levipes*). Surrounding agricultural areas and non-native grass- and shrublands provide nesting habitat for the northern harrier.

Recommendations for the management of the Park's MSCP-covered species and habitats include continued monitoring following MSCP monitoring protocols and the closure and restoration of unauthorized trails. A comprehensive rare plant survey should be conducted to identify presence and location of the Orcutt's bird beak, and raptor nesting and clapper rail habitats should be conserved and maintained following MSCP management criteria. All native habitats and associated species at TRVRP would profit from an extensive invasive species control program, specifically at the mesa tops and riparian areas, where non-native species encroach on native habitats. Both invasive species removal and restoration would benefit MSCP-covered species on the Preserve, such as the orange-throated whiptail, coast horned lizard, rufous-crowned sparrow, northern harrier, Cooper's hawk, and mammal species that require cover to migrate. Cowbird control may not be necessary at this time, specifically if horse manure is controlled on equestrian trails and staging areas.

Recreational and access pressure was significant at the time of the 2009 monitoring surveys, including equestrian and Border Patrol use of both authorized and unauthorized trails and border fence construction traffic. Closure and restoration of unauthorized trails and continued cooperation between County rangers and Border Patrol agents would ameliorate this problem, coupled with a public education program. Hydrological studies are recommended to improve the valley's water conveyance, avoid restriction of the river's floodplain, and protect the Park's native habitats and sensitive biological resources from the effects of flooding.

1.0 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to document results of biological monitoring studies performed for the County of San Diego's Tijuana River Valley Regional Park (TRVRP or the Park), and recommended methods and measures for future management and monitoring. The County of San Diego Department of Parks and Recreation (DPR) is responsible for all monitoring and management required within the Park. The information in this report, together with data from the biological resources technical report (Greystone 2005) and TRVRP Area Specific Management Directives (County of San Diego 2007), will be used to direct adaptive management and continued monitoring efforts.

Biological monitoring was conducted by Technology Associates International Corporation (TAIC) and the San Diego Natural History Museum (SDNHM) on behalf of DPR in 2009 pursuant to the County's Multiple Species Conservation Program (MSCP) monitoring and management goals and guidelines for the management of TRVRP's natural resources per the City of San Diego MSCP Subarea Plan (2007b). The year 2009 constitutes Monitoring Year 2 (baseline or Year 1 monitoring occurred in 2004) of future monitoring and adaptive management of TRVRP pursuant to monitoring and management goals set forth in the MSCP.

1.1.1 Monitoring and Management Goals

The main goal for regular biological monitoring is to collect data to detect long-term population trends, changes in habitat quality, and changes in species composition and biological diversity in order to guide adaptive management for TRVRP. Monitoring and management will be adapted to conserving TRVRP as a Core Resource Area within the MSCP's Multiple Habitat Planning Area (MHPA), the habitat of which, if lost, could not be mitigated or replaced elsewhere. Because this region contains one of the most productive and important riparian wetland areas in the City, the MHPA proposes to conserve 94 percent of the valley core area, in association with the many sensitive and MSCP-covered species in the area.

1.1.2 Monitoring Strategies and Protocols

MSCP monitoring and management guidelines, originally developed in 1996, are currently being revised as new scientific data become available. In 2001, the Conservation Biology Institute (CBI) reviewed the MSCP Biological Monitoring Plan (Ogden 1996) and provided a *Status Summary of Biological Monitoring Protocols for the MSCP* (CBI 2001) that included recommendations to refine the monitoring protocols. Subsequently, San Diego State University researchers (Regan et al. 2006) prioritized monitoring of MSCP-covered species by risk factors and threat levels and recommended monitoring for specific high priority species and habitat associations. The authors provide a detailed threat analysis of each covered species in risk groups 1 through 3 and list the types of threats per each species and the habitat associations most susceptible to threats.

Comprehensive monitoring strategies are currently being re-evaluated on a regional scale in San Diego County through the San Diego Association of Government's (SANDAG) Environmental Mitigation Program (EMP), a transportation tax-funded (TransNet) environmental conservation program that includes funding for conservation land acquisitions and management programs. This program oversees and collaborates with the Habitat Management Technical Committee (HMTC) identified in the MSCP. Regional monitoring protocols have been developed for some MSCP-covered species, including the coastal California gnatcatcher (*Polioptila californica californica*). Elements of the MSCP Biological Monitoring Plan are currently being revised by participating agencies and include revisions to rare plant (McEachern et al. 2007) and species-specific animal (USFWS 2008) monitoring protocols. In addition, San Diego State University (SDSU) has developed protocols for and obtained preliminary results of their three-year MSCP habitat and vegetation monitoring pilot study, including methods to reduce data variability for habitat and plant species monitoring due to collection techniques and different group observers (Deutschman and Strahm 2009 a/b; Deutschman et al. 2008).

Preserve-level monitoring guidelines have not yet been developed, mainly because each MSCP preserve has a set of different monitoring objectives. Until more specific protocols are available through the EMP (in progress), the scope of the monitoring efforts on TRVRP will be guided by the following documents:

- San Diego MSCP Subarea Plan (City of San Diego 1997a);
- Table 3-5, Species Evaluated for Coverage, of the City MSCP Subarea Plan (City of San Diego 1997b);

- MSCP Biological Monitoring Plan (Ogden 1996)[1];
- Status Summary of Biological Monitoring Protocols for the MSCP (CBI 2001);
- San Diego Multiple Species Conservation Program Covered Species Prioritization (Regan et al. 2006);
- Draft monitoring protocols and monitoring protocol revisions developed by:
    - U.S. Geological Survey for plants (McEachern et al. 2007);
    - San Diego State University for vegetation communities and habitats (Deutschman et al. 2008, 2009a/b); and
    - USFWS for animals (USFWS 2008).

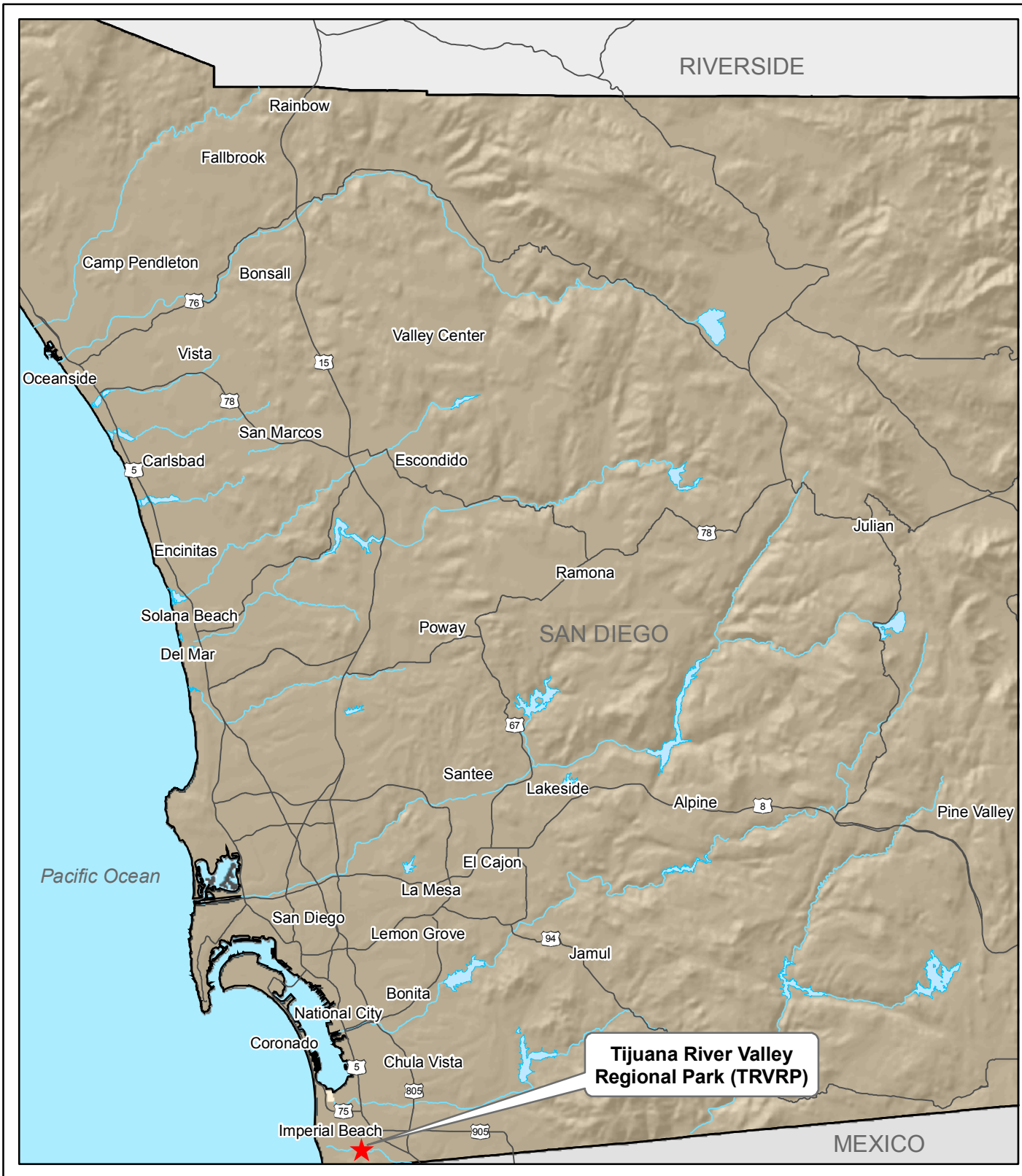
1.2 Study Area Description

1.2.1 Project Location and Site Description

The 1,897-acre TRVRP is located in the City of San Diego's southwestern portion west of Interstate 5 (I-5), adjacent to the international border with Mexico (Figure 1). As shown on Figure 2, TRVRP is bounded in the east by Dairy Mart ponds and Dairy Mart Road, and in the west by Goat Canyon. The Border Field State Park and the Tijuana Estuary are west of TRVRP. Sunset Avenue confines the Park in the north, and the U.S./Mexico International Border is directly to the south of the Park. TRVRP is bisected by the Tijuana River, which flows from Mexico through the Park to drain into the Pacific Ocean at the Tijuana Estuary. TRVRP is characterized by the river floodplain in the valley, steep mesas to the south, and the Tijuana Estuary and Pacific Ocean to the west. The City of Tijuana stretches along most of the Park's southern border, and residential development bounds TRVRP along the northern and eastern boundary.

The majority of TRVRP is owned by the County of San Diego (County); however, the Park includes a variety of privately-owned parcels, and properties owned by the City of San Diego (Figure 3), including private lands and agricultural lease holds. A Joint Exercise of Powers Agreement between the County and the City of San Diego was approved by the County Board of Supervisors on May 14, 2006. This agreement identifies the County as the manager of the City-owned lands within the Park. It also includes a clause that requires County and City staff to coordinate any projects within TRVRP that could impact City-owned lands.

[1] Document outdated and, therefore, used as limited reference where appropriate.



MSCP Year 2009 Monitoring
TRVRP

Regional Location Map

Figure 1

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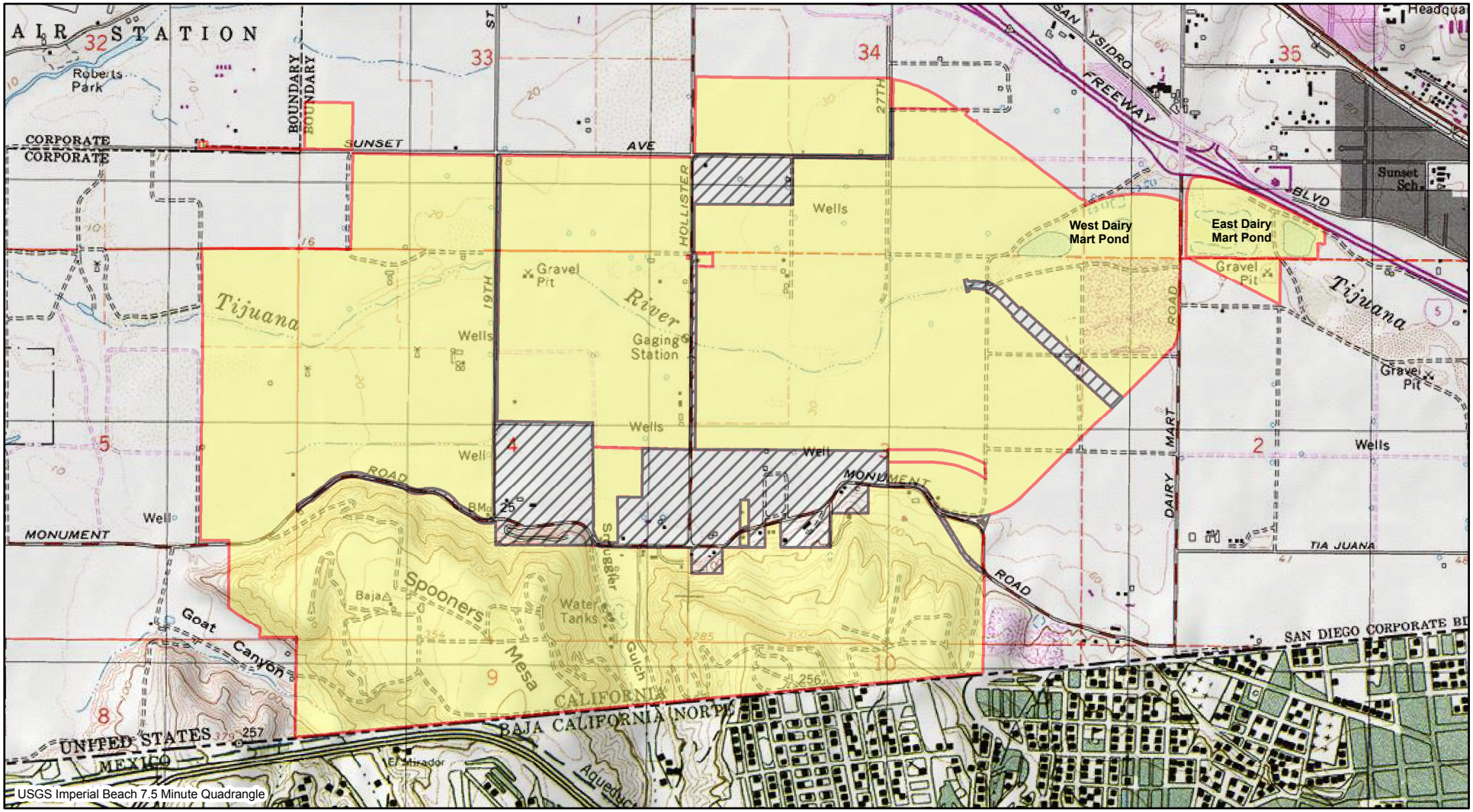

Legend

- TRVRP MSCP Monitoring Study Area
- Not a Part

N

Feet

0 2,000

MSCP Year 2009 Monitoring
TRVRP

USGS Topographic Quadrangle

Figure 2

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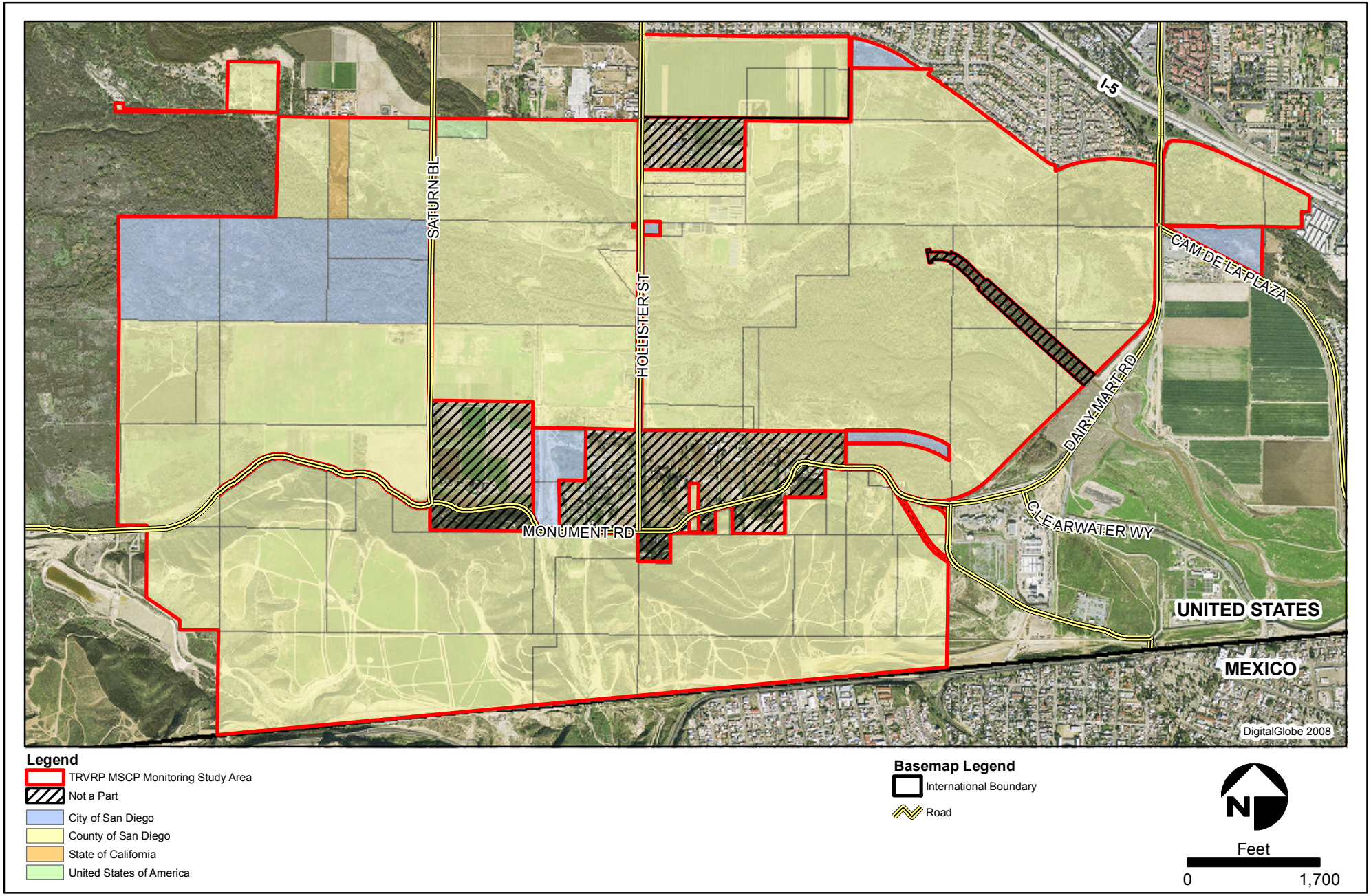

MSCP Year 2009 Monitoring
TRVRP

Site Map/Ownership

Figure 3

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Date: Nov 25, 2009

1.2.2 MSCP Preserve Boundaries

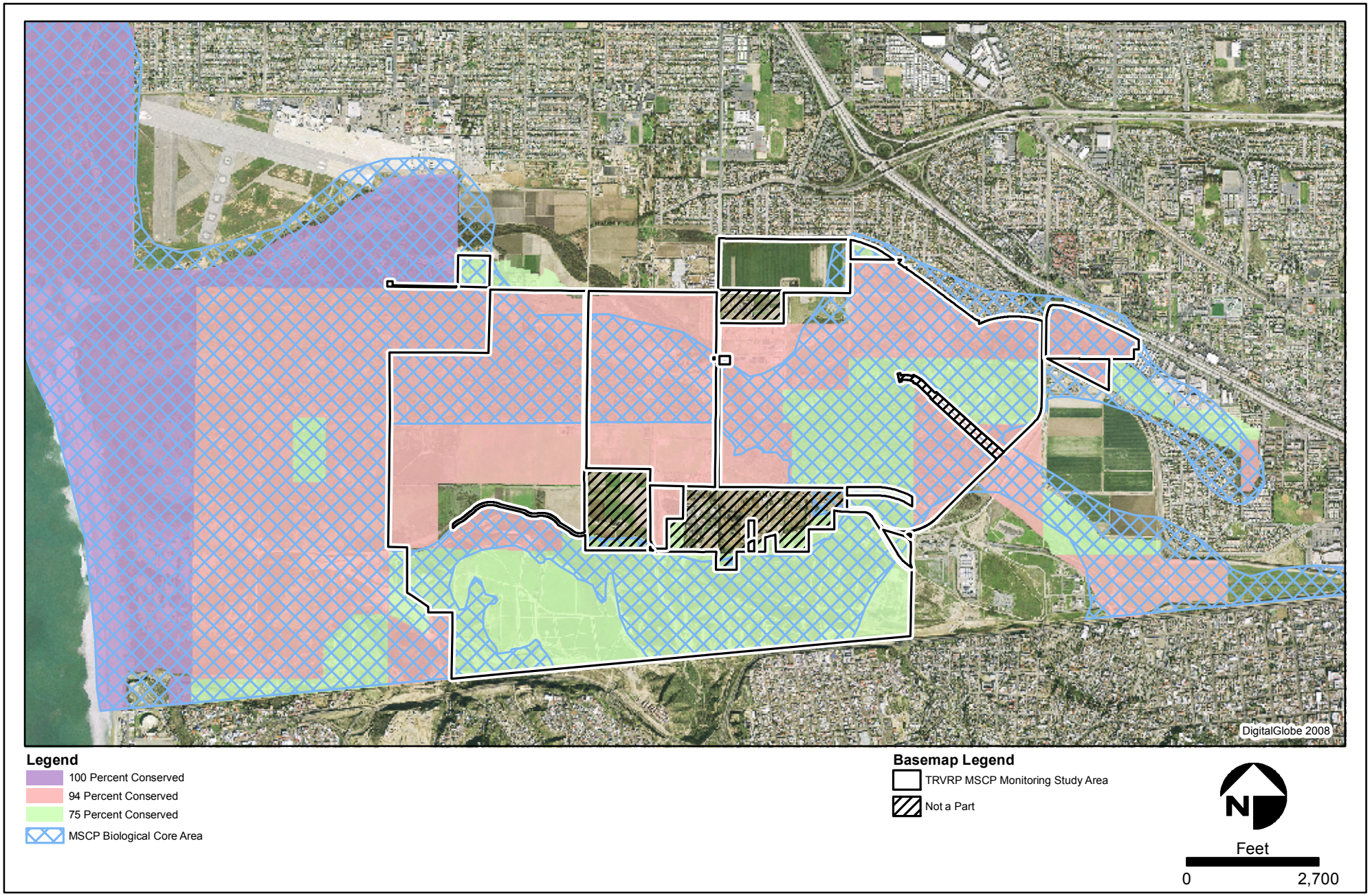
The entire Park is contained within the City of San Diego's Multiple Habitat Planning Area (MHPA), which is the planned habitat preserve within the City's MSCP Subarea (Figure 4). The MHPA incorporates the 25-year floodplain and much of the 100-year floodplain of the Tijuana River as well as the mesas and canyons on the south side of the Park, and Dairy Mart ponds in the northeastern part of TRVRP. All areas currently leased for agricultural uses are planned to eventually be (long-term) restored to native habitats.

1.2.3 Physical Characteristics

TRVRP consists mostly of native habitats (riparian woodland habitat in the valley, and disturbed upland habitats on the mesas) and agriculture. Rural housing, a community garden, and equestrian facilities make up the developed portions of TRVRP, and the international border fence and associated access and patrol roads extend along the top of the southern mesas. As part of the federal border fence construction project, a half-mile-long earthen berm and large box culvert have been built across Smuggler's Gulch effectively filling the canyon.

Construction of an international border fence was ongoing in the spring and summer of 2009 during the monitoring surveys and access to much of the eastern mesa and parts of Spooner Mesa was controlled and confined to exclusively construction personnel and U.S. Border Patrol. The federal government acquired an easement that extends 150 to 300 feet on the U.S. side along the International Border. This area is fenced and is excluded from the County's management mandate.

The San Diego County Water Authority (Water Authority) is planning the development of a 60-acre riparian/wetlands mitigation bank by creating and restoring 40 acres of wetlands in the western portion of TRVRP, immediately south of the Tijuana River floodplain and west of the Smuggler's Gulch drainage channel (Figure 5). The Water Authority will use 32 acres of wetlands creation credits to mitigate for impacts from the Water Authority's Emergency Storage and Carry-Over Storage projects and other future projects. The County of San Diego shall maintain and hold fee title to the mitigation site property which will be managed in perpetuity as open space within the TRVRP.



MSCP Year 2009 Monitoring
TRVRP

MSCP Multiple Habitat Planning Area (MHPA) and Biological Core Area

Figure 4

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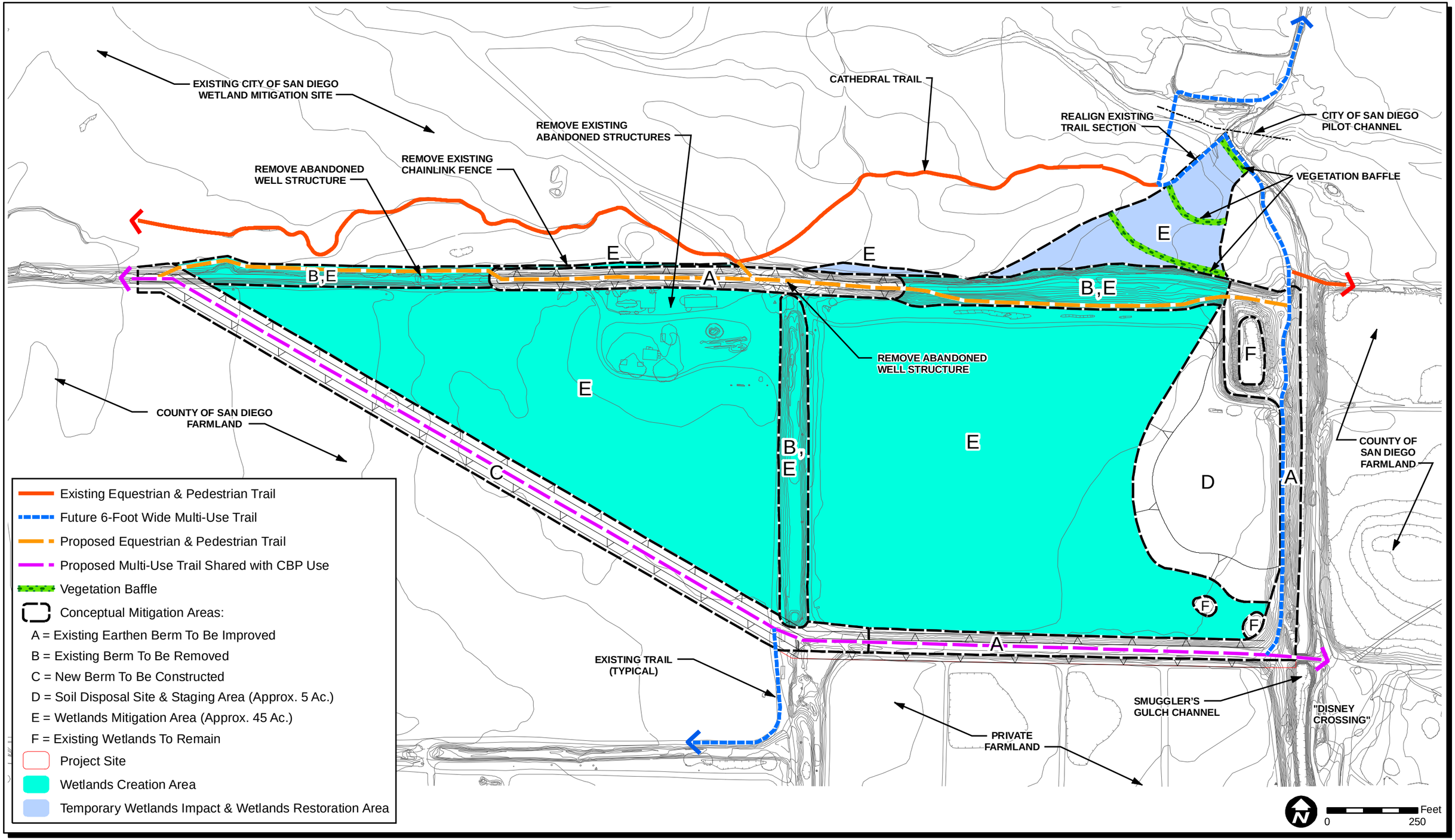

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Tijuana River Valley Wetlands Mitigation Project - Biological Resources Report

Conceptual Mitigation Design

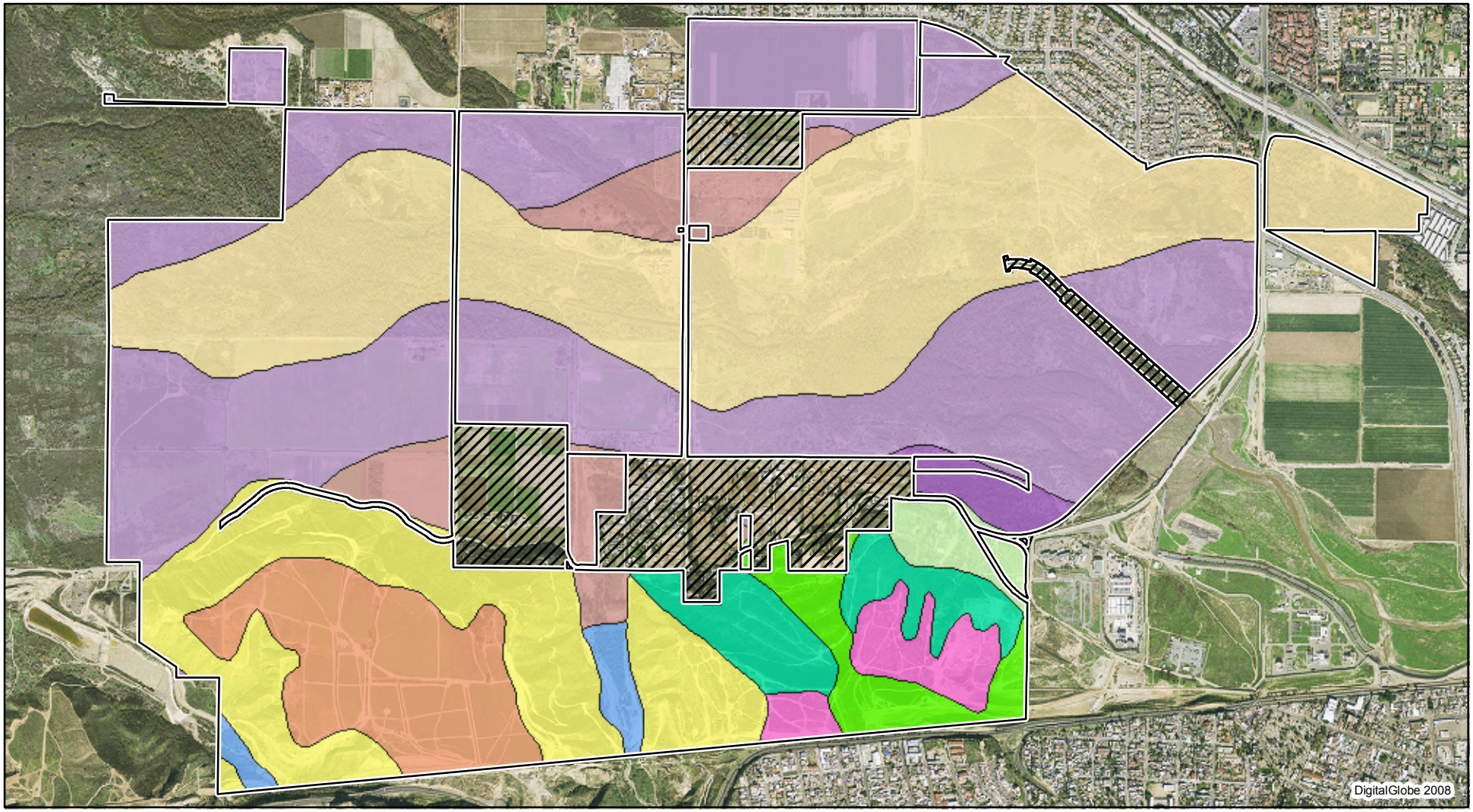
FIGURE 5

The TRVRP baseline report (Greystone 2005) and ASMDs (County of San Diego 2007) contain detailed information on the physical characteristics of TRVRP. To provide a landscape context for the monitoring data described in this report, the existing site conditions are summarized as follows. The Park is described as Semi-arid Steppe and exhibits a warm-summer Mediterranean climate according to the Koppen Classification System (Pryde 2004). It is located within the marine/coastal climate influence of the Pacific Ocean. Late night and early morning low clouds are frequent and temperatures are moderate. Precipitation for the Tijuana River Valley averages less than 10 inches per year. According to the U. S. Department of Agriculture, National Resources Conservation Service, Web Soil Survey (Bowman 1973), eleven soils types exist in the Park (Figure 6).

The Park is located in the Tijuana River Watershed, which is a bi-national watershed encompassing 1,700 square miles and crossing the westernmost portion of the U.S. - Mexico border. The watershed terminates at the Tijuana National Estuarine Research Reserve (Tijuana Estuary), which is one of the largest estuaries in southern California. Although discharges from the Tijuana River account for only a small percentage of total gauged runoff to the Pacific Ocean off Southern California, flooding in TRVRP is frequent. The Tijuana River contains the highest concentrations of suspended solids among the largest creeks and rivers in Southern California. Surface water quality has been affected primarily by runoff from Mexico while ground water contamination has occurred as a result of seawater intrusion and waste discharges.

Wildfire is a natural disturbance cycle which has historically shaped the Park's surrounding region. Some plant species found in local vegetation communities have developed the ability to survive naturally spaced recurrent fires by producing seeds that require a fire-related cue to stimulate germination and/or by stump sprouting after being burned. The return frequency of natural wildfires is not well known because the return cycle has increased in recent years. The majority (99 percent) of the recent firestorms in San Diego have been human-caused. In addition, the sources of wildfires have shifted over time, and the effects (including size and intensity) of these fires have been compounded by drought and Santa Ana wind conditions.

The recent firestorms in San Diego County, including the 2003 Cedar and Otay fires, and the 2007 Witch Creek and Harris fires, did not reach TRVRP. However, historic fires burned on the southern mesas in 1953 and 1983 (Figure 7). The 1953 fire (Lazy A Fire) burned across the border on the eastern mesa, and the 1983 fire (Assisted Fire #49) was a management fire set in the Gopher Canyon area (California Department of Forestry 2008).



MSCP Year 2009 Monitoring
TRVRP

Soils

Figure 6

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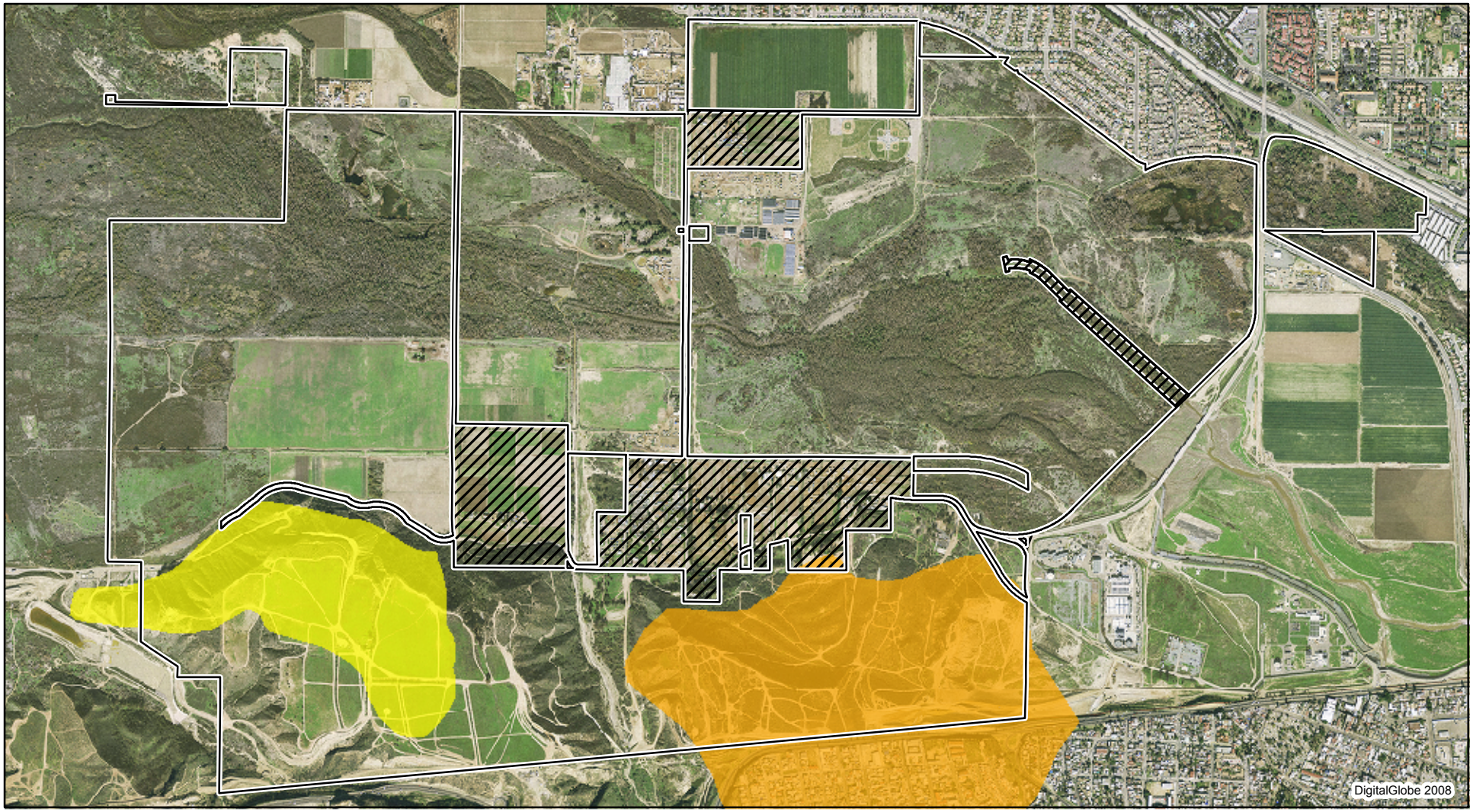

Source: U.S. Forest Service 2009

MSCP Year 2009 Monitoring
TRVRP

Fire History

Figure 7

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Date: Nov 25, 2009

2.0 METHODS

Prior to conducting biological field surveys, potentially occurring sensitive biological resources were identified through a review of the following species databases: California Natural Diversity Database (CNDDB), California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants (CNPS 2009), the San Diego Natural History Museum (SDNHM) Plant, Bird, and Mammal Atlas databases and San Diego Bird Atlas (Unitt 2004), SDNHM Herbarium database, SDNHM field guide to reptiles and amphibians (SDNHM 2008), and the 2009 U.S. Fish and Wildlife Service species occurrence database. Background documents including the Management Framework Plan for the Tijuana River Valley Regional Park (Schmidt Design Group 2002), Biological Technical Report for the Tijuana River Valley Regional Park Trails and Habitat Enhancement Project (Greystone 2005), and Tijuana River Valley Regional Park Area Specific Management Directives (County of San Diego 2007) were also reviewed prior to conducting monitoring.

Monitoring field surveys were conducted using protocols developed specifically for monitoring MSCP habitats and species, as indicated below and Appendix A. Most of the protocols have been designed for regional monitoring purposes and are still in the pilot program testing phase; some have been adapted from the regional to the preserve-level scale; others have been developed for species-specific presence/absence survey purposes. Sampling design for the monitoring effort followed these protocols to the extent feasible within the budget allocated for this effort. All species observed during monitoring surveys were recorded and are listed in Appendix B.

2.1 Vegetation Communities and Habitats

2.1.1 Vegetation Communities Mapping

In April of 2009, TAIC biologists conducted vegetation mapping of the entire Park (Table 1). Prior to going out into the field, GIS data from previous vegetation mapping efforts and the MSCP regional vegetation mapping within the Park boundaries (obtained from SanGIS) were reviewed and updated based on aerial signature of vegetation types. The information was plotted on current (year 2008) color aerial orthophotographs. Vegetation communities were confirmed, adjusted, and mapped in the field within the Park boundaries plus a 100-foot buffer (pursuant to County of San Diego survey guidelines, as updated). The presence or absence, and/or level of dominance of indicator plant species was used to confirm the vegetation type. The boundaries of vegetation communities were drawn onto a 200-scale (1" = 200') 2008 color aerial photograph (Figure 8).

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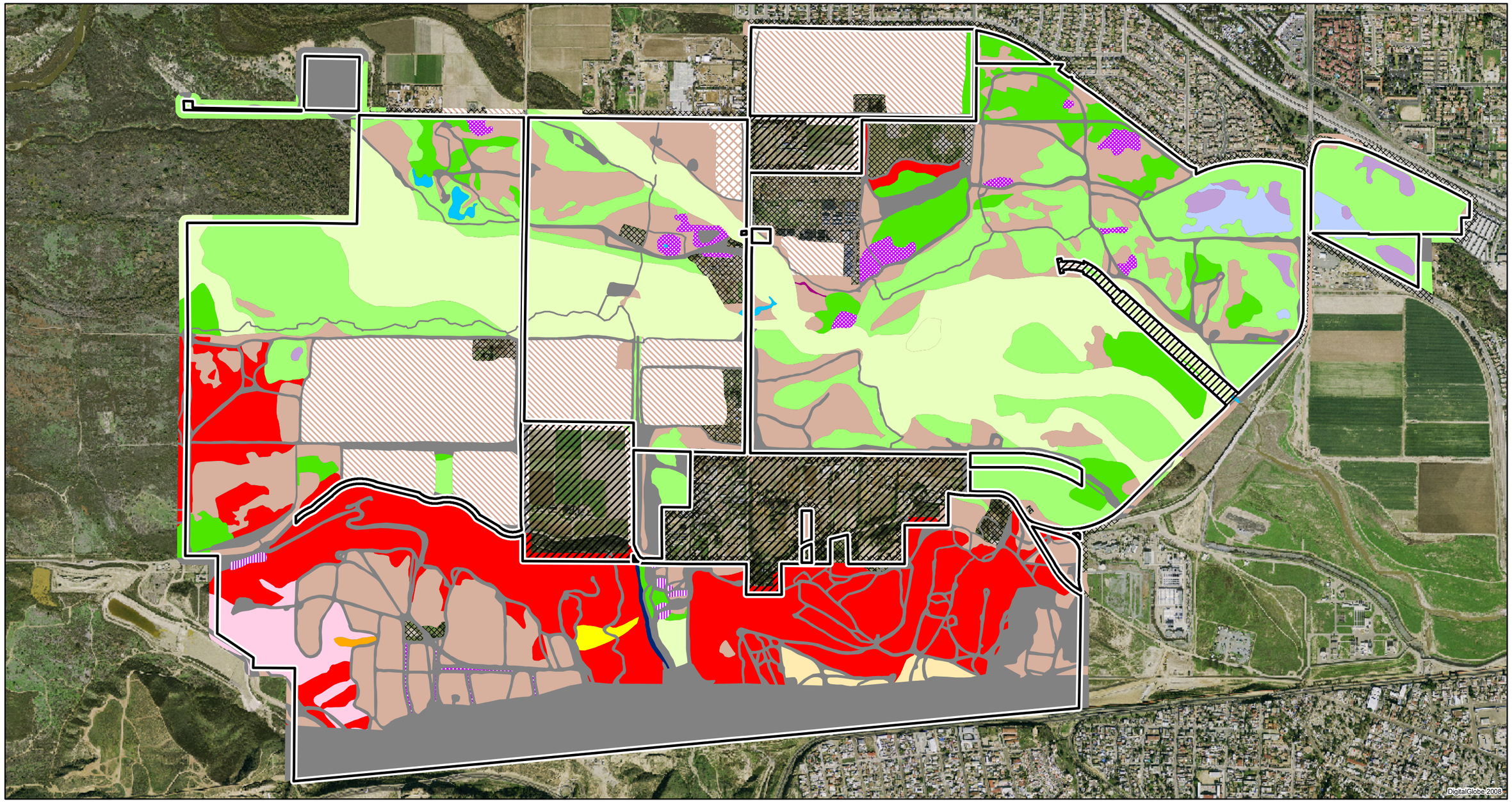

Legend

- Maritime Succulent Scrub
- Diegan Coastal Sage Scrub
- Coastal Sage-Chaparral Scrub Transition
- Southern Mixed Chaparral
- Southern Maritime Chaparral
- Non-Native Grassland - Broadleaf-Dominated
- Coastal and Valley Freshwater Marsh
- Emergent Wetland
- Herbaceous Wetland
- Southern Arroyo Willow Riparian Forest
- Mule Fat Scrub
- Southern Willow Scrub
- Tamarisk Scrub
- Non-Vegetated Channel/Floodway
- Open Water
- Eucalyptus Woodland
- Disturbed Habitat
- General Agriculture
- Row Crop
- Urban/Developed

Basemap Legend

- TRVRP MSCP Monitoring Study Area
- Not a Part

N

Feet

0 1,160

Source: Technology Associates 2009

MSCP Year 2009 Monitoring
TRVRP

Vegetation Communities

Figure 8

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Date: Nov 25, 2009

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Table 1. Vegetation Mapping and Habitat Monitoring Schedule

Vegetation Mapping		Habitat Monitoring	
Date	**Biologists***	**Date**	**Biologists***
April 20-21, 2009	RH, JF	March 25-28, 2009	RR, MM

* RH – Rosanne Humphrey; JF – Julie Fontaine; MM – Margie Mulligan.

The natural vegetation community classification system used in this report follows Oberbauer (2005) modified Holland (1986) Vegetation Classification System. This classification system was used in prior documents generated for TRVRP and was, therefore, maintained to (1) update previous mapping (Greystone 2005) and (2) compare the current state of vegetation communities to those identified in the MSCP. The regional vegetation classification system is currently being updated by SANDAG to more closely follow the Keeler-Wolf of CDFG (Sawyer, Keeler-Wolf 1995) vegetation classification system. Eventually, the vegetation mapping of TRVRP will be updated to this new classification once it has been adopted by the County of San Diego.

While mapping the vegetation community boundaries, biologists also collected the following information:

- Mapped and recorded areas that should be flagged for management, including areas with significant infestations of non-native species, erosion, unauthorized public access issues, trash and dumping, etc.;
- Noted any observed wildlife and wildlife sign, and, if feasible, mapped locations of sensitive species;
- Assessed habitat quality for MSCP-covered birds;
- Identified habitat for and occurrences of rare plants;
- Mapped incidental observations of raptor nests, and recorded raptor nesting behavior (specifically northern harrier [*Circus cyaneus*], and golden eagle [*Aquila chrysaetos*]);
- Identified opportunities/locations for vegetation transect locations (habitat monitoring);
- If opportunities presented themselves, verified that previous herpetological array locations are appropriate.

2.1.2 Habitat Monitoring

Selecting Monitoring Locations

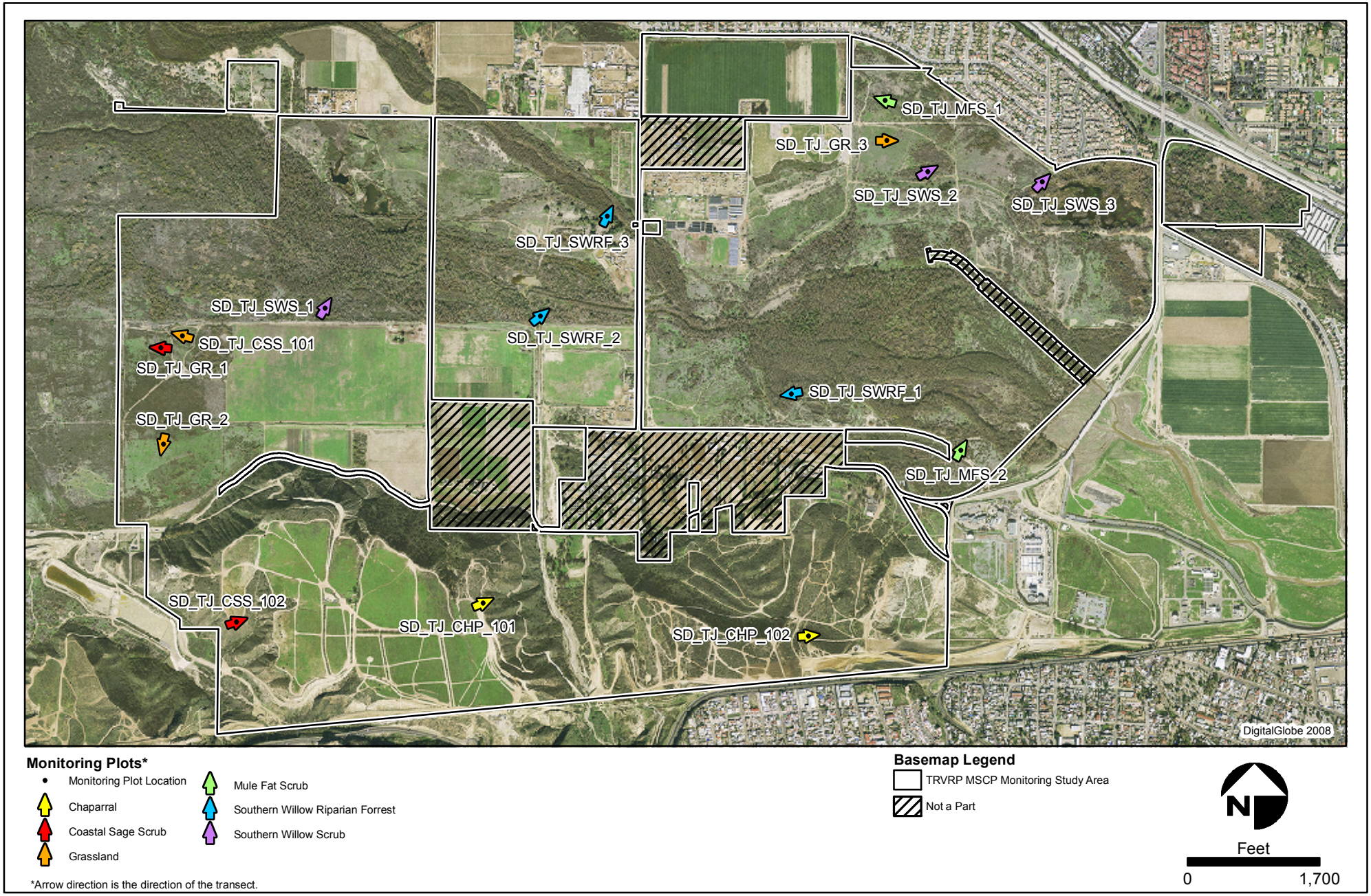
The overall goal of the vegetation communities monitoring program is to identify habitat trends that may require active management. Trends are determined by detecting changes in habitat condition over time and comparing them to baseline conditions. Habitat conditions were assessed by measuring *species richness* (the number of species in a given area), and *cover* (percentage of an area covered by a given plant species) of invasive grasses and forbs relative to native shrubs. The habitat monitoring objectives of the 2009 effort at TRVRP were as follows:

1. Identify baseline habitat conditions for the major habitat types in the Park.
2. Identify adaptive management issues specific to the Park.
3. Identify pertinent management questions that can be answered through this monitoring program.
4. Provide recommendations for adaptive management activities and future long-term vegetation monitoring based on the monitoring results.

The vegetation monitoring was conducted pursuant to the draft protocol identified in pilot vegetation monitoring studies conducted by SDSU for the California Department of Fish and Game (CDFG) and SANDAG (Deutschman et al. 2008; Deutschman and Strahm 2009a and 2009b). The detailed habitat monitoring methods are included in Appendix A.

A total of 15 permanent monitoring stations (plots) were selected randomly within each mapped vegetation community category (see Section 3.2.1) and pursuant to a select list of restricted randomization criteria (e.g., random plot locations must meet specific criteria, including accessibility and percent slope) as described below. Ideally, to compare species richness laterally between different vegetation communities, data should be collected from the same number of plots for each habitat type. However, this is not always possible due to funding constraints. The number of stations for the current monitoring effort was chosen in an attempt to balance funding availability with broad coverage of vegetation types and geography within the Park. SDSU researchers (Deutschman and Strahm 2009a) are currently monitoring nine coastal sage scrub/maritime succulent scrub plots[2] within TRVRP as part of SDSU's MSCP habitat monitoring pilot study. Therefore, the 15 plots (Figure 9) were selected from the following vegetation communities for the 2009 effort to avoid duplication of habitat monitoring in the Park and to create a comprehensive baseline for TRVRP habitat monitoring:

[2] Maritime succulent scrub was not differentiated from coastal sage scrub; all plots were labeled as coastal sage scrub habitat



MSCP Year 2009 Monitoring TRVRP

Habitat Monitoring Plot Locations

Figure 9

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Date: Nov 25, 2009

- **Grassland (3 plots)**
    - 2 plots in the vicinity of known nesting/foraging areas of the northern harrier but at least 50 meters from nest identified by TAIC in 2009.
- **Coastal sage scrub (1 plot)**
    - In the vicinity, but at least 50 meters from northern harrier nest
- **Maritime succulent scrub (1 plot)**
    - Within an area of recorded coast barrel cactus (a.k.a. San Diego barrel cactus) (*Ferocactus viridescens* var. *viridescens*) and Orcutt's bird's beak (*Cordylanthus orcuttianus*) locations
    - At least 100 meters from SDSU vegetation monitoring plots
- **Southern mixed chaparral (1 plot)**
- **Southern maritime chaparral (1 plot)**
    - Within an area of known wart-stemmed ceanothus (*Ceanothus verrucosus*) locations
- **Mule Fat scrub (2 plots)**
- **Southern willow scrub (3 plots)**
- **Southern willow riparian forest (3 plots)**
    - At least 1 plot in each of two major river channels.

Survey Methods

Quadrats and point intercepts were surveyed on May 25 – 28, 2009 (Table 1) along a 50-meter transect at each plot. Each of the two methods captures different components of the vegetation community (Deutschman et al. 2008). The quadrat method is best suited for capturing small plants, plants that are rare or that have low cover, and overall species richness; however, it is time-consuming and inferior when recording large plants (Deutschman and Strahm 2009a). The point intercept method, which is less time consuming, works well for large and small plants, abundant species, and estimating cover. It does not work well for capturing rare or low cover plants. For dense habitats consisting mostly of large trees (e.g., southern willow scrub and southern willow riparian forest), only the point intercept method was employed. For all other vegetation communities, both methods were used.

Quadrats

Quadrat measurements were taken every five meters on alternating sides from meter five to 50. Two measurements were taken within each quadrat: (a) absolute percent ground cover, not to exceed 100 percent; and (b) relative cover by plant species, which could

exceed 100 percent for overlapping plants. Ground cover classes included litter, bare, rock, vegetation or stem, cryptobiotic crust, and moss. Unknown plant species were collected and labeled with the date, plot number, and a unique number. Collected specimens were later identified using the Jepson Manual (J.C. Hickman ed., 1993), Flora of North America (1993), the most up-to-date literature, and the synoptic collection at the San Diego Natural History Museum Herbarium.

Point Intercept

The point intercept method was used along the same 50-meter transect. A ½ inch wooden dowel, one meter long, was placed perpendicular to the ground at every meter on the left side (facing the end point) starting at one meter and ending at 50-meters. Two measurements were taken at each meter: (a) ground cover type, as described above, and (b) species touching the dowel. Abundance was not recorded. For all plants with canopies that exceeded the height of the dowel (including trees and shrubs), presence or absence was estimated by extending an imaginary vertical line from the dowel toward the canopy; if the canopy touched the imaginary line, presence was established. Although species richness is best determined using the quadrat method, because the point intercept method often misses small or rare plant species, this method is not practical for areas with trees or dense shrub cover (Deutschman et al. 2008; Deutschman and Strahm 2009a and 2009b). For TRVRP, species richness for southern willow scrub and southern willow riparian forest was calculated from point intercept data, which might underestimate the species richness for these communities.

Area Search

In addition to conducting the quantitative methods described above, the area was assessed visually to make a qualitative assessment of habitat condition, and to record native or sensitive species that were not included in the quadrats or point intercept.

2.2 Plants

2.2.1 MSCP Plant Monitoring

One of the objectives of the monitoring program is to assess the condition of MSCP-covered rare plant species. Baseline surveys by Greystone (2005) resulted in a total of 13 rare plants in TRVRP (Table 2). Of these, three are covered by MSCP, including wart-stemmed ceanothus, Orcutt's bird's beak, and coast barrel cactus. Wart-stemmed ceanothus and coast barrel cactus are slow growing perennials that do not require annual monitoring because populations are expected to change little over time. As

recommended in the MSCP Monitoring Plan (Ogden 1996) and TRVRP ASMDs (County of San Diego 2007), monitoring for these species was conducted via habitat monitoring, as described in Section 2.1.2 above. Wart-stemmed ceanothus habitat was monitored at plot number SD_TJ_CHP_102, and coast barrel cactus habitat was monitored at SD_TJ_CSS_102 (Figure 9).

Table 2. Rare Plants Reported in TRVRP (Greystone 2005)

Scientific Name	Common Name	Status[1] Fed/State/CNPS	County Status[2]	MSCP Coverage
Artemisia palmeri	Palmer's Sagewort	--/--/List 4.2	List D	Not covered
Bergerocactus emoryi	Golden-Club Cactus	--/--/List 2.2	List B	Not covered
Ceanothus verrucosus	Wart-Stem-Ceanothus	--/--/List 2.2	List B	Covered
Chaenactis glabriuscula var. *orcuttiana*	Orcutt's Pincushion	--/--/List 1B.1	List A	Not covered
Cordylanthus orcuttianus	Orcutt's Bird's Beak	--/--/List 2.1	List B	Covered
Coreopsis maritima	San Diego Sea-Dahlia	--/--/List 2.2	List B	Not covered
Euphorbia misera	Cliff Spurge	--/--/List 2.2	List B	Not covered
Ferocactus viridescens var. *viridescens*	Coast Barrel Cactus	--/--/List 2.1	List B	Covered
Juncus acutus ssp. *leopoldii*	Southwestern Spiny Rush	--/--/List 4.2	List D	Not covered
Ornithostaphylos oppositifolia	Baja California Birdbush	--/SE/List 2.1	List B	Not covered
Quercus dumosa	Nuttall's Scrub Oak	--/--/List 1B.1	List A	Not covered
Suaeda taxifolia	Woolly Sea-Blite	--/--/List 4.2	List D	Not covered
Bahiopsis (Viguiera) laciniata	San Diego Sunflower	--/--/List 4.2	List D	Not covered

[1] FE = federally endangered, FT = federally threatened, SE = state endangered, ST = state threatened.
CNPS listing: List 1B = rare, threatened, or endangered in California and elsewhere; List 2 = rare, threatened, or endangered in California, but more common elsewhere; List 3 = more information needed (a review list); List 4 = limited distribution (a watch list)

[2] County Listing Status: List A = rare, threatened, or endangered in California and elsewhere, List B = rare, threatened, or endangered in California, but more common elsewhere; List C = plants which may be rare, but need more information to determine their true rarity status; List D = Plants of limited distribution and are uncommon, but not presently rare or endangered.

ASMDs for Orcutt's bird's beak recommend focused species surveys every five years. However, this species was not observed during baseline biological surveys (Greystone 2005). Additionally, since this was a low rainfall year, focused species monitoring surveys were not conducted. Rather, this species was monitored through habitat-based monitoring at the plot designated for barrel cactus, because Orcutt's bird's beak has been reported from many of the same locations and habitats as coast barrel cactus in TRVRP.

2.3 Wildlife

2.3.1 Herpetofauna

Herpetological monitoring was conducted at TRVRP from May through July 2009 (Table 3). Pitfall trap arrays have been widely used to obtain data on amphibians and reptiles throughout southern California (Fisher & Case 2000).

Table 3. Herpetofauna Survey Schedule

Survey Session	Survey Location	Dates
1	TRVRP	May 5 – May 8, 2009
2	TRVRP	June 2 – June 5, 2009
3	TRVRP	July 14 – July 17, 2009

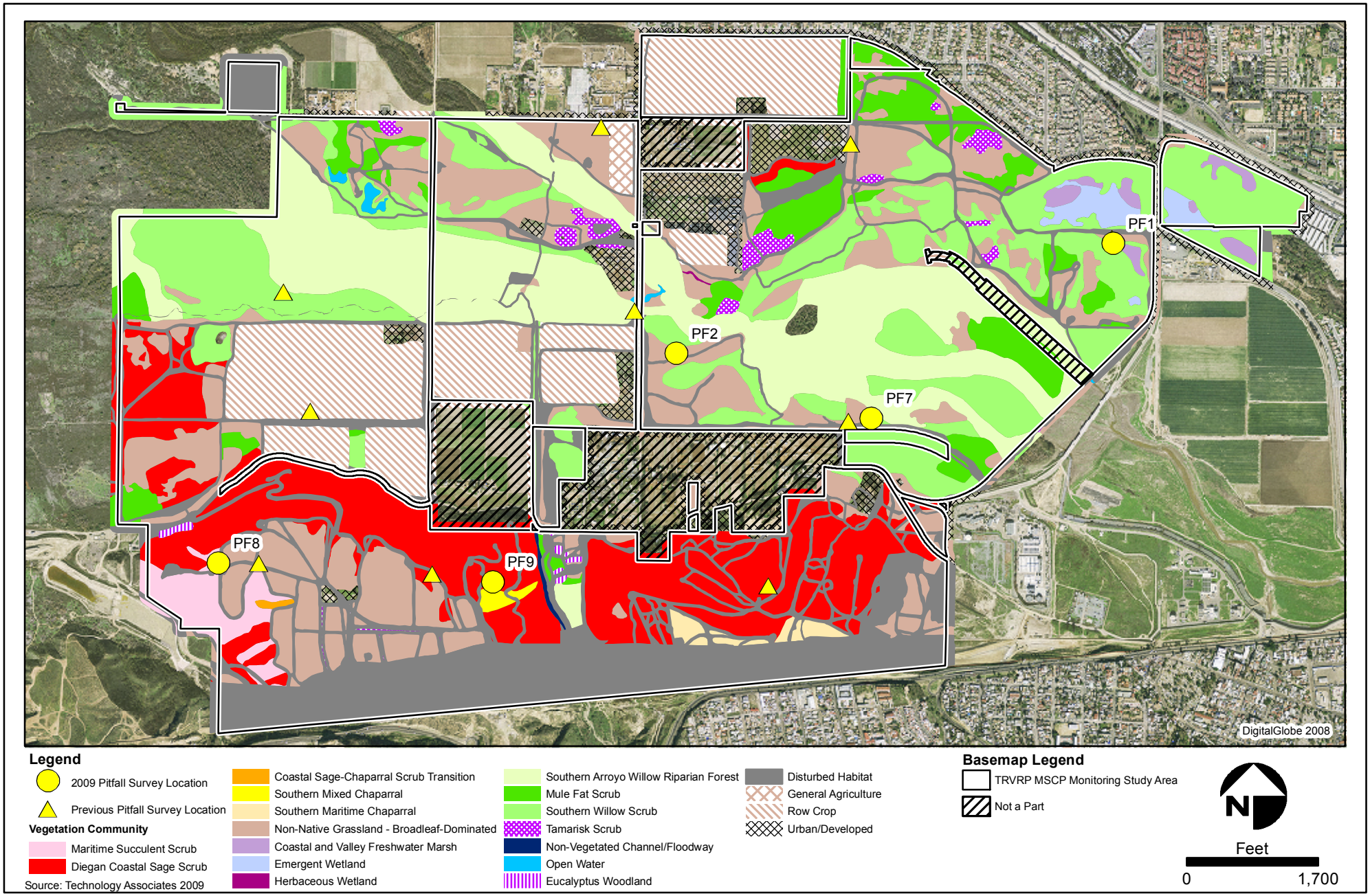
Selecting Monitoring Locations

There are 10 previously identified and surveyed pitfall array locations on TRVRP (Greystone 2005), five of which were surveyed during the 2009 monitoring effort (Figure 10). Two of the five pitfalls were relocated in/near the previous locations: Goat Canyon (array #8) and Spooner's Mesa (array #9) per Ogden 1996, Regional Monitoring Location H21. TAIC confirmed through field reconnaissance during pitfall construction that the previous survey locations were placed in representative areas within the Park to fully capture the diversity of the herpetofauna, including rock outcroppings and ravines. Some of the arrays had to be moved slightly relative to the previous locations due to accessibility or changes in habitat representation. All arrays were re-marked using GIS technologies and the locations mapped (Figure 10). The arrays were reconstructed in habitats representative of the Park, in the same or close to the same locations as previously surveyed (Greystone 2005).

Survey Methods

The following methods and survey protocol have been derived and modified from Fisher et al. (2008). Each pitfall arrayed consisted of four five-gallon buckets and three box funnel (12" x 8" x 18") traps connected by shade cloth drift-fences (15 m x 30 cm). Each array was created around a center bucket (pitfall) with three arms of drift fence extending out 15 meters forming a Y. In addition to the center bucket, each arm of the Y had a bucket placed in the middle and a box funnel trap placed at the end. Each box funnel trap and bucket contained a piece of PVC pipe to provide shelter for captured animals, and was covered with boards and/or lids to protect animals captured from the heat of the sun.

Arrays were installed during the week of April 23, 2009 (Table 3). Reptiles and amphibians were captured May through July, the period when most of the species are above ground and active. The herpetological surveys consisted of three five-day sampling sessions. Traps were opened on day one and checked every morning for four consecutive mornings (Tuesday – Friday). All vertebrates captured in the pitfalls and box funnel traps were recorded using a Personal Data Assistant (PDA).



MSCP Year 2009 Monitoring
TRVRP

Herpetological Array Locations

Figure 10

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Date: Nov 24, 2009

Approved mark/re-capture methods were used for monitoring purposes. All herpetofauna, except turtles and very small salamander species, were toe-clipped following the methods outlined in Fisher et al. (2008). All limbless reptiles were scale-clipped following the methods outlined in Fisher et al. (2008). Approved marking methods were used for identification purposes. Re-captured individuals were recorded with their unique toe-clip or scale-clip code, while new captures received a unique toe-clip or scale-clip number. Toe-clip and scale-clip numbers were tracked on a clip chart to prevent two animals from receiving identical numbers. Toes essential to the animal's survival (i.e., accelerator toes of lizards, thumbs of frogs and toads) were not clipped. Venomous snakes, blind snakes, and legless lizards were not scale-clipped.

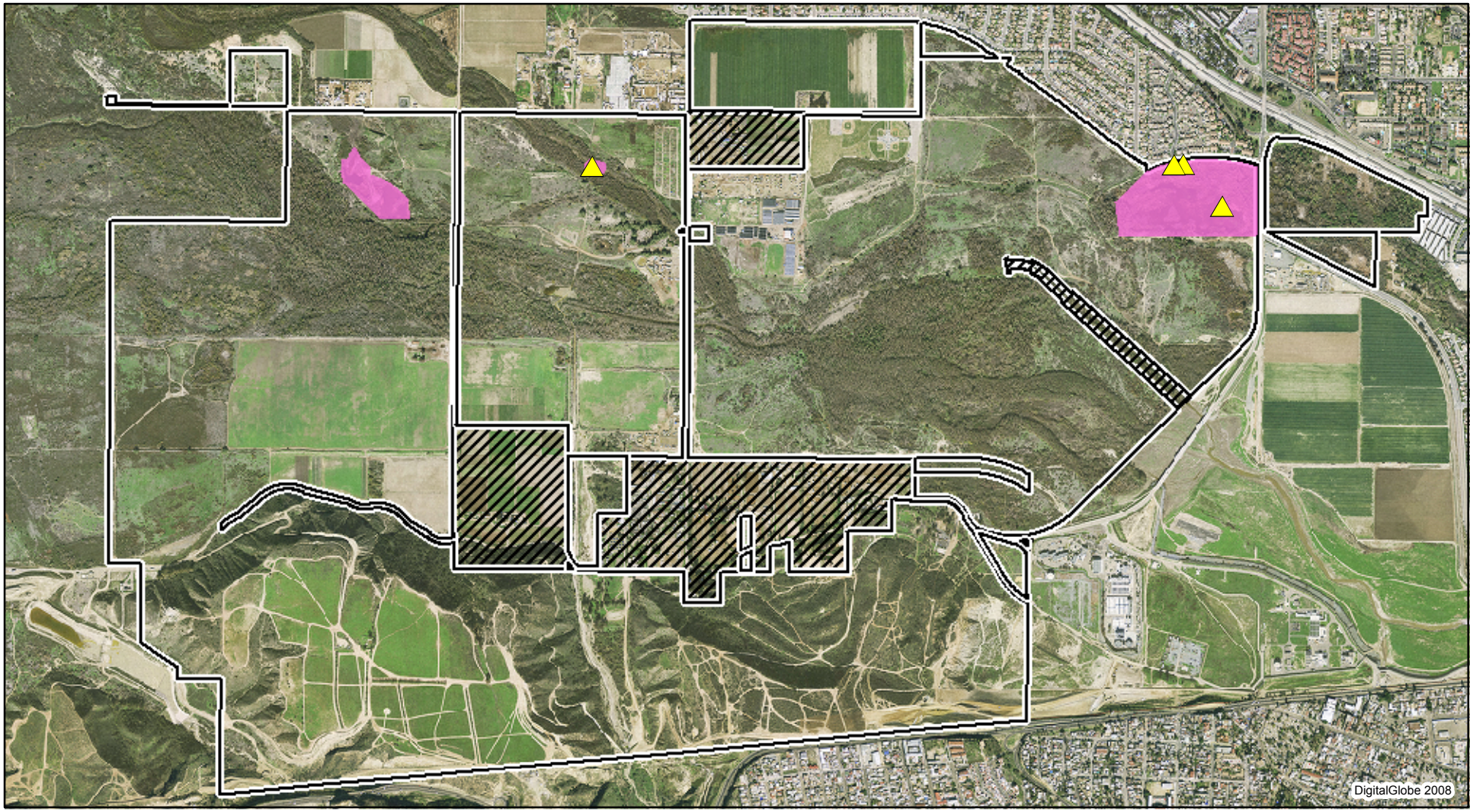
2.3.2 Avifauna

Light-footed Clapper Rail

Light-footed clapper rail (*Rallus longirostris levipes*) occupancy at TRVRP has been historically documented at the Dairy Mart ponds and at stock ponds in the northern portion of TRVRP (Greystone 2005; Zembal et al. 2008). An initial habitat survey was conducted to determine appropriate locations for conducting surveys in suitable habitat for this USFWS Risk Group I species (USFWS 2008). Two focused dusk surveys were conducted by John Konecny on May 17 and May 24, 2009 around the entire perimeter of the western and eastern Dairy Mart ponds utilizing digital vocalizations of the light-footed clapper rail. All potential clapper rail habitat was surveyed within the area bordered on the north by Servando Avenue, on the east by Dairy Mart Road, and on the south by the County Park dirt access road (Figure 11). The freshwater marsh in the North River Channel, southern pond, and two additional little ponds were also surveyed (Figure 11).

Southwestern Willow Flycatcher

Six focused surveys for southwestern willow flycatcher (*Empidonax traillii extimus*), another USFWS Risk Group I species, were conducted in suitable habitat (Figure 12) within the survey area between May 28 and July 8, 2009, following the most current USFWS survey protocol for the species (USFWS 2008). The surveys were conducted by TAIC biologist Geoffrey Rogers under authorization of federal permit #TE801346-4. Surveys were conducted by slowly walking through suitable habitat using digital vocalizations of the species advertising song and visual observations. Other avian species observed were also recorded (Appendix B). The survey area consisted of suitable riparian habitat within the Park, which was determined based on the USFWS 2008 monitoring protocol, expert experience and published data (e.g., Sogge 1997) on the species.



Legend

Light-Footed Clapper Rail Survey Area

Historic Light-Footed Clapper Rail Location

Basemap Legend

TRVRP MSCP Monitoring Study Area

Not a Part

N

Feet

0 1,700

Source: Technology Associates 2009

Species Sources: USFWS 2004 , San Diego Regional Species Database 1989, Greystone 2005

MSCP Year 2009 Monitoring
TRVRP

Light-Footed Clapper Rail
Survey Areas and Historic Locations

Figure 11

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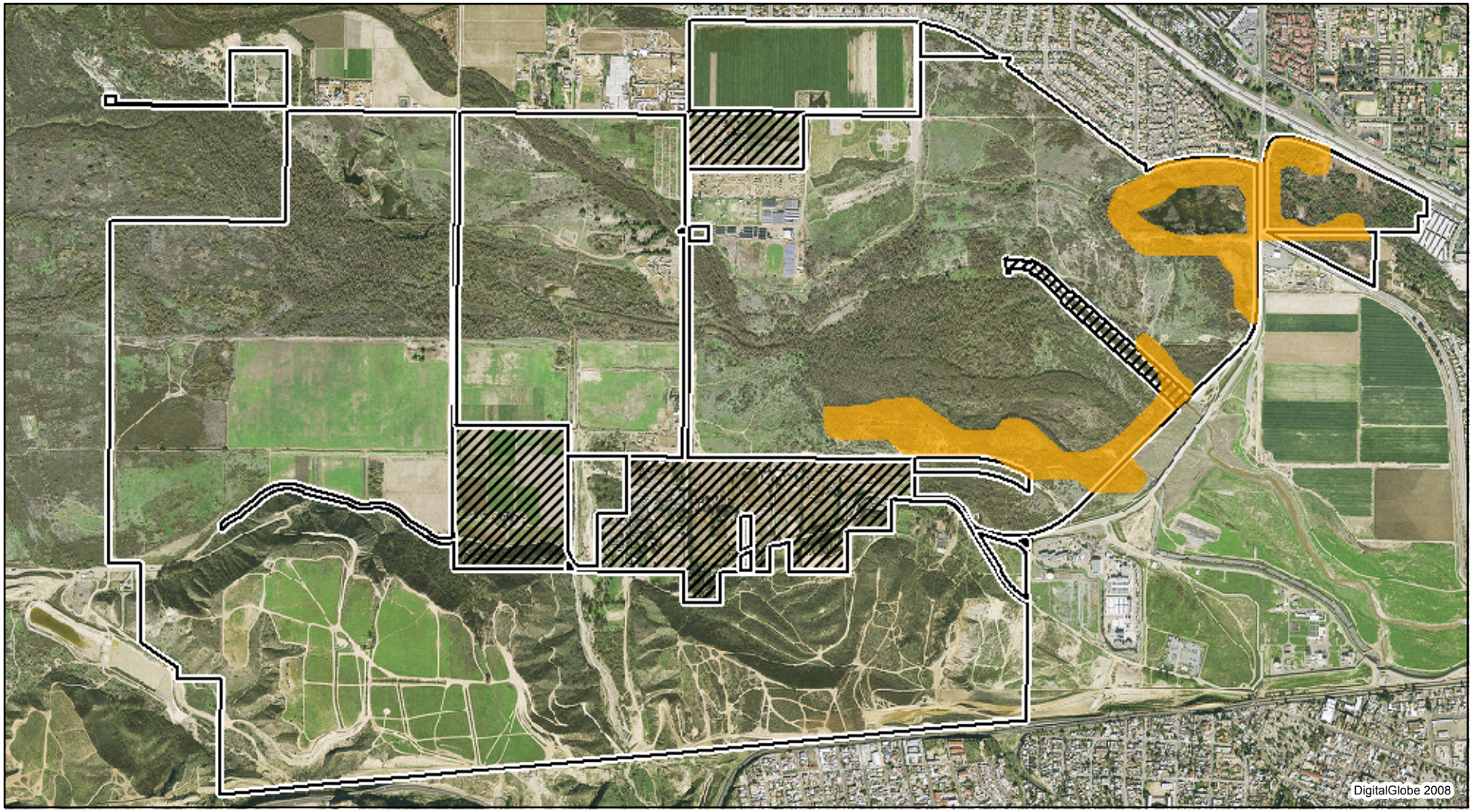
Date: Nov 24, 2009



Source: Technology Associates 2009

MSCP Year 2009 Monitoring
TRVRP

Southwestern Willow Flycatcher Survey Areas

Figure 12

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Date: Nov 24, 2009

A one-day habitat assessment was performed prior to the survey to rank suitable habitat areas by presence of surface water, an important factor in willow flycatcher habitat, and ready access due to protocol time limitations. The survey area (Figure 12) was determined based on access and presence of surface water as follows:

- Density of vegetation with no trail network rendered a vast area of suitable habitat in the center of the riparian floodplain as inaccessible;
- Areas along the Tijuana River west of Hollister Avenue with an adequate existing trail network were excluded due to lack of surface water;
- Although covered well by recreational birders, the area along Dairy Mart Road immediately south of I-5 has nearly permanent surface water, provides adequate habitat for many species, and has good accessibility. Both sides of Dairy Mart Road were surveyed;
- The portion of survey area south of the old Tijuana River channel near the intersection of Dairy Mart and Monument roads is not well covered by recreational birders, but does have a limited trail network. At the time it had limited surface water and was therefore included in the survey area.

Based on the criteria identified above, the survey area encompassed two separate areas covered over two consecutive days (Figure 12). The more northerly area included the large pond on the west side of Dairy Mart Road immediately south of I-5, a smaller area along the east side of Dairy Mart Road, and an extension of riparian habitat to the south along Dairy Mart Road. The second area, to the south, included portions of the Tijuana River channel immediately west of the new Dairy Mart Road bridge and an extended area along the south edge of the old river channel near the intersection of Dairy Mart and Monument roads. Both areas support structurally diverse willow riparian forest and scrub that appears sufficient for the southwestern willow flycatcher.

Brown-headed Cowbird Monitoring

Brown-headed cowbird (*Molothrus ater*) presence was noted and recorded during all avian surveys following the protocols described in each individual section.

Grassland Raptor Monitoring

Focused grassland raptor monitoring surveys were conducted on May 6 and 7, and June 3 and 4, 2009, to detect nest sites, breeding behavior, and presence/absence of grassland raptors. Survey target species were northern harrier, American kestrel (*Falco sparverius*), and red-tailed hawk (*Buteo jamaicensis*). Observations of other avian species were also noted. Special focus was given to the MSCP-covered northern harrier, a sensitive species that nests in the Park. Observations of this species were recorded (1) incidentally during

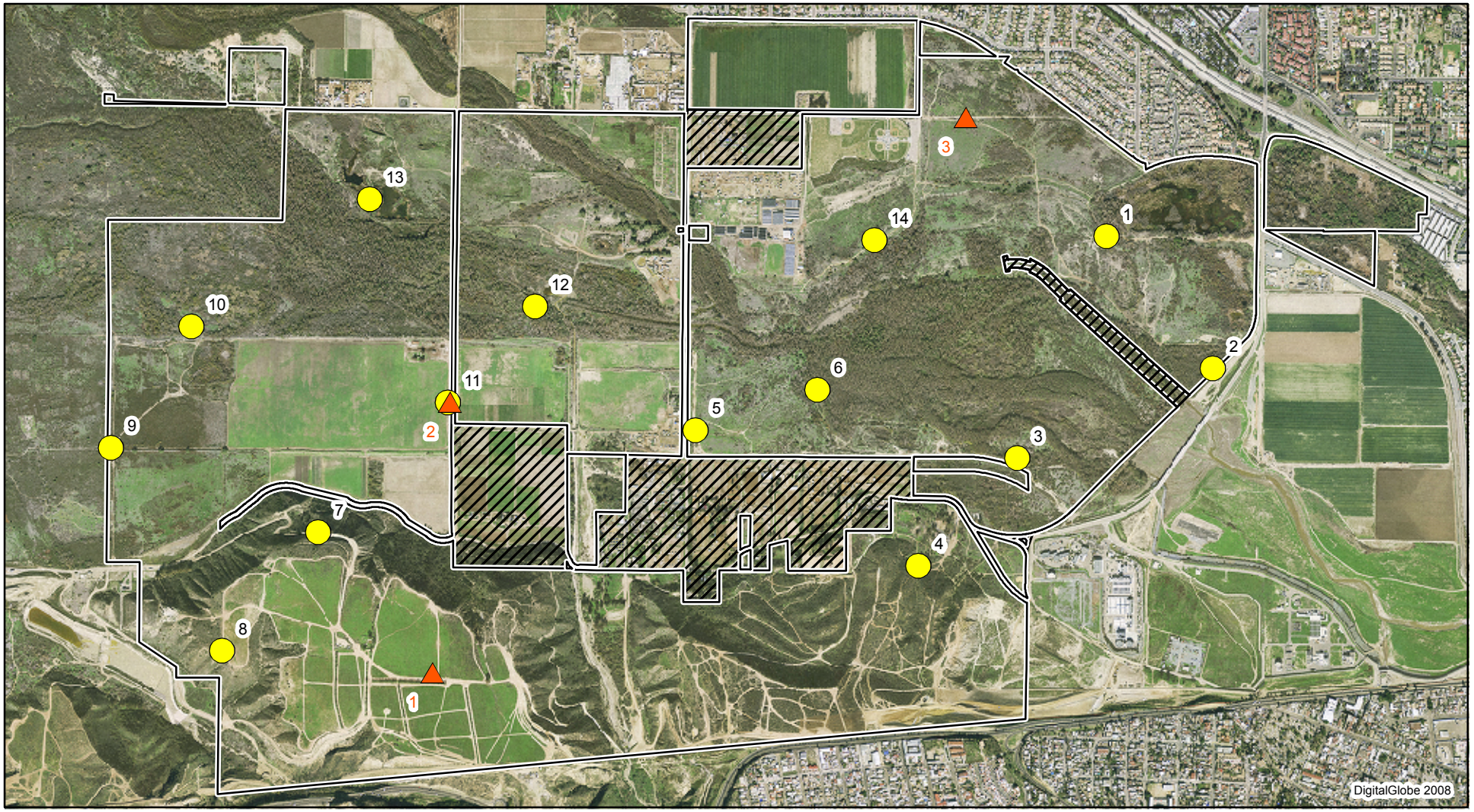
vegetation mapping, habitat monitoring, and wildlife surveys; (2) during avian point counts (avian trail monitoring) and while traveling between points, and (3) during focused grassland surveys. The latter consisted of stationary one hour visits to three discrete monitoring sites (Figure 13) that were selected based on suitable habitat and previous harrier observations (Greystone 2005). Based on vegetation communities identified and mapped in 2009, the monitoring points were located in areas of extensive grassland or grassland with minimal presence of weedy annuals, and are typical of habitat used for foraging and nesting by the northern harrier (Figure 8).

Avian Trail Monitoring

Avian surveys were conducted along the trail network at the Park to identify any MSCP-covered or sensitive bird species along the existing and planned Park trail network and determine nesting behavior or nest locations. The purpose of these surveys was to collect presence/absence data on the general avian population at the Park, and to provide a baseline that would assist the County with trail planning, including the potential need to avoid specific areas for the location of the new Park trail network. In addition, future surveys at the same point count locations may show whether or not recreational trail use has an affect on the bird population and conversely, whether closed trails would result in an increase of the bird population.

Point-count surveys along the planned trail network were conducted on May 6 and 7 (mid-breeding season) and June 3 and 4, 2009 (late breeding season) at 14 stations (Figure 13). The point count locations were marked using GPS; the GPS coordinates will assist in re-locating the point count locations for future surveys. Birds were counted at the points from dawn to mid-morning, with the surveys normally concluding by 10:30 AM. The counts were conducted in the same order each time. In addition to counting birds and establishing a species list, behaviors (e.g., nesting) were also noted.

The avian surveys were conducted primarily by timed 10-minute unlimited-distance point counts (Ralph et al. 1993). The survey points were selected through a habitat assessment to cover the range of habitat types and trail types (multi-use, equestrian/pedestrian, trails to be closed) along the trail network and for their location to maximize detections of birds. Points were located mainly in areas of the planned trail network, but some points were selected at current unauthorized trails that are planned for closure. Each point was positioned such that small birds detected at one point have little chance of being the same as those detected at another point.



Source: Technology Associates 2009

MSCP Year 2009 Monitoring
TRVRP

Avian Trail and Grassland Raptor Monitoring Locations

Figure 13

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Date: Nov 25, 2009

3.0 RESULTS

3.1 Vegetation Communities Mapping

Twenty vegetation communities were mapped within the Park during the 2009 surveys (Table 4; Figure 8). The Park is dominated by riparian and wetland habitats associated with the Tijuana River in the northern portion of the Park, and a combination of native and disturbed upland habitats in the southern and western portions of the Park. Active agricultural operations also occur within the Park in the central and northern portions.

The Tijuana River channel supports southern arroyo willow riparian forest with southern willow scrub, and mule fat scrub spreading out into the floodplain north and south of the river which trends east to northwest through the Park. Areas of wetland outside the main riverine complex occur in the northeast portion of the Park south of I-5 and east of Dairy Mart Road, and west of Dairy Mart Road, south of Servando Avenue. The riparian and wetland habitats along the Tijuana River and its side channels are extensive and of moderate to good quality in some areas; in other areas, however, invasive species such as tamarisk (*Tamarisk ramosissima*) and giant reed (*Arundo donax*) are mixed in with native riparian vegetation, and dominant monocultures of tamarisk still exist within the river's floodplain (Figure 8).

Upland habitats include coastal sage scrub, southern mixed chaparral, and southern maritime chaparral, which occur on the slopes of the mesas and ridges in the south. Broadleaf-dominated non-native grassland, which consists of a monoculture of crown daisy (*Chrysanthemum coronarium*), and disturbed habitat dominate the mesa tops in the south along the international border and flatter areas north of the Tijuana River.

In addition to the natural communities within the Park, many human-altered habitats also occur, including disturbed areas associated with scattered residences, agricultural operations, flood control levees and dredging, vegetation control, equestrian facilities, dumping, off-road activities, unauthorized trails, construction of the border fence, Border Patrol enforcement activities, and former sand and gravel mines. These disturbances have resulted in the loss of native habitat, negative impacts to water quality, compaction of native soils, accumulation of trash, erosion, and sedimentation. Active agricultural operations, such as row and nursery crops, occur in the central and northern portions of the Park though some are not part of the Park while others occur inside the Park boundaries. Areas considered developed include ballfields, horse facilities, greenhouses, other agricultural-associated buildings, and paved roads.

Table 4. Vegetation Communities within the Park

Vegetation Community[1]	Acres[2]
SENSITIVE (MSCP) HABITATS	
RIPARIAN/WETLAND COMMUNITIES	
Southern Arroyo Willow Riparian Forest (61320)	269.5
Southern Willow Scrub (63320)	311.3
Mule Fat Scrub (63310)	92.0
Coastal and Valley Freshwater Marsh (52410)	11.0
Herbaceous Wetland (52510)	0.2
Emergent Wetland (52440)	15.0
Open Water (64100)	2.8
Non-Vegetated Floodplain or Channel (64200)	1.6
Tamarisk Scrub (63810)	17.1
Subtotal	**720.5**
UPLAND COMMUNITIES	
Maritime Succulent Scrub (32400)	25.3
Southern Maritime Chaparral (37C30)	8.7
Diegan Coastal Sage Scrub (32500)	247.7
Coastal Sage-Chaparral Scrub Transition (37G00)	1.0
Southern Mixed Chaparral (37120)	3.1
Non-native grassland : Broadleaf-Dominated (42210)	322.9
Subtotal	**608.7**
TOTAL Sensitive Habitat	**1,329.2**
NON-SENSITIVE HABITATS	
Disturbed Habitat (11300)	276.4
Eucalyptus Woodland (79100)	2.7
Row Crops (18320)	210.5
General Agriculture (18000)	8.0
Urban/Developed (12000)	70.7
TOTAL Non-Sensitive Habitat	**568.3**
TOTAL TRVRP	**1,897.7**

[1] Holland code in parenthesis.

[2] Acres within the Park boundaries. Acreages do not include vegetation within the 100 foot mapped buffer around the Park. The assessor's parcel data list the Park to be 1,839.8 acres; however, calculations generated from the GIS data show the Park as 1,897.7 acres. Therefore, this report references the Park as 1,897.7 acres.

The dominant feature of the vegetation communities on site is the Tijuana River and the historic and continued use of the land for agriculture, horse-boarding, construction associated with the border fence, and U.S. Border Patrol activities. Fertile soils in the river valley have attracted farming and nursery operations, some of which continue today and some of which have been abandoned in years past but are still evident. The Tijuana River Valley is the largest horse-keeping area in the City of San Diego and riders use the

many trails that are present in the Park. Past and recent Border Patrol operations have created a strip of disturbed habitat along the international border associated with the border fence, and access roads to the edge of the bluffs where the river valley can be monitored. There are numerous trails though the Park, many of which are unauthorized and are associated with illegal immigrant and Border Patrol activity.

Southern Arroyo Willow Riparian Forest (61320)

Southern arroyo willow riparian forest is a winter-deciduous riparian forest dominated by arborescent, tall, broad-leafed trees dominated by arroyo willow (*Salix lasiolepis*) and having closed or nearly-closed canopies along perennially wet stream reaches. Understories usually are shrubby willows. The community is usually found along rivers and streams on frequently overflowed lands. Associated species within the Park include mule-fat (*Baccharis salicifolia*), Goodding's black willow (*Salix gooddingii*), narrow-leaf willow (*S. hindsiana*), and cocklebur (*Xanthium strumarium*). Non-native species, such as giant reed (*Arundo donax*), castor bean (*Ricinus communis*), tamarisk (*Tamarix ramosissima*), and garden nasturtium (*Tropaeolum majus*), are located in interior areas of the riparian forest where the canopy is not fully closed. Other non-native species, such as crown daisy (*Chrysanthemum coronarium*), wild radish (*Raphanus sativus*), and mustard (*Sisymbrium* spp.) are found along the edges of the habitat. Southern arroyo willow riparian forest dominates the main channels associated with the Tijuana River and covers 269.5 acres of the valley floor.

Southern Willow Scrub (63320)

As described by Holland (1986), southern willow scrub is a dense, broad-leafed, winter-deciduous riparian thicket dominated by several willow species (*Salix* spp.). The community does not support aborescent willows maintained by periodic flooding. Southern willow scrub is the most prevalent vegetation community in the Park, buffering the southern arroyo willow riparian forest along the channels associated with the Tijuana River and the emergent wetlands in the northeast of the Park, as well as occurring on tributary drainages, drainage ditches, and low-lying areas on the valley floor. The southern willow scrub in the Park is dominated by arroyo willow, Goodding's black willow, and mule-fat. Understory species include mugwort (*Baccharis douglasii*), dwarf nettle (*Urtica urens*), and a variety of non-native species, including wild radish, Mexican tea (*Dysphania abrosioides*), and ripgut grass (*Bromus diandrus*). Tamarisk, an invasive woody shrub, has also invaded this habitat in various locations. A total of 311.3 acres of southern willow scrub is present within the Park.

Mule Fat Scrub (63310)

Mule fat scrub is a depauperate, herbaceous riparian scrub dominated by mule-fat. This early seral community is maintained by frequent flooding, the absence of which would result in most stands succeeding to cottonwood- or sycamore-dominated riparian forests or woodlands (Holland 1986). Mule fat scrub is typically found along intermittent stream channels with fairly coarse substrate and moderate depth to the water table. Within the Park there is a high percentage of invasive, non-native herbaceous species, such as Sahara mustard (*Brassica tournefortii*), short-pod mustard (*Hirschfeldia incana*), and crown daisy, as well as patches of tamarisk. Mule fat scrub occurs in a patchwork across the Park but is most prevalent in the northeastern portion in moister areas of the valley floor. Some mule fat scrub also occurs in Smuggler's Gulch and in the far west of the Park, north of Monument Road. A total of 92.0 acres of mule fat scrub is present within the Park.

Coastal and Valley Freshwater Marsh (52410)

Coastal and valley freshwater marsh is dominated by perennial, emergent monocots such as bulrush (*Scirpus* spp.), cattails (*Typha* spp.), and sedges (*Carex* spp.), up to four to five meters tall, often forming completely closed canopies. The vegetation occurs at permanently flooded fresh water (rather than brackish, alkaline, or variable) sites lacking significant current where periods of prolonged saturation permits accumulation of deep, peaty soils. They are found along the coast and in coastal valleys near river mouths and around the margins of lakes and springs. On site, this freshwater marsh habitat is found around the Dairy Mart ponds and depressions in the northeast of the Park; small patches also occur around depressions in the northwest area of TRVRP. This habitat covers 11.0 acres at the Park.

Emergent Wetland (52440)

Emergent wetland in this report is identified as a generally persistent wetland consisting of perennial wetland and other aquatic plants emerging from otherwise shallow open water. These can be found in slow-moving channels, in depressions at seeps and springs, and in floodplains, at the margins of lakes, and various basins such as pools, ponds, and palustrine lakes. Without a continuous source of water, these communities would dry out and become marsh habitat. If the supply of water is constant but too deep, the open water will persist. Commons species include bulrush and cattails, and emergent willows. On site, this emergent wetland habitat is found at the Dairy Mart ponds and a nearby depression to the south in the northeast of the Park and covers 15.0 acres.

Herbaceous Wetland (52510)

Herbaceous wetland is seasonal wetland supporting mainly annual species. These areas do not support species such as bulrush, cattails and sedges. typically associated with Freshwater Marsh (52400) communities, but do support herbaceous species including seep monkeyflower (*Mimulus guttatus*) and annual beard grass (*Polypogon monspeliensis*). In San Diego County, these wetlands may only occur during wetter than average years and are usually found in swale areas or adjacent to drainages. Regular or sustained water presence results in growth of perennial riparian scrubs. On site, a small drainage in the north of the site supports a seasonal, mostly herbaceous flora before entering a major riparian area, and covers 0.2 acre.

Open Water (64100)

Open water habitat includes lakes, ponds, or other bodies of water that do not support emergent plant cover. Open water is present in ponds on site in the northeast of the Park. The ponds support some wetland vegetation around their edges, are likely used by amphibians for reproduction, and provide a water source for mammals and birds when little free water exists after winter rains cease. The ponds on site total 2.8 acres.

Non-Vegetated Floodplain or Channel (64200)

Non-vegetated channels are flood channels, unvegetated on a relatively permanent basis. Variable water lines inhibit the growth of vegetation, although some weedy species of grasses may grow along the outer edges of the wash. Vegetation may exist, but is usually less than 10% total cover. Non-vegetated channels are found on the lower reaches of cismontane rivers and in desert washes. In the Park, this community is evident as the wash that emerges from the newly channeled section of Smuggler's Gulch. It covers 1.6 acres of the Park.

Tamarisk Scrub (63810)

Tamarisk scrub is a weedy, virtual monoculture of tamarisk (salt cedar) species (*Tamarix ramosissima*, and *Tamarix aphylla*), usually supplanting native vegetation following major disturbance. It is most often found in sandy or gravelly braided washes or intermittent streams, often in areas where high evaporation increases the stream's salinity. Tamarisk is a strong phreatophyte (a deep-rooted plant that obtains water from a permanent ground supply or from the water table) and a prolific seeder, attributes which predispose the species to be aggressive competitors in disturbed riparian corridors. Often

tamarisk is found with saltgrass (*Distichlis spicata*), arrow weed (*Pleuchea sericea*), and narrow-leaf willow. Riparian woodlands dominated by tamarisk have been found to provide habitat for the federally endangered southwestern willow flycatcher (Sogge et al. 2004). In the Park, tamarisk is present in and along the Tijuana River channel. The majority of the tamarisk is scattered within the river channel and floodplain often mixed with willows and giant reed. A few patches where tamarisk is predominant occur north of the river where some are naturalized and some apparently planted (e.g., around the staging area west of Hollister Road). In the northwest, south of Sunset Avenue, a small patch of tamarisk is associated with a pond area. On Spooner's Mesa, tamarisk (*Tamarix aphylla*) occurs in rows along dirt roads, apparently planted to provide wind breaks. Tamarisk scrub covers 17.1 acres in the Park.

Maritime Succulent Scrub (32400)

Maritime succulent scrub reaches its northern distributional limits in San Diego County on the mainland and offshore on the California Channel Islands. It is confined to dry, south-facing slopes along the coastal areas from Torrey Pines State Park south to El Rosario in northern Baja California. This community is a low, open vegetation type with a poorly-developed understory (Holland 1986). The dominant shrub species in this community include some of the coastal sage scrub dominants, as well as a number of cacti and other succulent species. Scrub and suffrutescent species (having a woody base that does not die down each year) within the Park include coastal sagebrush (*Artemisia californica*), California copperleaf (*Acalypha californica*), coast spice bush (*Cneoridium dumosum*), California encelia (*Encelia californica*), cliff spurge (*Euphorbia misera*), bladderpod (*Isomeris arborea*) and San Diego sunflower (*Bahiopsis [Viguiera] lacinitata*). Cacti include golden-club cactus (*Bergerocactus emoryi*), coast barrel cactus, fish-hook cactus (*Mammillaria dioica*), and coast prickly pear (*Opuntia littoralis*). On site, maritime succulent scrub covers 25.3 acres in the southwest of the Park, on the south and western faces of Spooner's Mesa.

Southern Maritime Chaparral (37C30)

Southern maritime chaparral is a low, relatively open chaparral typically characterized by such species as wart-stemmed ceanothus (*Ceanothus verrucosus*), Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*), Del Mar sand aster (*Corethrogyne filaginifoila* var. *linifolia*), and San Diego sea dahlia (*Coreopsis maritima*), among others. Other species that commonly occur in this habitat are chamise (*Adenostoma fasciulatum*), mission Manzanita (*Xylococcus bicolor*), and toyon (*Heteromeles arbutifolia*).

Distinguishing between southern maritime chaparral and southern mixed chaparral can be difficult, especially in coastal areas where ecotonal or transitional associations between the two types often occur. Important differences between these habitat types include the number and dominance of characteristic southern maritime chaparral species (some of which are listed above), the structural characteristics of the vegetation, and the range of soil types and geographical areas over which these habitats occur. Species such as Del Mar manzanita, wart-stemmed ceanothus, summer holly, and others tend to be more frequent and have increased dominance in southern maritime chaparral, while species such as chamise, toyon, and mission manzanita typically dominate southern mixed chaparral. Southern maritime chaparral is also often more open and lower growing, possibly as a result of its apparent restriction to relatively infertile, weathered sandstone soils. Geographically, southern maritime chaparral is restricted primarily to the coastal fog belt and currently occurs only at Torrey Pines State Reserve, Del Mar Mesa, and a few other scattered nearby localities.

Within the southern portion of the Park, just north of the international border and east of Smugglers Gulch, is chaparral habitat on sandstone soils within the fog belt dominated by wart-stemmed ceanothus. Other shrub species include chamise, mission manzanita, coast spice bush, and black sage (*Salvia mellifera*). Even though the site is outside the known range of Del Mar manazanita, the community is characterized by many of the attributes specific to southern maritime chaparral. A total of 8.7 acres of southern maritime chaparral occurs in the Park.

Diegan Coastal Sage Scrub (32500)

As described by Holland (1986), Diegan coastal sage scrub is a community dominated by drought-deciduous, soft-woody subshrub species, and is frequently found on arid or steep sites. Diegan coastal sage scrub frequently intergrades with chaparral communities, such as southern mixed chaparral, at higher elevations. Dominant species in the coastal sage scrub within the Park include: coastal sagebrush, coyote brush (*Baccharis pilularis*), California buckwheat (*Eriogonum fasciculatum*), and coast goldenbush (*Isocoma menziesii*). On site, this community is present mostly in the southern portion of the Park with a small strip occurring in the very north. Much of the habitat is highly disturbed and overrun with invasive species, such as crown daisy, crystalline iceplant (*Mesembryanthemum crystallinum*), and red brome (*Bromus madritensis* ssp. *rubens*). In the ridges and valleys of the southeast, the habitat is criss-crossed with dirt roads and trails, and some areas are recovering from a mining operation that started in the 1970s

and ceased in 2000. The habitat is more intact on the mesa slopes in the southwestern portion of the Park. Diegan coastal sage scrub comprises 247.7 acres of the Park.

Coastal Sage-Chaparral Scrub Transition (37G00)

Coastal sage-chaparral scrub is a mixture of sclerophyllous (having small, stiff, evergreen leaves) chaparral shrubs and drought-deciduous sage scrub species regarded as an ecotone (transition) between two vegetation communities. This singular community typically contains floristic elements of both communities including coastal sagebrush, California buckwheat, laurel sumac (*Malosma laurina*), chamise (*Adenostoma fasciculatum*), scrub oak (*Quercus berberidifolia*), and ceanothus (*Ceanothus* spp.), most of which are found in the Park. A patch of coastal sage-chaparral scrub is found in the southwestern portion of the Park on the north-facing slope of a small canyon west of Spooner's mesa. Coastal sage-chaparral scrub on site totals 1.0 acre.

Southern Mixed Chaparral (37120)

As described by Holland (1986), southern mixed chaparral is a dense, relatively short, shrub-dominated community widely distributed on arid landscapes in coastal southern California. At TRVRP, this vegetation is relatively scarce, covering a single slope in the southern portion of the Park. Chamise is the most prevalent species; however, other species found in this community in the Park include spiny redberry (*Rhamnus crocea*), toyon, mission manzanita, spice bush, coastal sagebrush, California buckwheat, and laurel sumac. In addition, as with the other upland communities at TRVRP, this habitat also consists of invasive non-native species, such as Sahara mustard, short-pod mustard, and red brome. Southern mixed chaparral covers 3.1 acres in the Park.

Non-Native Grasslands: Broadleaf-Dominated (42210)

This vegetation community is a subset of non-native grassland which is typically dominated (i.e., with greater than 50% vegetative cover) by one or several non-native, invasive broadleaf species. Common broadleaf dominants include crown daisy, short-pod mustard, Sahara mustard, crystalline iceplant, Indian sweetclover (Melilotus indicus), and wild radish. Invasive, non-native grasses such as red brome are also common. This community has become increasingly common in coastal areas. On site, this community occupies the top of Spooner's Mesa in the south, and extensive areas in the river valley both north and south of the river. A total of 322.9 acres of broadleaf-dominated non-native grassland occur on site. These extensive swaths constitute the largest areas of potential habitat restoration in the Park.

Eucalyptus Woodland (79100)

As described by Holland (1986), eucalyptus woodland is typically characterized by dense monotypic stands of eucalyptus trees (*Eucalyptus* spp.). Plants in this genus, imported primarily from Australia, were originally planted in groves throughout many regions of coastal California as a potential source of lumber and building materials, for their use as windbreaks, and for their horticultural novelty. Their cover has increased through natural regeneration, particularly in moist areas sheltered from strong coastal winds. Eucalyptus trees naturalize readily in the state and, where they form dense stands, tend to completely supplant native vegetation, greatly altering community structure and dynamics. Within the Park, 2.7 acres of eucalyptus woodland occurs as small patches in Smuggler's Gulch in the southern portion of the Park.

Disturbed Habitat (11300)

Disturbed habitat is any land on which the native vegetation has been significantly altered by agriculture, construction, or other land-clearing activities, and the species composition and site conditions are not characteristic of the disturbed phase of one of the plant associations within the study region. Such habitat is typically found in vacant lots, roadsides, construction staging areas, utility easements (i.e., telephone poles, power lines, etc.), or abandoned fields, and is either barren of vegetation or, if present, dominated by non-native annual species and perennial broadleaf species.

For the most part, disturbed habitat within the Park is comprised of areas cleared by the U.S. Border Patrol at the international border, and Park's official and unauthorized trail system (totaling 93.3 acres), including: dirt roads mostly created and used by the Border Patrol (14.9 acres), various trails represented by the Park's official trail system (43.2 acres) as well as unofficial trails (35.2 acres), and the abandoned sand mining operation in the southeast. However, 183.1 acres of disturbed habitat was also observed, including in the northern portion of the Park where abandoned horse corrals and cleared areas of undetermined origin are present. Combined with the trails, a total of 276.4 acres of disturbed habitat occur within the Park.

Row Crops (18320)

Agricultural land is broadly defined as land used primarily for production of food and fiber. Agriculture is further divided into extensive and intensive categories. Extensive agriculture includes fields, pastures, and croplands. Row crops occur in the western portion of the Park north of Monument Road and south of the Tijuana River, and north of

the Tijuana River east of Hollister Road and north of Sunset Avenue. A total of 210.5 acres of row crop agriculture occurs within the Park.

General Agriculture (18000)

General agriculture is land that supports an active agricultural operation and is used to cover operations that have a mixture of agricultural practices that cannot be further differentiated into row crops, grazing lands, cattle yards, chicken coops, orchards or vineyards. On site, an 8.0 acre community garden is present in the northern portion of the Park west of Hollister Road and south of Sunset Avenue.

Urban/Developed (12000)

Urban/developed areas are found where habitat has been altered by human activities to a state beyond the potential for recovery to a natural state. In general, free standing structures and surrounding areas that are paved or landscaped are considered developed. Developed land within TRVRP is represented by the paved roads that cross the Park, farmhouses, horse corrals and trail staging areas. A total of 70.7 acres of urban/developed land occurs within the Park.

3.2 Habitat Monitoring

The following section details the results of habitat monitoring surveys following data analysis recommended in SDSU MSCP habitat monitoring pilot studies (Deutschman et al. 2009a). A list of species encountered at each transect is included in Appendix C.

3.2.1 Species Richness

A total of 89 plant species were identified within the 15 habitat monitoring stations that were established to represent chaparral (southern mixed and southern maritime), coastal sage scrub, maritime succulent scrub, non-native grassland, mule fat scrub, southern willow scrub, and southern willow riparian forest (Figure 8). Based on quadrat and point intercept data collected for each habitat monitoring transect, of this total, 53 species (60%) were native, consisting of 2 trees, 16 shrubs, 29 forbs, and 6 grasses; 32 species (36%) were non-native, consisting of 1 tree, 2 shrubs, 20 forbs, and 9 grasses; and 4 species could not be identified because the plants were dormant during the time of survey (Table 5).

Table 5. Species Richness by Vegetation Community and Functional Group

Habitat[1] (# plots)	Total No. Species[2]	Native Species				Non-Native Species			
		Trees	Shrubs	Forbs	Grasses	Trees	Shrubs	Forbs	Grasses
QUADRAT DATA									
SMC (1)	15	0	5	3	1	0	0	3	2
MC (1)	16	0	6	7	0	0	0	1	2
CSS (1)	5	0	2	0	0	0	0	3	0
MSS (1)	18	0	5	5	4	0	1	2	1
GR (3)	16	0	2	1	0	0	1	7	4
MFS (2)	18	1	1	2	0	1	0	10	2
POINT INTERCEPT DATA									
SWS (3)[3]	17	2	2	3	0	1	0	6	3
SWRF (3)[3]	22	2	1	6	0	1	1	8	0
QUADRAT + POINT INTERCEPT DATA									
Entire Site	89	2	16	29	6	1	2	20	9

[1] SMC = southern mixed chaparral, MC = southern maritime chaparral, CSS = coastal sage scrub, MSS = maritime succulent scrub, GR = grassland, MFS = Mule fat scrub, SWS = southern willow scrub, SWRF = southern willow riparian forest

[2] Due to their dormant condition several species could not be identified and were not assigned to functional groups

[3] Species richness for SWS and SWRF was determined by using point intercept data. Species richness for all other vegetation types were calculated using quadrat data. Note that point intercept tends to underestimate the number of species (especially native and non-native forbs)

Species richness was highest in southern willow riparian forest (22 species), and lowest in coastal sage scrub (five species). The other vegetation communities showed similar levels of species richness to one another (15 - 18 species), just slightly lower than in southern willow riparian forest.

3.2.2 Percent Cover

Table 6 shows the average percent cover of each functional group for each habitat type, and the last column shows the percent cover of non-native species, which is one measure of habitat degradation. These results illustrate the high level of habitat degradation overall within TRVRP, presumably due to a long history of human use including agriculture, equestrian use, and activities by illegal immigrants and the Border Patrol. Habitats showing the highest percent cover of non-native species were, not surprisingly, non-native grassland (96% of total cover), as well as mule fat scrub (75%), coastal sage scrub (72%), and southern mixed chaparral (61%). Habitats showing the lowest levels of non-native species cover included southern willow scrub (15%) and southern willow riparian forest (26%), which tended to have dense cover of non-natives at the edge of the habitat, little to no understory in the center of the habitat due to seasonal flooding, and dense native tree cover overall. Additionally, southern maritime chaparral had relatively low cover of non-native species (21%), due to dense overstory of wart-stemmed ceanothus. Maritime succulent scrub had 31% cover of non-native species. This open

habitat had fairly rocky soil, which may have been less amenable to non-native species growth.

Table 6. Average Percent Cover by Vegetation Community and Functional Group

Habitat (# plots)	Total Cover[1]	% Cover of Native Species				% Cover of Non-Native Species				
		Trees	Shrubs	Forbs	Grasses	Trees	Shrubs	Forbs	Grasses	% Total
SMC (1)	56.7	0	18.7	2.7	0	0	0	19.3	15.3	61
MC (1)	52.7	0	36.7	4.6	0	0	0	0	11.3	21
CSS (1)	40.7	0	11.3	0	0	0	0	29.3	0	72
MSS (1)	38.7	0	7.3	11.3	5.3	0	0	10	2	31
GR (3)	134.7	0	3.3	0	0	0	3.3	62.7	63.3	96
MFS (2)	107.3	0	24.7	2.7	0	1.3	0	58.7	20	75
SWS (3)	160.0	69.3	53.3	13.3	0	5.3	0	9.3	9.3	15
SWRF (3)[2]	195.3	100	19.3	11.3	0	2	10	36	2	26

[1] Due to overlap of cover of individual species, it is possible to have greater than 100% cover for a given functional group. In addition, several species could not be identified due to their dormant condition and they were not classified into a functional group. As such, total cover may be greater than the sum of all functional groups for a given vegetation community.

[2] Total cover for southern willow riparian forest includes 10.7 % open water and 4% unknown species.

3.2.3 Dominant Species by Vegetation Community

Two monitoring stations were set up in chaparral habitat to generally assess this plant community and to monitor the habitat of wart-stemmed ceanothus. The first monitoring station (SD_TJ_CHP_101) was established in southern mixed chaparral that intergrades with coastal sage scrub habitat. The latter two thirds of the transect graded into an area that had more coastal sage scrub elements, such as California sage brush and California buckwheat, but no chamise and few other chaparral species. Overall, the dominant species along this transect were coastal sagebrush, California buckwheat, and coast spice bush (Table 7). The understory was dominated by non-native Sahara mustard (*Brassica tournefortii*) and red brome. Chaparral species recorded along the transect included chamise and spiny redberry. A coast barrel cactus was observed next to the transect (the species was not picked up with the quadrat or point intercept methods). A total of 15 species were recorded, and nine of these were native species.

The second chaparral plot (SD_TJ_CHP_102) was located in southern maritime chaparral habitat. This community was dominated by wart-stemmed ceanothus. The ground cover was mostly litter; however the most common understory species was red brome. Other native species recorded along the transect were chamise, coast spice bush, and mission manzanita. In addition, Baja California birdbush (*Ornithostaphylos oppositifolia*), a state endangered species, was observed 50 centimeters from the transect. This is an important observation, as much of this population was destroyed during installation of the border fence.

Table 7. Dominant Species for Each Vegetation Community (Average % Cover)

Habitat (# plots)	Dominant Species	Average % Cover	Habitat (# plots)	Dominant Species	Average % Cover
All Vegetation Communities (15)	*Bromus madritensis* ssp. *rubens* *Baccharis salicifolia* *Salix gooddingii* *Chrysanthemum coronarium* *Salix lasiolepis*	27.2 24.0 24.0 18.3 18.3			
SMC (1)	*Brassica tournefortii* *Bromus madritensis* ssp. *rubens* *Cneoridium dumosum* *Artemisia californica*	50.0 44.0 22.0 20.0	GR (3)	*Bromus madritensis* ssp. *rubens* *Mesembryanthemum crystallinum* *Chrysanthemum coronarium*	60.7 28.0 25.3
MC (1)	*Ceanothus verrucosus* *Bromus madritensis* ssp. *rubens* *Adenostoma fasciculatum* *Cneoridiuim dumosum*	54.0 34.0 28.0 12.0	MFS (2)	*Baccharis salicifolia* *Chrysanthemum coronarium* *Bromus madritensis* ssp. *rubens* *Hirschfeldia incana*	37.0 33.0 30.0 21.0
CSS (1)	*Chrysanthemum coronarium* *Isocoma mensiezii* *Mesembryanthemum crystallinum* *Melilotus indica*	42.0 34.0 26.0 18.0	SWS (3)	*Baccharis salicifolia* *Salix lasiolepis* *Salix gooddingii* *Artemisia douglasiana*	52.0 44.7 24.7 10.7
MSS (1)	*Bahiopsis(Viguiera) laciniata* *Acalypha californica* *Mirabilis laevis* var. *crassifolia* *Muhlenburgia microsperma*	22 16 12 12	SWRF (3)	*Salix gooddingii* *Salix lasiolepis* *Baccharis salicifolia* *Chrysanthemum coronarium*	71.3 28.7 19.3 12.0

As part of the regional MSCP habitat monitoring pilot study, SDSU has established six monitoring transects in coastal sage scrub/maritime succulent scrub communities in TRVRP. TAIC added two monitoring stations to this community to capture additional information, as follows. One station (SD_TJ_CSS_101) was set up in coastal sage scrub habitat that supports a known northern harrier nest from 2009. The vegetation in this location was not typical of coastal sage scrub; it was dominated by coast goldenbush, crown daisy, and crystalline iceplant, and no coastal sagebrush or California buckwheat was observed. A total of five plant species were recorded at this location. The other station (SD_TJ_CSS_102) was established in maritime succulent scrub habitat along the slope below Spooner's Mesa. This area was chosen to monitor habitat of coast barrel cactus and Orcutt's bird's beak which have been previously reported in this location. Barrel cactus was observed and included in the transect; however, an area search did not reveal any Orcutt's bird's beak plants. The habitat appeared to be high quality with a relatively low non-native species cover. A total of 18 species were recorded, and only four of these were non-native. San Diego sunflower (CNPS List 4 and County List D) was the dominant shrub. Subdominant shrubs included coast spice bush and cliff spurge, a CNPS List 2 species. Other native species included coastal wishbone plant (*Mirabilis laevis* var. *crassifolia*), California copperleaf, bladderpod, and lady-fingers (*Dudleya edulis*).

Three monitoring stations were established in non-native grassland habitat. No native grassland exists on site. Monitoring stations 1 and 2 (i.e., SD_TJ_GR_1 and SD_TJ_GR_2) were located to the north and south of a known northern harrier nest (on the west side of the Park) in order to obtain information about the habitat of this species. The third station (SD_TJ_GR_3) was located in the north central portion of TRVRP.

Much of the non-native grassland habitat on site consists of invasive, non-native species, such as red brome and crown daisy. Some areas are also dominated by crystalline ice plant. Other common non-native species included Indian sweetclover, mustards (*Hirschfeldia incana* and *Sisymbrium* spp.), and annual grasses such as ripgut grass. Some of the non-native grassland areas are comprised of scattered native shrub species, such as mule-fat and goldenbush; these areas are generally adjacent to or interspersed with mule fat scrub or coastal sage scrub communities. A total of 16 species were recorded in the non-native grassland community, and three of these were native.

Eight riparian monitoring stations were placed throughout TRVRP in mule fat scrub, southern willow scrub, and southern willow riparian forest. Mule fat scrub (plots SD_TJ_MFS_1 and SD_TJ_MFS_2) was more similar to adjacent upland communities than the other riparian communities. The understory of this habitat was dominated by non-native species including crown daisy, crystalline ice plant, red brome, short-pod mustard, and Sahara mustard. The shrub cover was dominated by mule-fat. Other native species recorded in this vegetation community included arroyo willow, California croton (*Croton californicus*), and western nettle (*Hesperocnide tenella*). A total of 18 species were recorded, 13 of which were non-native.

The willow scrub (SD_TJ_SWS_1-3) and riparian forest (SD_TJ_SWRF_1-3) habitats were similar in that they were very dense (almost impenetrable), and contained a low cover of understory plants and low percentage of non-native species. Riparian forest was more diverse with a total of 22 species recorded (9 native). The dominant species in this community were arroyo willow and Goodding's black willow. Other native species included mule-fat, narrow-leaved willow, willow dock (*Rumex salicifolia*), and California bulrush (*Schoenoplectus* [*Scirpus*] *californicus*). The trees appeared to be larger and the canopy was taller than in willow scrub, which is typical of these vegetation communities. It was evident from the debris on the ground and in the trees that these areas experience frequent and deep (up to an estimated five meters) flooding. This was also illustrated at station 3 (SD_TJ_RF_3), which was end-staked at meter 39 because the rest of the transect extended over open water. The willow scrub habitat consisted of 17 species, seven of which were native. This community was dominated by mule-fat, arroyo willow, and black willow.

3.3 Plants

Wart-stemmed ceanothus and coast barrel cactus were monitored indirectly through habitat monitoring. Section 4.2.1 above characterizes the habitats of these species in detail based on the results of the vegetation monitoring and data analysis. Both species persist in the coastal sage scrub and maritime succulent scrub habitats along slopes of the southern mesas in the Park.

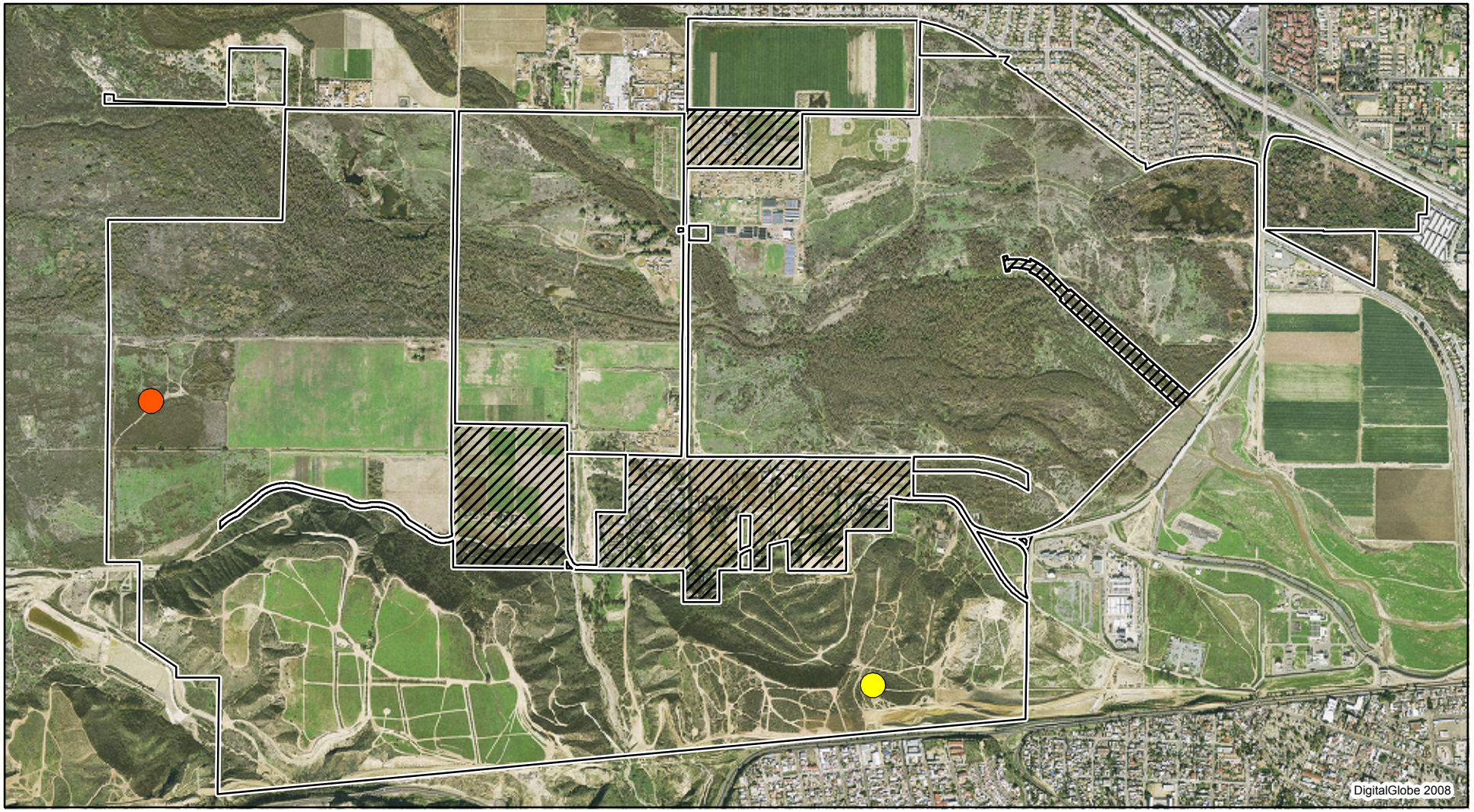
The sensitive Orcutt's bird's beak (CNPS watch list 2 and County List B) has been previously recorded from the southern mesas of TRVRP; however, the area site search and habitat monitoring transects (one of which was set up in a historic location of this species) did not result in any observation or positive identification of this species. However, one sensitive plant species, Baja birdbush, was encountered during vegetation communities mapping (Figure 14). This species was previously recorded at TRVRP (Greystone 2005). Although not covered by MSCP, the species is state endangered, and on the CNPS watch list 2.1 and County List B.

3.4 Wildlife

The following section details the results of wildlife monitoring surveys, specifically herpetological and avian surveys. These surveys have been identified in the TRVRP ASMDs (County of San Diego 2007) and include only a portion of the animal surveys that will be conducted as part of a comprehensive monitoring study for TRVRP. Currently, the USFWS is developing animal monitoring protocols and has initiated focused surveys for California gnatcatcher and least Bell's vireo (*Vireo bellii pusillus*) to document regional trends within the MSCP plan area. Additional animal surveys will be conducted, if necessary, as funding becomes available.

3.4.1 Herpetofauna

Ten species were captured (Tables 8 and 9) with only two being a species of special concern, the western skink (*Plestiodon skiltonianus*), and orange-throated whiptail (*Aspidoscelis hyperythrus*). Except for the skink, the three lizard and five snake species captured are relatively common in both undisturbed and disturbed habitats on large and small open space preserves. Raw capture data from pitfall arrays, including herpetological and mammal species, are included in Appendix D.



MSCP Year 2009 Monitoring
TRVRP

Sensitive Species

Figure 14

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Date: Nov 25, 2009

The orange-throated whiptail (County List Group 2) was the most abundant species in the herpetological arrays in 2009, and the only MSCP-covered species detected in herpetological arrays in 2005. It was captured primarily in riparian, but also in coastal sage scrub areas. Eighty-two orange-throated whiptails were captured at all array locations during all three capture months (May, June and July) in 2009. Generally, this species is most abundant in coastal areas. The majority of captures was in arrays #7 and #9 and coincided with coastal sage scrub and disturbed upland habitat at the edge of riparian habitat. The commonly observed western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta standburiana*) were also abundant in the Park and were trapped in all arrays during all three survey months. The side-blotched lizard was most common in Array #2, which corresponds with non-native upland habitat dominated by crown daisy.

Table 8. Reptiles and Amphibians trapped at TRVRP in 2009

Scientific Name	Common Name	Listing Status		MSCP Coverage/ County List[2]
		Federal	State[1]	
AMPHIBIA (Amphibians)				
ANURA (Frogs and Toads)				
Pipidae (Tongueless Frogs and relatives)				
Xenopus laevis	African clawed frog	--/--		No
REPTILIA (Reptiles)				
SQUAMATA (Lizards and Snakes)				
Anguidae (Anguid lizards and relatives)				
Elgaria multicarinata	Southern Alligator Lizard	--/--		No
Phrynosomatidae (Spiny lizards and relatives)				
Sceloporus occidentalis	Western Fence Lizard	--/--		No
Uta stansburiana	Side-blotched Lizard	--/--		No
Scincidae (Skinks)				
Plestiodon skiltonianus	Western Skink	--/SSC		No
Teiidae (Whiptails and relatives)				
Aspidoscelis hyperythrus	Orange-throated Whiptail	--/SSC		Yes/Group 2
Colubridae (Colubrids)				
Hypsiglena torquata	Night Snake	--/--		No
Lampropeltis getula	California Kingsnake	--/--		No
Masticophis flagellum	Coachwhip	--/--		No
Masticophis lateralis	Striped Racer	--/--		No
Pituophis catenifer	Gopher Snake	--/--		No

[1] SSC – state species of special concern

[2] County Listing Status: Group 1: Animal species that have a very high level of sensitivity either because they are listed as threatened or endangered or because they have very specific natural history requirements; Group 2: Animal species that are becoming less common, but are not yet so rare that extirpation or extinction is imminent without immediate action (these species tend to be prolific within their suitable habitat types).

Table 9. 2009 Pitfall Array Survey Results.

Array	Habitat[1]	Species (*Scientific Name/Common Name*)									
		Aspidoscelis hyperythra Orange-Throated Whiptail			*Elgaria multicarinata* Southern Alligator Lizard	*Hypsiglena torquata* Nightsnake	*Lampropeltis getula* California Kingsnake		*Masticophis flagellum* Coachwhip	*Masticophis lateralis* Striped Racer	
		May	June	July	June	June	May	July	May	May	June
8	MSS	2	2	3	1	1	2	1	1	1	
9	CSS	10	13	7				1			
2	GR	3	1	3			1				
7	SWRF	9	10	12							1
1	SWS	3	2	2							
Subtotal		*27*	*28*	*27*	*1*	*1*	*3*	*2*	*1*	*1*	*1*
Total		**82**			**1**	**1**	**5**		**1**	**2**	

Array	Habitat[1]	Species (*Scientific Name/Common Name*)											
		Pituophis catenifer Gopher Snake			*Plestiodon skiltonianus* Western Skink		*Sceloporus occidentalis* Western Fence Lizard			*Uta stansburiana* Side-Blotched Lizard			*Xenopus laevis* African Clawed Frog
		May	June	July	May	June	May	June	July	May	June	July	July
8	MSS						2	2			1	1	
9	CSS						3	1	1	1		9	
2	NNG				1		4	5	4	9	6	11	
7	SWRF		1		1		2	1	1	3	1	6	
1	SWS	3		2		1	7	3	4	1	1		1
Subtotal		*3*	*1*	*2*	*2*	*1*	*18*	*12*	*10*	*14*	*9*	*27*	*1*
Total		**6**			**3**		**40**			**50**			**1**

[1]Habitats: CSS = coastal sage scrub, MSS = maritime succulent scrub, GR = grassland, SWS = southern willow scrub, SWRF = southern willow riparian forest

Captures worth noting were the African clawed frog (*Xenopus laevis*) at Array #1, which corresponds with the occurrence of this invasive species in 2005 near the West Dairy Mart Pond. Also observed was the Baja subspecies of the coachwhip at Array #9 in southern mixed chaparral/coastal sage scrub, at the edge of crown daisy-dominated upland habitat. The Baja California coachwhip is more often referred to as a distinct species (*Masticophis fuliginosus*), but the taxonomic studies are still unpublished.

3.4.2 Avifauna

A combined total of 67 species were detected during monitoring surveys for the southwestern willow flycatcher and grassland raptors, and avian trail monitoring (point count surveys). The species are listed in Appendix B and E. Neither the light-footed clapper rail nor the southwestern willow flycatcher, both federally endangered, were observed in the Park. Least Bell's vireo was observed in high numbers during avian surveys in 2009. During the point counts and focused southwestern willow flycatcher surveys, the vireos were almost never out of hearing range in dense riparian areas. This species is being separately monitored by the USFWS, and results are not yet available for the purpose of this report.

Light-footed Clapper Rail

No light-footed clapper rails were detected in any of the areas surveyed in the Park (see focused survey report in Appendix F). Light-footed clapper rails have been detected sporadically within the TRVRP, more specifically at the Dairy Mart ponds and north Tijuana River channel (Figure 11), with one or two pairs being present since the 1980s. Two pairs were present in 2003, and one pair was detected in 2004, 2005, and 2007 (Zembal et al. 2008).

The Dairy Mart ponds are the most conspicuous feature of the TRVRP and are composed of a three pond complex, of which two ponds are located west of Dairy Mart Road and one pond east (Figure 2). The easternmost pond may have had freshwater marsh present at some time, but today it has matured into southern willow riparian forest with little or no cattails or bulrush. This area shows sign of seasonal flooding, but did not have standing water at the time of the clapper rail survey. In its current state, it is not light-footed clapper rail habitat. Of the two western ponds, the northern pond is the most suitable for the light-footed clapper rail. This pond features open water and has emergent patches of bulrush around the periphery with smaller patches of cattails. The southern pond, like the eastern pond, is surrounded by a more mature southern willow riparian forest vegetation community, but does have some open water with cattails and bulrush

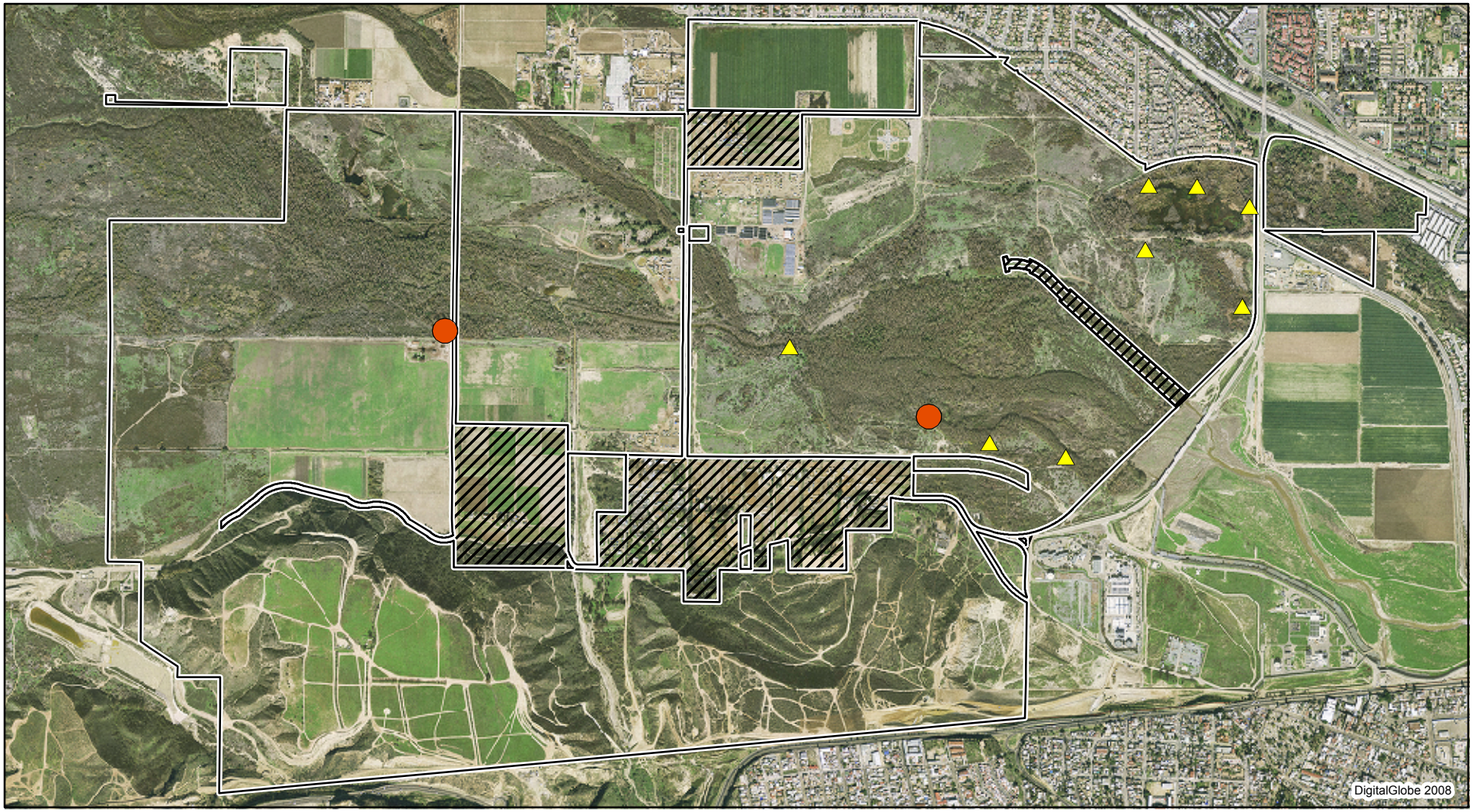
present. The degree of open water is likely dependant on the amount of rainfall; consequently, as a result of the 2009 drought year, the amount of freshwater marsh present in this pond was relatively small. Small patches of emergent freshwater marsh are present in the north Tijuana River channel west of the Dairy Mart ponds. Light-footed clapper rails were detected in this channel in 2003 (John Konecny, pers. obs). Two small isolated ponds are present southwest of the north channel. These ponds had very little emergent freshwater marsh vegetation and are possibly maintained in that condition. In their present state they are not considered light-footed clapper rail habitat.

Southwestern Willow Flycatcher

The southwestern willow flycatcher was not detected during the 2009 focused surveys (Appendix F); therefore, this species is considered absent from the survey area at this time. However, the subspecies of willow flycatcher that migrates through San Diego County, *E. t. brewsteri*, was detected during the 2009 monitoring surveys (Figure 15). *E. t. brewsteri*, the little willow flycatcher, breeds in central California and is state-listed as Endangered but not federally listed. Unitt (2004) indicates that *E. t. brewsteri* passes through San Diego County starting in May with peak movement in early June. This is the only subspecies of willow flycatcher previously recorded in the Tijuana River Valley (Unit 2004). Field identification of the two subspecies is dependent on date of sighting, quality and delivery of vocalizations, and plumage. The individual judged by these criteria to be *E. t. brewsteri* was detected on 29 May at 3601238mN; 492969mE (UTM Zone 11, NAD 83 (Figure 15). It was not detected in subsequent survey visits. It is likely that the unpaired migrants reported by Greystone (2005) were misidentified as *E. t. extimus*, but were probably also *E. t. brewsteri*.

Brown-headed Cowbird

Eight brown-headed cowbirds were detected during the focused willow flycatcher surveys, specifically near the pond west of Dairy Mart Road (Figure 15). Cowbirds are expected to parasitize birds nesting in the survey area and have been previously reported from the riparian habitats in the Park. Cowbird trapping efforts have been conducted in the past by the County of San Diego (Greystone 2005). The species is the only brood parasite in southern California but plays a major role in the riparian bird community (Unitt 2004). In 2009, the species occurred in relatively low abundance at TRVRP.



Source: Technology Associates 2009

MSCP Year 2009 Monitoring
TRVRP

Southwestern Willow Flycatcher and Brown-Headed Cowbird Locations

Figure 15

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Date: Nov 25, 2009

Raptors

The grassland raptor surveys detected five raptor species, and turkey vulture at the avian bird count monitoring stations (Appendix E), which were located on Spooner's Mesa in the cultivated fields northwest of the intersection of Saturn Boulevard and Monument Road, and at the east end of Sunset Avenue (Figure 13). The latter is not considered a true raptor, but does soar and feeds frequently on the same species as true raptors. Additionally, nine passerine species were detected during these surveys. These were either open area/grassland species or flyovers from other habitats.

Golden eagles were not detected during the 2009 survey efforts. The white-tailed kite (*Elanus leucurus*), a species with a history of population swings due in part to availability of its chief prey, the California vole (*Microtus californicus)*, was also absent during current monitoring surveys. This species was confirmed as breeding and wintering in the TRVRP (Unitt 2004), and was also observed breeding during surveys for the TRVRP Trails and Enhancement Project (Greystone 2005). Peregrine falcon (*Falco peregrinus*), which was detected previously (Greystone 2005), was not observed in 2009. To date, all records of this falcon in the Tijuana River Valley have been either migrants or wintering birds (Unitt 2004).

Three red-tailed hawks were detected and over the course of an entire year this species is probably the valley's most common raptor. Based on local Audubon Society Christmas Count results (National Audubon Society 2002), red-tailed hawks from out of the area occasionally winter in the TRVRP and add to the local population; the species was also previously detected (Greystone 2005). Although the red-shouldered hawk (*Buteo lineatus*) is essentially a more tree-oriented species, it does occasionally forage over open fields from riparian edges or roadside perches. The single detection of this species from a grassland area does not reflect the population existing within the riparian canopy. Essentially the same can be said for the Cooper's hawk (*Accipiter cooperii*) in its preference for trees and occasional foraging in more open areas; one Cooper's hawk was detected at Station 3. The Cooper's hawk is largely a bird-eating specialist and will chase prey through densely wooded conditions while the red-shouldered hawk is more of a generalist and prefers to hunt from a perch. American kestrels were detected only twice during the 2009 monitoring surveys, and although the species is considered stable over its range there may be a population decline in California as a whole (Sauer et al. 2003).

Although the northern harrier was detected only twice, it is probably the next most abundant raptor in the TRVRP behind the red-tailed hawk. The species is frequent in grasslands as well as in and adjacent to marshes, and probably prefers the latter.

Although the species breeds in the Park (Unitt 2004), and was confirmed breeding during the avian trail monitoring surveys, more occupy the TRVRP in winter than in the breeding season. This is consistent with other raptors finding favorable winter conditions in the TRVRP and emphasizes the Park's value at an otherwise less productive time of year. Nesting activity of a northern harrier pair was recorded on 7 May 2009 and a nest was mapped at a location toward the west end of TRVRP (Figure 14). The nest was 40 feet from a park access road in a nearly solid patch of goldenbush (*Isocoma menziesii*) and was observed over several weeks as the female returned with nest material.

Avian Trail Monitoring

Over the course of the three visits, 62 bird species were detected by either sight or sound (Appendix E), including the black-throated magpie-jay (*Calocitta collie*) and northern cardinal (*Cardinalis cardinalis*). Neither species occurs naturally in the region; both are presumed here as escaped from captivity. All other species were either migrants or summer resident species and of natural occurrence. No nests were found during the avian point count surveys along the TRVRP trails. Only one rufous-crowned sparrow (*Aimophila ruficeps canescens*), a MSCP-covered and County Group 1 species, was observed at Station 7.

Common species particularly well represented by presence at more than 10 of the point count stations include: common yellowthroat (*Geothylipis trichas*), song sparrow (*Melospiza melodia*), house finch (*Carpodacus mexicanus*), and American goldfinch (*Spinus tristus*). Only slightly less frequent, at nine stations, were: Anna's hummingbird (*Calypte anna*), least Bell's vireo, and yellow warbler (*Dendroica petechia*). Only one California gnatcatcher individual was encountered in one of the monitoring locations (Station 7) in high functioning coastal sage scrub habitat along the slopes of Spooner Mesa.

Of special interest were a single willow flycatcher and a single Swainson's thrush (*Catharus ustulatus*). As noted above, the willow flycatcher was determined not to be from the locally breeding, federally endangered subspecies, "southwestern" willow flycatcher (*Empidonax trailii extimus*), but from the central California breeding subspecies, "little" willow flycatcher (*E. t. brewsteri*). This subspecies is seen more frequently in San Diego County during migration than the southwestern willow flycatcher (Unitt 2004). Another "little" willow flycatcher was detected in the TRVRP during focused southwestern willow flycatcher surveys (Section 4.4.2.2). The Swainson's thrush was heard singing and was either a migrant or possibly breeding

(inconclusive observation). TRVRP lies at the south end of the species' breeding range and possible breeding was detected in 2001 (Unitt 2004).

Stations recording the most activity were generally within the riparian canopy but not far from the edge of an adjoining habitat, specifically along the northern edge of riparian habitats associated with the Tijuana River and the Dairy Mart ponds; the two most productive stations in terms of species richness were stations 1 and 13 (Figure 13). Station 1 and surrounding area produced 25 species, Station 13 produced 24 species, and Station 12 produced 22 species. All three stations have a mix of native species and habitats, but also major elements of non-native vegetation. Stations with less arboreal habitat, or minimal native habitat, had reduced species richness. Station 7 in disturbed Diegan coastal sage scrub had only 10 species and Station 8 at the edge of Diegan coastal sage scrub and non-native grassland had only 8 species. Species richness is not synonymous with habitat function, because disturbed habitats or habitats with a large non-native species component may also attract more non-native bird species, which would positively affect the species richness factor.

4.0 CONCLUSIONS

Evaluation criteria for coverage of species are listed in Table 3-5 of the MSCP and City Subarea Plan (City of San Diego 1997a and 1997b) and include recommendations for management and monitoring of the entire MSCP preserve system. Specific management goals for TRVRP have been identified in the TRVRP ASMDs.

TRVRP supports a wide range of native wildlife species, from invertebrates to large solitary mammals, many of which are covered by the MSCP. Specifically, the TRVRP bird population is outstanding compared to many other San Diego County open space preserves, and the extensive riparian corridor provides opportunities for wildlife movement across this part of the region. Many agencies and interest groups monitor regional biodiversity within San Diego County, including TRVRP, and wildlife diversity is well documented. These include the United States Geological Service (USGS), San Diego Natural History Museum (SDNHM), San Diego Chapter of the Audubon Society, the USFWS, and CDFG.

In contrast to the diversity and abundance of bird species, however, non-native species are numerous in TRVRP, and many of the Park's habitats are affected by human activity. The Park's location along the international border and associated border activities, including the construction of the triple border fence, Border Patrol traffic, and illegal immigration, pose a challenge to the integrity of TRVRP's biodiversity. Historic and current land uses, including sand mining, flood control, agriculture and recreational use, have left scars on the landscape and deteriorated many of the Park's native habitats. Although the Tijuana River's floodplain contains one of the largest and most productive riparian systems in the County, some of these riparian habitats have been invaded by invasive species such as tamarisk and giant reed, which grow dense specifically at the native habitat edges where edge effects and disturbances from adjacent land uses are more prominent. The Tijuana River extends only six miles into the United States from the international border to its confluence with the Pacific Ocean; the largest part of the river flows through Mexico. The river's delta creates one of the most productive estuarine ecosystems in California and its riparian ecosystem through TRVRP effectively shields the Tijuana Estuary from environmental damage. However, the significant amounts of sediment, pollutants, and trash being transported across the international border through frequent flooding of the river and the associated environmental problems are well documented.

4.1 Habitats and Vegetation Communities

The results from the 2009 habitat monitoring plots and vegetation mapping surveys illustrate the high overall level of habitat degradation within TRVRP, most likely due to a long history of human use, including agriculture, equestrian use, and activities by illegal immigrants and Border Patrol. Similar conditions were reported in the 2005 baseline report (the data between 2005 and 2009 are not directly comparable because different survey and data analysis methods were used). However, construction of the border fence and associated impacts to large expanses of habitat along the international border constitute a significant increase in habitat deterioration since 2005. Not documented in monitoring survey results are impacts related to flooding and debris/sediment transport across the international border, which are well documented. Efforts are currently underway by the City and County of San Diego and numerous non-profit organizations to install flood controls and organize clean-up events.

Specifically, the more instable habitats in the region, those that don't recover easily from disturbance and tend to type-convert (e.g., coastal sage scrub habitat converting to non-native grassland) are most in jeopardy of degradation and the associated native species loss. The construction area for the border fence and associated security zone (a swath of land that ranges in width between 150 and in excess of 300 feet) has been cleared in the years 2008/2009. In this process, sensitive species and habitats present in these areas, including southern maritime scrub, coastal sage scrub, wart-stemmed ceanothus and Palmer's sagewort, have been removed without compensation or replacement. Coastal sage scrub habitat on TRVRP is occupied by the federally threatened California gnatcatcher and habitat integrity is important for this bird's continued survival.

Species richness is highest in willow riparian habitats that are characterized by a high species diversity and high diversity in stratum and structure. Riparian habitats also exhibit the highest percent cover of native species, despite that fact that invasive exotics, such as tamarisk and giant reed, proliferate along the habitat edges. However, the amount of high functioning riparian habitat at the core of the Tijuana River floodplain trumps the amount of invasive exotics present in the riparian habitats at TRVRP. The lowest species richness is found in coastal sage scrub, which is also highly affected by non-native species coverage. As a group, chaparral habitats at TRVRP display the second highest native species cover after riparian habitats. Generally, coastal sage scrub, mule fat scrub and non-native grasslands display the highest amount of non-native species. While the most invasive species, giant reed and tamarisk, are largely confined to the riparian habitat edges, the most problematic non-native species at TRVRP are those that have invaded every habitat type in the Park to some degree. These species form

dense monocultures on the mesa tops and the transitional riparian habitat edges and should be targeted for intensive management; they are:

- Red brome (*Bromus madritensis* ssp. *rubens*)
- Ice plant (*Mesembryanthemum crystallinum*)
- Crown daisy (*Chrysanthemum coronarium*).

4.2 Plants

Several sensitive plant species were observed at TRVRP in 2009, including Baja birdbush, wart-stemmed ceanothus and coast barrel cactus. The latter two species are MSCP covered species. Additional sensitive species were reported from Greystone 2005; however, these species are not covered by the MSCP and were not identified during the habitat monitoring surveys conducted in 2009. The Orcutt's bird's beak was not observed in 2009, but has been previously reported. The species occurred in an area of maritime succulent scrub that experiences potential encroachment by invasive species, including crown daisy. As stated in Table 3-5 of the MSCP, the species is sensitive to edge effects and the population at Goat Canyon/Spooner Mesa is considered high monitoring priority. Presence of this species must be confirmed and MSCP monitoring methods reviewed to manage this species according to MSCP criteria.

4.3 Wildlife

4.3.1 Herpetofauna

The data collected during 2009 monitoring surveys reflect a high abundance and low diversity of herpetological species. A full comparison to the 2005 results is not possible at this time because the 2005 study evaluated a total of 10 trapping arrays, half of which were trapped during the 2009 study. Therefore, percent total of captures cannot be compared between 2005 and the 2009 dataset; however, data comparisons will be possible once a few full data sets have been collected.

The most captures at TRVRP in 2009 occurred in Array #9, which is located at the slope of Spooner Mesa in high quality coastal sage scrub near southern mixed chaparral. Array #8, located in disturbed maritime succulent scrub, did not capture the diversity and abundance of species otherwise expected from this habitat. This may be due to the array's location adjacent to crown daisy-dominated habitat, which is typically depauperate of native species. The maritime succulent scrub habitat at the mesa is in declining condition and may, therefore, provide lesser quality habitat for the reptiles expected there.

The orange-throated whiptail, a MSCP-covered species, is well represented in the Park. The other MSCP-covered reptile, the coast horned lizard, was not documented in the pitfall trapping studies in 2005 and 2009. The diversity and richness of herpetological species is directly reflected by the habitat integrity in the Park, and species associated with degrading habitats, such as coastal sage scrub, may experience a slow decline.

The 2009 data for TRVRP show that a large number of species that have historically been documented in the Park (including in 2005) were not captured, including the following species: California legless lizard *(Anniella pulchra*), coast horned lizard, red diamond rattlesnake (*Crotalus ruber*), western rattlesnake (*Crotalus oreganus*), long-nosed snake (*Rhinocheilus lecontei*), and western spadefoot (*Spea hammondii*). Based on regional distribution maps and San Diego Natural History Museum records, the following species could potentially occur in the Park: Pacific tree frog (*Pseudacris regilla*), western toad (*Bufo boreas*), garden slender salamander (*Batrachoseps major*), glossy snake (*Arizona elegans*), ring-necked snake (*Diadophis punctatus*), western whiptail (*Aspidoscelis tigris*), western banded gecko (*Coleonyx variegates)*, western patch-nosed snake (*Salvadora hexalepis*), and western thread snake (*Leptotyphlops humilis*). Continued monitoring according to Table 3-5 (City of San Diego 1997b) is needed to evaluate whether this is an ecological trend versus an effect of the stratified monitoring methodology.

4.3.2 Avifauna

TRVRP contains a wide variety of avian habitat. The high diversity of migrants and breeding species supported by the Park and adjacent areas is exceptional. There are few other comparable large areas of riparian habitat in coastal Southern California. The work documented in this report accounted for 67 bird species, but many more have been recorded (Unitt 2004). Many species are able to adapt to the variably disturbed nature of some of the Park's habitats. However, others such as the least Bell's vireo require relatively undisturbed dense willow riparian vegetation, which still exists largely at the core of the riparian habitat associated with the Tijuana River.

The TRVRP contains areas designated as critical habitat for both the least Bell's vireo and southwestern willow flycatcher (Greystone 2005). The vireo, once in steep decline from brown-headed cowbird parasitism and compromised habitat, has responded range-wide to trapping and removal of that species and increased in population. The southwestern willow flycatcher, on the other hand, has not (Barbara Kus pers. comm.). Maintaining large tracts of undisturbed habitat will sustain the vireo and possibly assist it to develop instinctive defenses against parasitism (Kus and Whitfield 2005).

Other areas including freshwater marsh, eucalyptus woodland, non-native grassland, and upland areas of Diegan coastal sage and maritime succulent scrub provide habitat for a variety of breeding and migrant species. However, the MSCP-covered rufous-crowned sparrow was recorded in low numbers during the 2009 point count surveys. The unintended occasional introduction of individuals of exotic species from a variety of sources has added to the TRVRP's native avifauna. The best known of these are the black-throated magpie-jay (*Calocitta collie*) and northern cardinal (*Cardinalis cardinalis*); however, comparably mundane species of even more obscure origin such as the nutmeg mannikin (*Lonchura punctulata*) are also present. To date, the magpie-jay and cardinal have bred in very small numbers in the TRVRP, but it is unproven that they can continue this without a contributing source near the border such as aviaries or pet stores. Natural dispersal from their native range is impeded by distance and intervening incompatible habitat. No exotic species are currently considered to have a major impact on native avifauna in the TRVRP. However, infrastructure construction projects, including trail management, require site-specific surveys to avoid impacts to sensitive species, including the California gnatcatcher and raptor species, specifically in the coastal sage scrub and grasslands areas.

Light-Footed Clapper Rail

The TRVRP is located immediately east of the Tijuana Marsh National Wildlife Refuge (NWR). One hundred and forty-two pairs of light-footed clapper rails were present at this site in 2007 (Zembal et al. 2008), the second largest population in the state. They occur there as a permanent resident of coastal salt marsh traversed by tidal sloughs characterized by cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia* spp.). Light-footed clapper rails have also been documented in freshwater marsh characterized by cattails and bulrush at Buena Vista, Agua Hedionda, Batiquitos, San Elijo, and San Dieguito Lagoons in San Diego County (Zembal et al. 2008), as well as the San Diego River; and in spiny rush (*Juncus acutus*) at Naval Air Station Point Mugu.

The TRVRP is likely a natural dispersing corridor for the rails at the Tijuana Marsh NWR. The habitat quality of the northern Dairy Mart pond is very good quality for wintering and breeding. The north Tijuana River channel is much more tenuous, but as long as freshwater marsh habitat is present, it remains viable as light-footed clapper rail habitat. The southern Dairy Mart pond appears to undergo some seasonal variation in water level, and the quality of rail habitat varies from none to poor. According to Table 3-5 (City of San Diego 1997b), conservation and maintenance of wetlands habitat is paramount for the conservation of this species.

Southwestern Willow Flycatcher

Willow flycatchers nest only in dense riparian vegetation associated with streams, rivers, lakes, springs, and other and other watercourses and wetlands (Sogge et al. 1997). Additionally, in San Diego County, willow flycatchers breed in streamside areas dominated by coast live oak (*Quercus agrifolia*) (Finch and Stoleson 2000). The southwestern willow flycatcher is an obligate riparian species and typically inhabits structurally diverse woodland along watercourses. Although the species is currently absent, suitable riparian habitat for the southwestern willow flycatcher is present within the survey area. The species is somewhat colonial; pairs defend very small territories in close proximity to neighbors of the same species (Prescott and Middleton 1988). According to bird atlas data (Unitt 2004), the species is only found nesting in colonies in the following two locations: the upper San Luis Rey River between East Grade Road and the La Jolla Indian Reservation, and along the Santa Margarita River in Camp Pendleton. However, four newer sites along the lower San Luis Rey River were also found during the atlas period. Nesting of a single pair was confirmed on Agua Tibia Creek while several pairs were confirmed along the San Dieguito River between Lake Hodges and Tim's Canyon. Two pairs were found on the upper San Diego River past El Capitan Reservoir and a small colony was found near Paroli Spring in the San Felipe Valley. In 2002, another pair was found elsewhere in the San Felipe Valley. It is unclear why the southwestern willow flycatcher has not been recorded in the Tijuana River Valley and specifically within the Park, or other suitable habitat in the region. It is conceivable that the colonial nature of the bird would require that resident birds would need to be present to attract additional birds to move into the area.

Since suitable habitat for the southwestern willow flycatcher is present within the survey area, it may nest here in the future provided that the riparian forest and open water are prevented from degrading. Although the majority of the riparian forest in the Park contains proper habitat for flycatchers, small portions are dominated by weedy annuals such as black mustard, crown daisy, and patchy stands of mule-fat. In areas of mature riparian forest, the canopy is composed of well developed Goodding's black willow, arroyo willow, narrow-leaved willow, and a variety of non-native species including giant reed, castor bean, Brazilian pepper (*Schinus terebinthifolius*), and occasionally salt cedar. The shrub layer within the survey area at the north end of Dairy Mart Road is minimally developed in most places and generally comprised of younger growth of the previously mentioned species. In the southern survey area, vegetation is frequently dense to the point of being impenetrable. Just west of the Dairy Mart Road bridge, there are patchy, treeless thickets with dense desert fragrance (*Hymenoclea monogyra*), mule-fat, cocklebur, crown daisy, and black mustard. Saltbush (*Atriplex* spp.) grows in scattered

patches while cocklebur is sometimes fairly widespread. The ground cover/herb layer under the densest trees contains extensive detritus except for minimal patches of garden nasturtium (*Tropaeolum majus*) and a few other invasives.

Brown-Headed Cowbird

The brown-headed cowbird is largely granivorus (seed eaters) and consumes grain and seed remnants found in cattle and horse droppings. It was historically not present in southern California, but moved westward to follow the expansion of cattle grazing toward the west. The County population has increased due to elimination of native shrub habitat which frequently results in weedy open space or type-conversion to non-native grassland. Wooded areas adjacent to these open areas and containing host species provide ideal habitat for the brown-headed cowbird. The increase in cowbirds has led to a decrease in some species, in particular, the least Bells vireo. In such a vast riparian area as is found in TRVRP, it is likely that cowbirds find hosts in many species but large populations of host species can generally offset losses to cowbirds. At this point, the overall effect of the species presence cannot be determined except to note that the least Bells vireo population in the TRVRP has been expanding and seems to be healthy. Past brown-headed cowbird trapping programs (Greystone 2005) implemented by the County have likely contributed to the increasing vireo population. Increased equestrian use in the riparian corridor may encourage the expansion of the cowbird population due to the presence of horse manure, which contains seeds and grains as a food source for this species.

Raptors

The grassland raptor surveys results from these late spring/early summer surveys should be considered a very limited view of raptor usage in the TRVRP as data from National Audubon Society's San Diego Christmas Bird Count (National Audubon Society 2002) and Unitt (2004) suggest a modest increase in the raptor population during the winter months. This would include wintering and migrant golden eagles from out of the area (Unitt 2004). Wintering surveys would also assist in a more comprehensive dataset of such MSCP-covered species, such as the Cooper's hawk and peregrine falcon, which occur at TRVRP, but were not present in the expected abundance during the 2009 surveys. Conservation and management of grasslands raptors at TRVRP, including northern harrier, per Table 3-5 (City of San Diego 1997b) requires the addition and conservation of grassland habitats in preserves. The San Diego County Water Authority Wetlands Mitigation Project eliminates nesting habitat for the harrier; however, sufficient harrier habitat remains at TRVRP and surroundings (San Diego County Water Authority 2008).

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5.0 MANAGEMENT RECOMMENDATIONS

Management of biological resources at TRVRP should ultimately strive to fulfill provisions in Table 3-5 of the MSCP (City of San Diego 1997a) and the following goal as identified in the MSCP Framework Management Plan for the Tijuana River Valley (City of San Diego 2007b):

> *The optimum future condition for the Tijuana River Valley is a broad natural floodplain containing riparian and wetland habitats, and bounded by high mesas and deep canyons with chaparral, sage scrub, and grasslands. The natural habitat would be intermixed with compatible agricultural, recreational, and water quality improvement activities, all functioning in concert to maintain and enhance natural ecosystems and processes, water quality, and the full range of native species, and to generally improve the local quality of life and the environment.*

The following MSCP-covered species are identified as management targets in the MSCP Framework Management Plan for TRVRP:

Plants	**Animals**
Orcutt's bird's beak	California gnatcatcher
Coast barrel cactus	Cooper's hawk
Shaw's agave	Least Bell's vireo
Wart-stemmed ceanothus	Northern harrier

As described in this document, balancing biological resources management and human uses at TRVRP is challenging, albeit important for the following reasons:

- Preserving the buffer functions of riparian habitats to protect the Tijuana Estuary;
- Maintaining the integrity of one of the largest riparian ecosystems in San Diego County;
- Conserving the function of sensitive habitats unique to southern California;
- Conserving the diversity of sensitive and MSCP-covered species.

This report includes the results from select 2009 MSCP monitoring surveys at TRVRP, and discusses these results relative to previous surveys results (Greystone 2005) and MSCP-associated management recommendations (County of San Diego 2007; City of San Diego 1997a/b). While these early results allow for a limited number of management recommendations, the majority of adaptive management decisions require multiple years of data collection. Adaptive management is based on the analysis of

scientific data, often requiring multiple years to data collection to develop a comprehensive baseline, and resulting informed decision making (Atkinson et al. 2004). For example, comprehensive, site-specific studies regarding the status of the cowbird and black-throated magpie-jay at TRVRP and their effect, specifically on least Bell's vireo, would provide data to develop an adaptive management program specific to the control and management of these parasitic bird species. Or, a comprehensive, site-specific survey of the Orcutt's birds beak, a plant previously reported from the TRVRP mesas but not recently observed, would help identify whether a specific monitoring program should be developed and implemented at TRVRP. In turn, multiple years of data collection can also refine the approach and methodology for long-term monitoring at the Park.

Preserve-level monitoring protocols have not yet been developed in San Diego County, with the exception of sensitive plant survey protocols (McEachern et al. 2007), the development of which are currently in progress. USFWS, USGS and SDSU are presently designing regional MSCP monitoring protocols, some of which have been adapted to the preserve-specific scale; however, no long-term data exist on the usefulness and validity of these protocols relative to informing adaptive management and long-term trend monitoring. When applying monitoring protocols to the preserve-level, the following key aspects of an effective monitoring program need to be considered:

- The monitoring study must be carried out over long periods and designed to account the natural variability of the system;
- The monitoring study must be designed using the best available ecological concepts, study design, and principles;
- The data must be collected in a consistent and well-documented manner to achieve required continuity and reliability; and
- The program should be designed to detect changes and impacts based on sound statistical analyses.

The following sections describe management and monitoring recommendations for TRVRP. Some of these recommendations would require additional funding for pilot studies necessary to collect adaptive management data. Funding may be available through local assistance grants from CDFG and EMP grants from SANDAG, and coordination with academic institutions (including master thesis/dissertation research and other academic grants). When applying for funding, care must be taken to properly evaluate sampling design including adequate sampling size and allocation of sampling effort (McDonald 2002). In the future, sufficient funding should be allocated to hypothesis formulation for each monitoring target, the implementation of statistically

robust sampling design (including spatial and temporal variance), data quality and statistical power at the start of each monitoring effort (Legg and Nagy 2005).

5.1 Habitats and Vegetation Communities

As documented by habitat monitoring results, TRVRP's habitats experience disturbance and degradation due to intense human uses. This is more prevalent in the Park's upland communities and the fringes of riparian habitats. In addition, flooding affects the Park's habitat significantly on a regular basis.

5.1.1 Long-Term Monitoring Approach

Future monitoring studies in TRVRP should be designed to specifically target human impacts on native habitats in the Park. Specifically, invasive species removal and the active restoration of unauthorized trails would benefit the Park's habitats and associated MSCP-covered species. Specific public use recommendations are included in Section 5.6 below. The County should encourage and participate in cooperative agreements with other agencies, including the City of San Diego and Non-Governmental Organizations (NGOs), as well as apply for monitoring grants (e.g., from the San Diego Foundation, or through local assistance programs from CDFG and the SANDAG EMP) that would fund extensive invasive species control, active restoration, flood and access control, and public education.

5.1.2 Long-Term Habitat Monitoring Program Design

The following recommendations are specific to informing long-term habitat monitoring design for the Park.

- **Timing of monitoring surveys.** In order to take full advantage of the range of spring-blooming forbs, habitat monitoring surveys should occur in April. The County should continue to coordinate survey methods and schedule with regional habitat monitoring surveys.
- **Reducing quadrat sampling in grasslands**. Plant communities with low overall species diversity, low native species cover, and low plot to plot variability (e.g., non-native grassland habitat) could be monitored with less plots/community or by using only the point-intercept method (Spring Strahm pers. comm. 2009). Quadrats are very time intensive and may not provide much additional information. In the future, it may be recommended that quadrats not be used to monitor grasslands. However, one or two additional years of monitoring during good rain years should be conducted before this decision is made.

- **Monitoring protocol for riparian vegetation communities.** Research is being conducted by SDSU to determine the most efficient and cost effective means to monitor habitat for the MSCP program. However, these efforts are currently restricted to coastal sage scrub and chaparral habitat. The County should continue to coordinate with the efforts to revise habitat monitoring methods for the MSCP, and revise monitoring protocols for grassland and riparian habitat as necessary.

- **Monitoring frequency.** The timing and amount of rainfall can dramatically affect the lifecycle in plants, especially in annual species. Blooms and vegetative structures are important in species detection and identification. Therefore, monitoring should be conducted often enough to capture this natural background variation. On the other hand, shrub and tree species tend to change little over time, and too-frequent monitoring may not be cost effective. However, if monitoring is too infrequent, it may take decades before enough data are collected to detect trends. It is therefore recommended to conduct annual monitoring for the first three to five years and long-term monitoring every three years thereafter. If long-term monitoring falls on a drought year, monitoring can be deferred for another year or two. However, no more than five years should pass without monitoring.

- **Sampling design**. Capturing spatial and temporal variance in habitats is important to monitor long-term habitat trends (Larsen el al. 2001; Urquhart and Kincaid 2006). When conducting regular habitat monitoring surveys at TRVRP, develop a sampling design that employs a combination of rotating and fixed panel designs. Fixed panels or sentinel plots (stationary plots) capture temporal variations, whereas rotating panels capture spatial changes. The sampling design for TRVRP should incorporate both methods, in which rotating plots should be monitored more frequently (e.g., annually) and sentinel plots less often (e.g., every three to five years). Specifically, during the second monitoring year, none of the habitat monitoring plots surveyed in 2009 should be revisited; rather, new plots should be located to capture spatial variability of the Park's habitats (including edge effects). However, a statistically robust number of stationary plots from this complete sample should be revisited every five to ten years to capture changes over time. The sampling design for TRVRP should be developed prior to the next habitat monitoring visit.

- **Feedback loop.** In coordination with SDSU's refinement of the regional MSCP habitat monitoring protocols, develop feedback loops to inform adaptive management, including criteria that trigger specific management actions and prioritization tools to focus resources on habitat restoration.

5.2 Plants

MSCP-covered and other sensitive plants targeted for management in the TRVRP ASMDs either occur in the Park or have historically occurred there. The following targeted monitoring studies should be conducted to document presence/absence and distribution of the plants.

- **Orcutt's bird's beak** is an MSCP-covered target species for TRVRP; however, the species has not been observed during focused surveys in the year 2005 and the 2009 habitat monitoring surveys. A comprehensive focused survey for at least two consecutive years should be conducted during good rain years at the appropriate time of year (April – July). Surveys should focus on the plant's habitat, in maritime succulent scrub in which previous observations have been recorded. If found, annual species-specific surveys should be conducted using methods to be determined. Monitoring survey methods should adhere to the plant monitoring method revisions currently being developed by USGS (McEachern et al. 2007 and revisions, in progress).
- **Coast barrel cactus and wart-stemmed ceanothus**. Habitat based surveys for these species should be continued using the habitat monitoring protocols identified by SDSU. Management triggers and criteria should be developed particularly for these two species (see Section 6.1.2). Both species should be included in plant palettes of any upland habitat restoration projects.
- **Shaw's agave**. Shaw's agave (*Agave shawii*) is an MSCP-covered narrow endemic species and almost extirpated in the U.S. It has not been documented within TRVRP, but is known from the Tijuana River valley. The only known wild occurrences in the U.S. are from a small stand near the Mexican border at Border Field State Park and from Point Loma. Continued habitat monitoring at TRVRP and infrequent comprehensive sensitive plant surveys (e.g., every 5-10 years) should be conducted to inventory the Park to potentially capture this species. Reintroduction of this species utilizing native seed as source material should be considered as part of habitat enhancement associated with trail restoration and the removal of crown daisy monocultures.
- **Baja California birdbush** is a rare species listed as endangered by the California State Endangered Species Act. Although not covered by the MSCP, a comprehensive survey for this species should be conducted in suitable habitat and the population identified and mapped. Focused surveys should be conducted at least every five years using photo monitoring plots; in addition, the plants should

be mapped (using GPS) the first year and checked every five years for signs of disease/stress, and for seedlings and natural recruitment.

5.3 Wildlife

Herpetological array monitoring should continue in the Park as described in the MSCP monitoring protocol for the first five monitoring years (five surveys every 3-5 years) to collect a thorough baseline of the Park's herpetofauna. However, we recommend that additional funding should be made available to facilitate more sampling events per monitoring year and to implement sampling as recommended in the Animal Monitoring Protocols (USFWS 2008). This allows for potentially reflecting more accurately the diversity and richness of the Park's herpetofauna as well as capturing species that are more active during the wet season (e.g., amphibians such as the arroyo toad and aquatic reptiles such as the southwestern pond turtle). After data collection from five monitoring years, the data analysis may show that monitoring frequency may be reduced.

5.3.1 Herpetofauna

- **Survey protocols.** It is expected that not all species reported from TRVRP would be present within the limited capture samples gathered during the 2009 monitoring study. In order to gain a more complete understanding of the herpetological species at TRVRP survey areas that are missed by the pitfall arrays (e.g., aquatic species at Dairy Mart ponds), and to reduce the frequency of future monitoring surveys, pitfall trapping results should be combined with one comprehensive visual survey every five years. Continued monitoring will result in a more comprehensive species list.
- **Management recommendations.** Invasive species removal, discontinuation of unauthorized trails, and active restoration of disturbed habitat and unauthorized trails may result in a recovery of the herpetological species diversity in TRVRP.
    - **Orange-throated whiptail**, a MSCP-covered species, is well represented in the Park; management of trails and restoration of unauthorized trails back to native habitat will benefit this species over time.
    - **Coast horned lizard**, also covered by the MSCP, was not documented in the pitfall trapping studies in 2005 and 2009. The coast horned lizard is sensitive to disturbance and prefers open upland scrub habitats in coastal areas, including coastal sage scrub and chaparral. These habitats are associated with its prey base, native ants. Non-native Argentine ants that have invaded disturbed habitats and habitats adjacent to developments

outcompete native ants and limit the lizard's food source, potentially affecting the abundance and distribution of coast horned lizard at TRVRP. The development of the border fence and associated disturbance and elimination of the lizards' preferred habitat, in addition to the expanse of unauthorized trails and abundance of disturbed habitats and agricultural land uses, may limit the distribution and abundance of this species. Coast horned lizards have historically been found at TRVRP (museum records), but the species has a documented low capture rate in pitfall traps; this may also account for the absence of this species in the 2005 and 2009 pitfall trapping studies. Active restoration of unauthorized trails and disturbed, non-native habitats (including crown daisy-dominated uplands) to coastal sage scrub may benefit the recovery of this species in the Park. In addition, an ant study would help determine the presence and distribution of the native harvester ant as a food source and the distribution of the non-native Argentine ant to determine whether this non-native species has an affect on the presence of the coast horned lizard.

5.3.2 Avifauna

- **Southwestern willow flycatcher** does not currently occur at TRVRP. In coordination with regional monitoring efforts for this species conducted by USGS/USFWS, evaluate the future necessity for flycatcher monitoring in the Park. If and when the species is positively identified as *E. t. extimus* (not *brewsteri*) during regional vireo monitoring surveys, TRVRP should be included as a monitoring location in the regional monitoring effort for this species. Before removing tamarisk to control invasive species in the riparian areas, literature describing the benefit of tamarisk dominated riparian habitat on nest success of the southwestern willow flycatcher should be carefully evaluated (Barbara Kus pers. comm.).
- **Light-footed clapper rail** habitat should be systematically surveyed at least every other year during the active mating season, and more preferably every year, following the USFWS animal monitoring protocol (USFWS 2008). Wetlands habitat should be monitored according to the MSCP habitat monitoring protocols (in progress for riparian and wetlands habitats) and invasive species be removed as indicated below to maintain viable habitat for this species.
- **Wintering raptors.** In order to comprehensively survey the raptor population at TRVRP, specifically grassland raptors, conduct wintering surveys in addition to breeding surveys. Golden eagle, white-tail kite and peregrine falcons are mostly

encountered during the winter months at TRVRP and raptors are generally more visible during winter months when deciduous trees in the region are void of their foliage. Wintering surveys should be conducted in December, January and February in addition to breeding season surveys. Raptor nesting habitats should be conserved and managed according to MSCP management criteria.

- **Northern harrier.** The species has successfully established nesting territories at TRVRP and nesting was observed in 2009. Nest monitoring through observation during the breeding season should continue for this species at least every other year as part of the County's MSCP monitoring and adaptive management effort. The County should ensure that harrier nesting habitat, which includes grasslands, agricultural areas and low-growing shrub communities, be conserved and managed.

- **Least Bell's vireo**. In coordination with regional monitoring efforts conducted by USFWS, periodically monitor least Bell's vireo population size, productivity, and incidence of cowbird parasitism. Look for trends that may suggest declining host populations. Although human (including equestrian) usage of the trail system is fairly light and generally concentrated along a few major trails, the establishment of new trails may generate unanticipated impacts to nesting birds. Closely monitor bird activity along new trails and, if needed, restrict usage seasonally in riparian areas of highest least Bell's vireo concentration. To manage the least Bell's vireo population, consider management of the following issues:

    - **Brown-headed cowbird.** Monitor the local population in riparian areas. Trapping efforts since the late 1980s have greatly reduced the species' numbers and subsequent parasitism of hosts. It is not clear that trapping needs to be continued at this point. However, due to the presence of horse manure, which contains seeds on which the cowbird feeds, cowbird numbers should be monitored. With increased numbers of host nests, the cowbird population may also increase. Cowbird trapping should be restarted if predation on least Bell's vireo increases exponentially (based on regional vireo monitoring results).

    - **Horse manure** should be regularly removed from equestrian staging areas and equestrian trails near and through riparian habitat. In order to develop an efficient and effective manure removal program, develop a pilot study to test whether manure removal is an effective cowbird management tool. Select several target areas around equestrian trails/staging areas from where cowbirds are known and divide them equally into treatment areas and controls. Over at least two breeding seasons, continually remove

horse manure in the treatment areas, but not in the controls. Measure the effects on cowbirds and brood parasitism to assist in the adaptive management of this species.

- **Black-throated magpie-jay**. This species is a member of the *Corvidae* family which is known to prey on eggs and young of other birds. Black-throated magpie-jays should be monitored to determine whether or not they pose a threat to the least Bell's vireo and other riparian species nesting in the TRVRP. If predation is detected, a black-throated magpie-jay eradication program should be implemented.

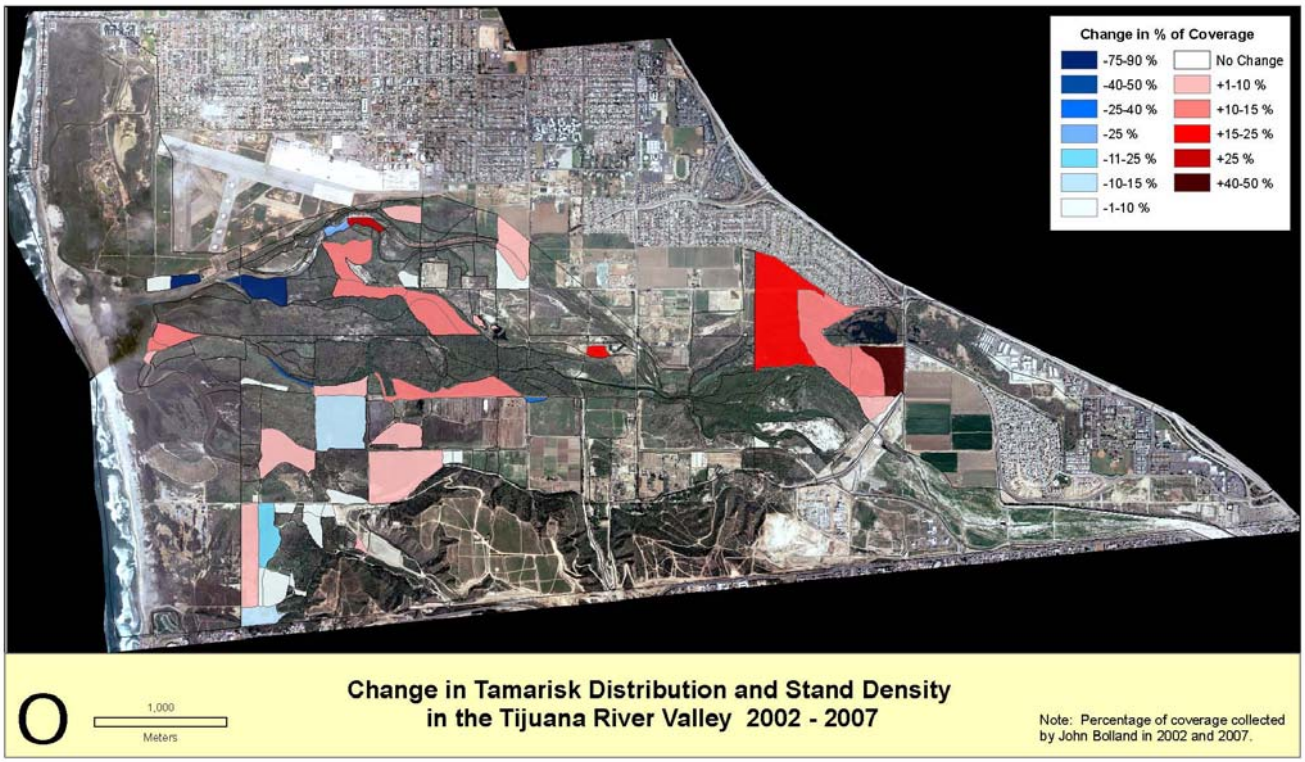
5.4 Invasive Species Removal

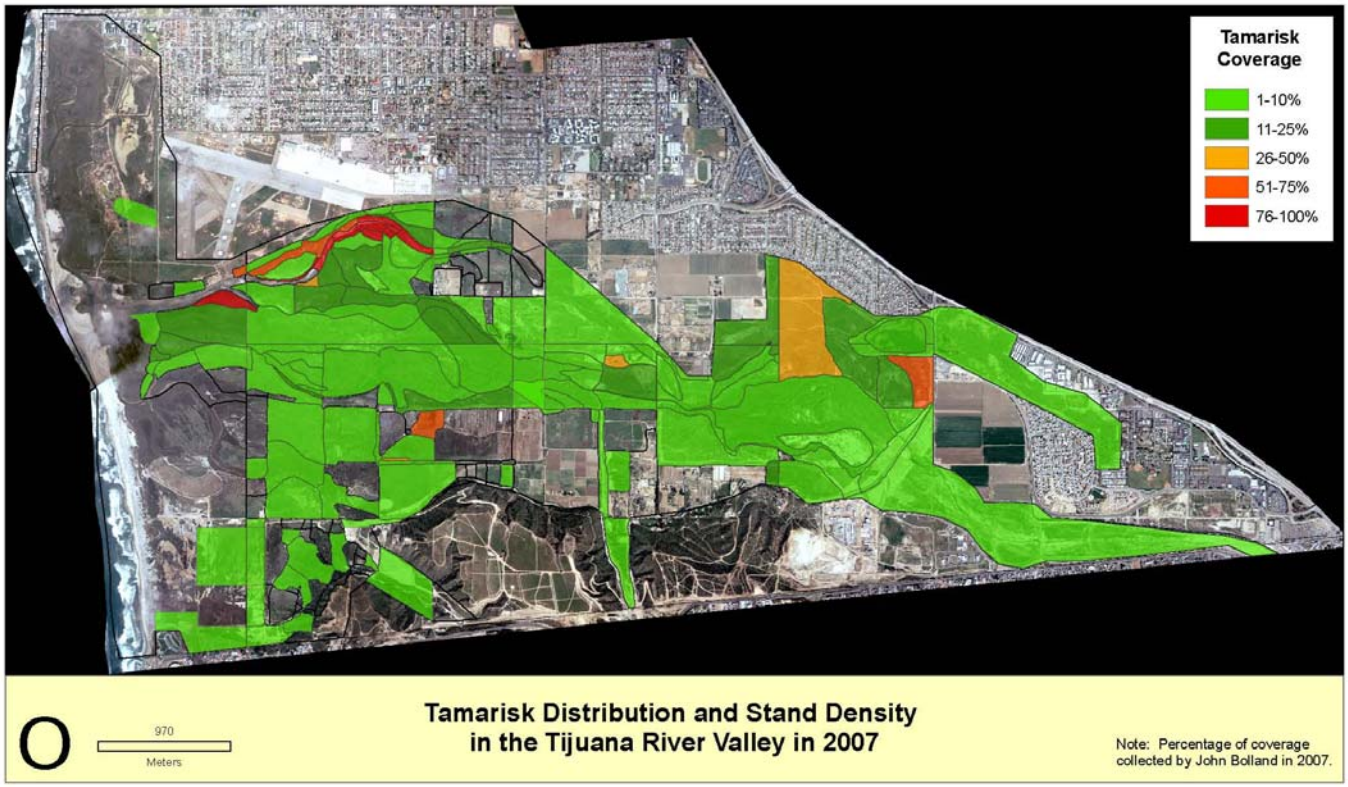
The most important management action for vegetation communities at TRVRP is a comprehensive invasive species removal program covering the entire Park, combined with active restoration and habitat enhancement, post restoration monitoring. Tamarisks have been removed in the estuary and the riparian habitats at TRVRP between the years 2002 and 2007 (Figure 16; John Boland pers. comm.). However, the prevalence of tamarisk in large areas of native habitat in the eastern portion of the Park still presents an exotic species removal challenge. Similar to the County's comprehensive invasive species removal and restoration program for the Otay River Valley Regional Park, a program tailored to TRVRP could be implemented in the Park. The invasive species program should target the removal of riparian invasive species such as giant reed and tamarisk along the Tijuana River floodplain as well as the Park-wide removal of such exotic upland species as crown daisy and ice plant.

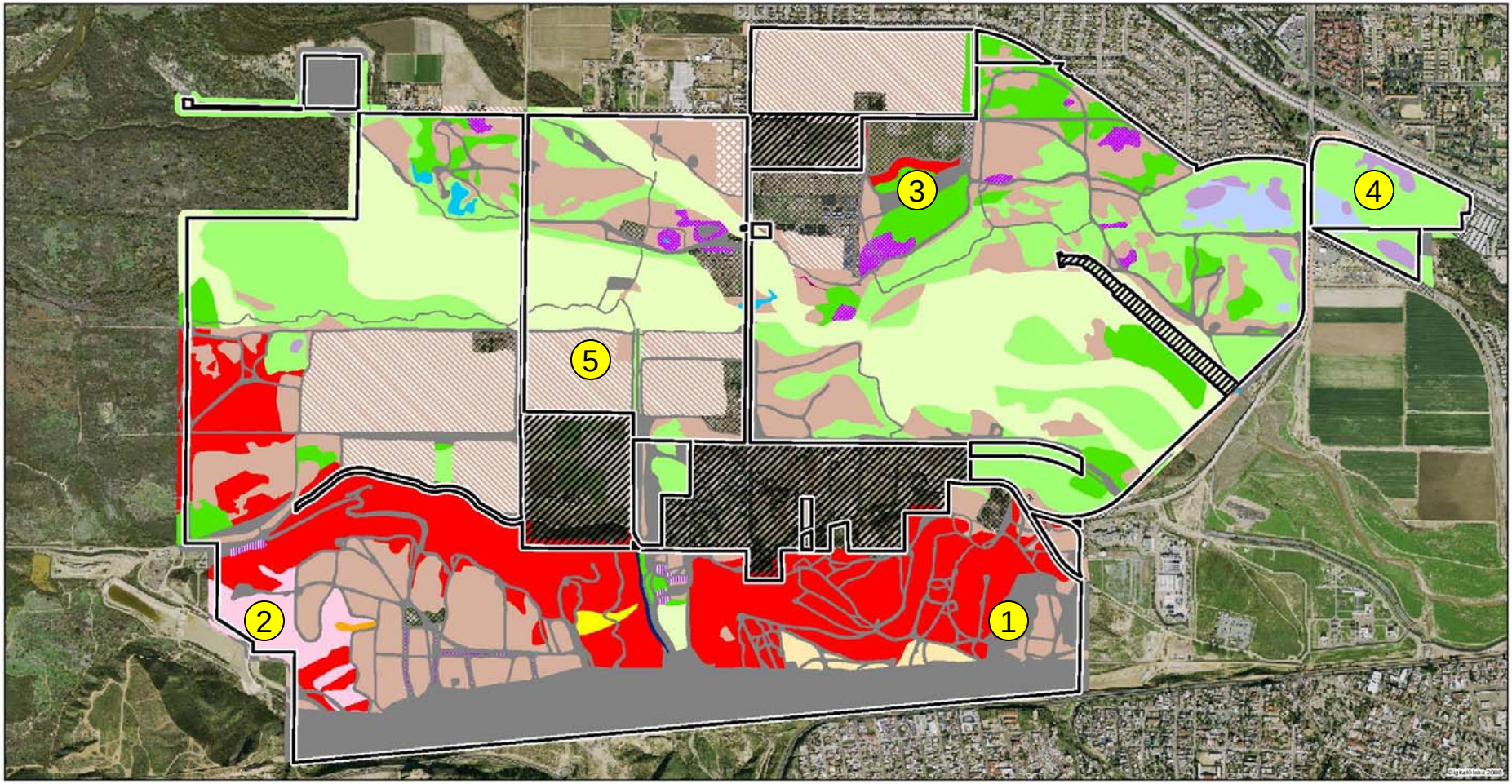
5.5 Restoration Opportunities

Active restoration of degraded habitats is paramount to the conservation of habitat integrity at TRVRP. Because of the environmental pressures present at the Park (including border-associated impacts, agricultural practices, and equestrian recreation) and the resulting spread of invasive and non-native species, passive restoration will likely not be effective, and would require very costly intensive monitoring. Active restoration should be part of any invasive species removal to provide less area for reinvasion. In addition to all decommissioned and unauthorized trails, the following areas and habitats would benefit from active restoration (these areas are listed on Figure 17 by the number they appear below):

1. Degraded coastal sage scrub habitat at the abandoned sand and gravel operation on the south-east mesa west of Monument Road ("Badlands"); this is a high priority project for the County and is currently being planned.


Change in % of Coverage
-75-90 %
-40-50 %
-25-40 %
-25 %
-11-25 %
-10-15 %
-1-10 %
No Change
+1-10 %
+10-15 %
+15-25 %
+25 %
+40-50 %
1,000
Meters
Change in Tamarisk Distribution and Stand Density
in the Tijuana River Valley 2002 - 2007
Note: Percentage of coverage collected
by John Bolland in 2002 and 2007.


Tamarisk
Coverage
1-10%
11-25%
26-50%
51-75%
76-100%
970
Meters
Tamarisk Distribution and Stand Density
in the Tijuana River Valley in 2007
Note: Percentage of coverage
collected by John Bolland in 2007.



MSCP Year 2009 Monitoring
TRVRP

Potential Restoration Areas

Figure 17

2. Maritime succulent scrub at the western Spooner Mesa toward Goat Canyon (enhancement to prevent encroachment of non-native species).
3. In and around degraded area at the extension of International Road, south of the ball fields along Sunset Avenue (restoration of riparian and transitional riparian habitat, including mule fat scrub); East Dairy Mart Pond: expanding open water and cattail marsh to provide habitat for light-footed clapper rail and southwestern willow flycatcher as well as water fowl.
4. Active restoration as part of the Water Authority's wetland mitigation bank creation (Figure 5). This project is also in the planning stages. Care should be taken that the riparian and wetland habitat creation goals are achieved, that berms are removed to widen the floodplain (per goals identified in the MSCP), and that the site is managed and maintained for wetlands function, including invasive species removal.

5.6 Additional Management Recommendations

TRVRP is intended for public use; however, recreational and access pressure and associated effects on the Park's biological resources was significant at the time of the 2009 monitoring surveys, including equestrian and Border Patrol use of both authorized and unauthorized trails and border fence construction traffic. Public access, trail management, clean-up and public education and coordination efforts are required per the TRVRP ASMDs to manage the Park in perpetuity as a public resource. The following recommendations are made based on incidental observations from 2009 monitoring surveys.

5.6.1 Public Use and Access

- Restrict activities that degrade habitat within the Park. These activities include unauthorized clearing or alteration of riparian vegetation and activities that would lead to habitat fragmentation or invasion with exotic species, loss of northern harrier nesting habitat, or that would cause insufficient or inappropriate water levels leading to loss of willow riparian or wetland habitat suitable for the light-footed clapper rail.
- Increase ranger patrols and enforcement of restrictions on prohibited and unauthorized activities as detailed in the TRVRP ASMDs, specifically those observed activities such as grading, excavation, placement of soil, sand, rock, gravel or other material, clearing of vegetation, off-road vehicular activities, and trash dumping.
- When planning infrastructure projects (including trail system), conduct focused surveys in sensitive habitats (including riparian habitats, chaparral, coastal sage scrub,

and maritime succulent scrub) to avoid impacts to sensitive biological resources and review projects against the provisions of MSCP and ASMD management requirements.

5.6.2 Trails and Access Roads

- Implement the County's TRVRP Trails and Enhancement Project (County of San Diego 2006), including the creation of a 22.5-mile multi-use trail system, habitat restoration, and equestrian staging. The bridge across the Tijuana River, as specified in the trails and enhancement project, will be reconsidered based on the City of San Diego's creation of a new pilot channel in the river.
- Based on the trails plan (see above), close all unauthorized trails using physical barriers (e.g., large boulders or split rail fencing) and avoid circumvention of the barriers. In addition, all unauthorized trails should be actively restored.
- Increase ranger patrols to enforce trail closures. Rangers should also continue to closely collaborate with the Border Patrol (see below).
- Post signage at trails that indicate the trail closure and the primary reason for the closure (steep slopes leading to erosion issues, sensitive biological resource impacts, etc.). Whenever possible, postings should also include a suggested substitute route. Signs should also include a contact phone number.
- During ranger patrol, collect data to indicate whether there is continued use of closed trails, the type of use, to determine if the closures and methods of closures are effective. Re-evaluate and redesign ineffective barriers.

5.6.3 Signage and Education

- Coordinate with the U.S. Border Patrol regarding habitat restoration and patrol activities, with the goal of avoiding and/or minimizing damage to habitats and habitat restoration projects. This would include a negotiated agreement with the Border Patrol and user groups to cease usage and accept closure of specific trail segments.
- Develop an outreach/education program tailored to Border Patrol personnel highlighting the ecological importance of biological resources within TRVRP. The program should include a protocol that informs the Border Patrol about the timing and location of specific activities, identifies personnel and vehicles involved in restoration activities, and delineates boundaries to avoid damage to restoration areas specifically during routine patrol activities.

- In association with the development of the official trail system, provide additional educational trail-side signage and educational kiosks. In addition, signage provided at access points and on trail maps provides a form of education.
- When possible, develop, organize and conduct interpretive walks or programs guided by rangers, park aides, or volunteers/volunteer organizations.

5.6.4 Litter/Trash Removal

- Continue large scale clean-up efforts in the Park on a regular basis, not only immediately prior to impending flood events. Large amounts of trash and debris are frequently washed across the international border from Mexico through the Tijuana River floodplain. These effects have been well documented. Clean-up efforts are currently underway and are being conducted as funding allows through inter-agency coordination efforts (e.g., Tijuana River Valley Recovery Team).
- In order to protect riparian habitats and MSCP-covered riparian birds such as the least Bell's vireo, implement a manure removal program. Manure removal should be conducted and inspected on a regular basis based on results of a pilot study as detailed in Section 5.3.2 or this report.

5.6.5 Hydrological Management

- In coordination with the City of San Diego and the Tijuana River Valley Recovery Team, conduct a hydrological study of the entire Park to study the effectiveness of the Park's current water conveyance and flood control system. This study should also take into consideration the San Diego County Water Authority's planned mitigation bank south of the river. Hydrological conveyance has been a historical challenge and has even further deteriorated since the construction of the border fence. A box culvert was created in Smuggler's Gulch to facilitate flows of the tributary to the Tijuana River; however, water conveyance during flood events is significantly inhibited due to the large of amount of debris traveling through the culvert. The City of San Diego has begun to clean out the pilot channel in the river.
- Allow flooding of the Tijuana River floodplain to adequately sustain riparian and wetland habitats in the valley while protecting human lives and livestock. Avoid constricting the floodplain as much as feasible to avoid significant scour and damage to native habitats and sensitive biological resources.

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Appendix A:

Detailed Monitoring Methods

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The following contains the survey methods for habitat monitoring, herpetological pitfall array surveys and light-footed clapper rail survey in detail that exceeds the summary provided in the TRVRP Monitoring Report.

Habitat Monitoring Field Methods

Selecting Monitoring Locations

The TRVRP vegetation monitoring was conducted pursuant to the draft protocol identified in pilot vegetation monitoring studies conducted for the California Department of Fish and Game (CDFG) by San Diego State University (SDSU).

A total of 15 permanent monitoring stations (plots) were selected randomly within each mapped vegetation community category and pursuant to a select list of restricted randomization criteria (e.g., random plot locations still must meet specific criteria, including accessibility and percent slope) as described below. The number of stations was chosen in an attempt to balance funding availability with broad coverage of vegetation types and geography within the Park. SDSU researchers (Deutschman and Strahm 2009) are currently monitoring nine coastal sage scrub/maritime succulent scrub plots[1] within TRVRP as part of SDSU's MSCP habitat monitoring pilot study. Therefore, the 15 plots ere selected from the following vegetation communities for the Year 1 effort to avoid duplication of habitat monitoring in the Park and to create a comprehensive baseline for TRVRP habitat monitoring:

- **Grassland (3 plots)**
    - 2 plots in the vicinity of known nesting/foraging areas of the northern harrier (*Circus cyaneus*), but at least 50 m from nest identified by TAIC in 2009.
- **Coastal sage scrub (1 plot)**
    - In the vicinity, but at least 50 m from northern harrier nest
- **Maritime succulent scrub (1 plot)**
    - Within an area of recorded coast barrel cactus (*Ferocactus viridescens* var. *viridescens*) and Orcutt's bird's beak (*Cordylanthus orcuttianus*) locations
- At least 100 m from SDSU vegetation monitoring plots
- **Southern mixed chaparral (1 plot)**
- **Southern maritime chaparral (1 plot)**
    - Within an area of known wart-stem-lilac (*Ceanothus verrucosus*) locations

[1] Maritime succulent scrub was not differentiated from coastal sage scrub; all plots were labeled as coastal sage scrub habitat

- **Mule Fat scrub (2 plot)**
- **Southern willow scrub (3 plots)**
- **Southern willow riparian forest (3 plots)**
    - At least 1 plot in each of two major river channels.

Stations in coastal sage scrub, grassland, and mulefat scrub were selected at least 30 m from disturbed or developed areas to reduce edge effects, and no more than 300 meters from a road or trail to ensure accessibility. Due to the extensive network of roads, and trails, however, this was not always possible. In addition, some of the more dense habitats (chaparral, riparian forest, and willow scrub) were difficult to access and, therefore, the distance parameter was reduced to 15 m – 50 m from disturbed/developed areas. The slope parameter of less than 40% was chosen primarily for safety and accessibility. The number of stations was chosen in an attempt to balance funding availability with broad coverage of vegetation types and geography within TRVRP. To accommodate geographic variability (i.e., to ensure that the stations were spread throughout TRVRP), zones were chosen manually for each vegetation type, and a single station was placed in each zone. For example, to obtain three southern willow scrub station locations, a vegetation map based on 2009 mapping conducted by TAIC was consulted, and TRVRP was arbitrarily divided into three zones of southern willow scrub with similar acreage. Zones were established for each vegetation type (zones for grassland were not the same as zones for chaparral, for example). Zones with special requirements (e.g., near northern harrier nest) were not necessarily equal in acreage, but were established to include the requirements while maintaining geographic dispersion throughout TRVRP as much as possible.

Using a Geographic Information System (GIS) tool developed by TAIC to generate random points, a "mask" was created to exclude constrained areas based on the criteria above (e.g., slope, edge effect); a grid was then established within the opportunities areas for each zone to generate a prioritized alternative set of random points. A total of five alternate random points was generated for each zone within each vegetation type, and the points were numbered and placed onto a field map. In the field, the point with the lowest number within a zone was visited first. If this area was unacceptable (e.g., the area was inaccessible or obstructed), an alternate point was chosen. For example, five random points for grassland were generated for grassland zone 1 (G_1-5), zone 2 (G_6-10), and zone 3 (G_11-15). Random point G_1 was visited first in zone 1. If that point was not acceptable, an alternate random point (G_2, G_3, G_4, or G_5) was visited within that zone. For efficiency (to reduce travel time), the priority was chosen based on the point's proximity to the initial point and the distance to stations in other vegetation types. If the chosen location was generally acceptable but the point was infeasible (e.g., if it fell on a boulder or under an inaccessible bush), the point was moved just far enough to avoid the obstruction, and a new point was recorded into a hand-held Geographic Positioning System (GPS) unit.

Survey Methods

Two survey methods were employed along a 50 m transect for each station, as each method captures different components of the vegetation community. The quadrat method is best for capturing small plants, plants that are rare or that have low cover, and overall species richness (number of species); however, it is time-consuming and inferior when recording large plants (Deutschman and Strahm 2007). The point intercept method, which is less time consuming, works well for large and small plants, abundant species, and estimating cover. It does not work well for capturing rare or low cover plants. For dense habitats consisting mostly of large trees (e.g., riparian forest and willow scrub), only the point intercept methods was employed. For all other vegetation communities, both methods were used.

Stations were set up by first navigating to the random point. If the area was found to be acceptable, two pieces of rebar were hammered in the ground next to one another to mark the origin of the transect. A 1-foot long piece of ¾ inch PVC pipe was placed over the rebar. The PVC pipe was marked with the station number and the word "Origin". In order to be consistent with regional monitoring protocols, the numbering system for the stations was chosen to be consistent with the SDSU numbering system: [San Diego]_[plot name]_[vegetation code]_[station number], for example: SD_TJ_SWS_1. Because SDSU has established monitoring stations in coastal sage scrub and chaparral communities, the numbering system for stations in these communities established by TAIC began with 101 instead of 1 to avoid duplicate numbers.

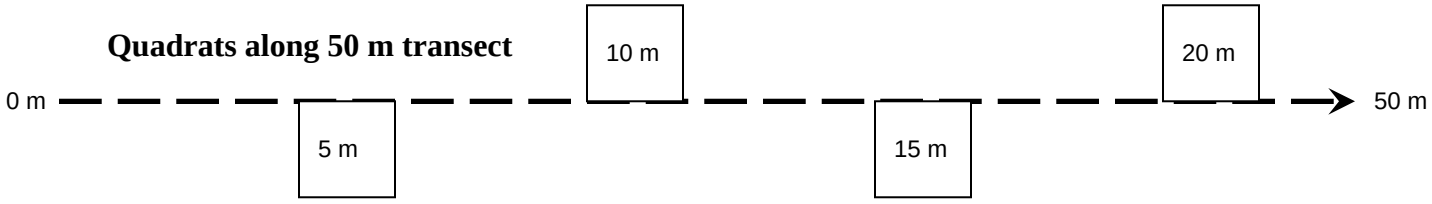
A list of randomly-generated compass directions was consulted to determine the direction of the transect. If the compass direction was infeasible (e.g., crossed a trail or headed toward an inaccessible area), the next random compass direction in the list was chosen. Once an acceptable direction was chosen, a 50-m tape was looped around the rebar and run in a straight line in that direction. At 50 m, a single piece of rebar was hammered into the ground and a piece of PVC labeled with the station number and "End" was placed over the rebar. The tape was wrapped around the end point so that it remained taut during the data collection. Quadrats were established and surveyed from the end point toward the origin to reduce trampling[2]; on the way back to the end point, the point intercept method was used. At three stations, the end point was inaccessible (e.g., open water or dense vegetation). At those stations, the end stake was placed as far as possible, the meter mark was recorded, and the measurements were estimated. A similar situation occurred at mulefat station 1. The habitat area was very small and dissected by trails. The end point would have crossed a trail, so the origin was extended in the opposite direction as far as

[2] Surveying an area within a quadrat is more susceptible to vegetation disturbance than surveying point-intercept transects.

possible to avoid the trail. The origin stake was placed at meter 2 instead of 0 due to inaccessibility of meters 0 and 1.

Quadrats. A 1 m^2 quadrat made from PVC pipe was used to construct quadrats along the previously established transect. Measurements were taken every 5 m on alternating sides from 5 m to 50 (see diagram below). Starting on the right side (facing the end point), the quadrat was placed on the ground between the 5 and 6 m marks. One side of the quadrat was in line with the measuring tape. The final quadrat was placed at the 50 m mark and extended beyond the end stake of the transect. Two measurements were taken within each quadrat: (a) absolute percent cover (not to exceed 100 percent), and (b) relative cover by plant species, which could exceed 100 percent for overlapping plants. Ground cover classes included litter (L), bare (B), rock (R), vegetation or stem (V), cryptobiotic crust (C), and moss (M). Plant species were recorded using a six letter code, which consisted of the first three letters of the genus and first three letters of the species name (i.e., brodia was used for *Bromus diandrus*¸ ripgut brome). Unknown species were collected and labeled with the date, plot number, and a unique number. Collected specimens were later identified using the Jepson Manual (J.C. Hickman ed., 1993) and the synoptic collection at the SDNHM Herbarium. Quadrats were only used in mulefat scrub, grassland, coastal sage scrub, and chaparral communities.

Quadrats along 50 m transect



Point Intercept. The point intercept method was used along the same 50 meter transect that was set up for the quadrats. A ½ inch wooden dowel, 1 m long, was placed perpendicular to the ground at every meter on the left side (facing the end point) starting at 1 m and ending at 50 m. Two measurements were taken at each meter: (a) cover type[3], and (b) species touching the dowel. Species were recorded using the six letter code described above. Only the name of the species touching the dowel was recorded. Abundance was not recorded. For all plants with canopies that exceeded the height of the dowel (incl. trees and shrubs), presence or absence was estimated by extending an imaginary vertical line from the dowel toward the canopy; if the canopy touched the imaginary line, presence was established.

[3] The cover classes were the same as those described for the quadrats.

Area Search. In addition to conducting the quantitative methods described above, the area was assessed visually to make a qualitative assessment of habitat condition, and to record native species that were not included in the quadrats or point intercept.

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Herpetological Pitfall Array Survey Methods

Pitfall trap arrays have been widely used to obtain data on amphibians and reptiles throughout southern California (Fisher & Case 2000). The following methods and survey protocol has been derived and modified from Fisher et al. (2008).

There are ten (10) previously identified and surveyed pitfall array locations on the TRVRP, five (5) of which were surveyed during the first monitoring year in 2009. Two of the five pitfalls were relocated in/near the previous locations: Goat Canyon (array #8) and Spooner's Mesa (array #9) per Ogden 1996, Regional Monitoring Location H21. TAIC confirmed through field reconnaissance during pitfall construction that the previous survey locations were placed in representative areas within the park to fully capture the diversity of the herpetofauna, including rock outcroppings and ravines. Some of the arrays had to be moved slightly relative to the previous locations due to accessibility or changes in habitat representation. All arrays were re-marked using GIS technologies and the locations mapped. The arrays were reconstructed in habitats representative of the park, in the same or close to the same locations as previously surveyed.

Survey Methods

The following methods and survey protocol have been derived and modified from Fisher et al. (2008). Each pitfall array consists of four 5-gallon buckets and 3 box funnel (12" x 8" x 18") traps (Figure 1) connected by shade cloth drift-fences (15 m x 30 cm). Each array is created around a center bucket (pitfall) with three arms of drift fence extending out 15 m forming a Y. In addition to the center bucket, each arm of the Y has a bucket placed in the middle and a box funnel trap placed at the end (Figure 2). Each box funnel

trap and bucket contains a piece of PVC pipe to provide shelter for captured animals, and is covered with boards and/or lids to protect animals captured from the heat of the sun.

The herpetological surveys consist of three five-day sampling sessions. Traps are opened on day one and checked every morning for four consecutive mornings (Tuesday – Friday). All vertebrates captured in the pitfalls and box funnel traps are recorded using a Personal Data Assistant (PDA).

Mark/re-capture methods are used for monitoring purposes. All herpetofauna, except turtles and very small salamander species, are toe-clipped following the methods outlined in Fisher et al. (2008) (Figure 3 and 4). All limbless reptiles are scale-clipped following the methods outlined in Fisher et al. (2008) (Figure 5). Marking are used for identification purposes. Re-captured individuals are recorded with their unique toe-clip or scale-clip code, while new captures receive a unique toe-clip or scale-clip number. Toe-clip and scale-clip numbers are tracked on a clip chart to prevent two animals from receiving identical numbers. Toes essential to the animal's survival (i.e. accelerator toes of lizards, thumbs of frogs and toads) are be clipped. Venomous snakes, blind snakes, and legless lizards are be scale-clipped.

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Fisher, R.N.; Stokes, Drew; Rochester, Carlton; Brehme, Cheryl; Hathaway, Stacie; and Case, Ted. 2008. Herpetological monitoring using a pitfall trapping design in southern California: U.S. Geological Survey Techniques and Methods 2-A5, 44 p.

Figure 1. Drift fence with funnel trap

Figure 2. Array Design

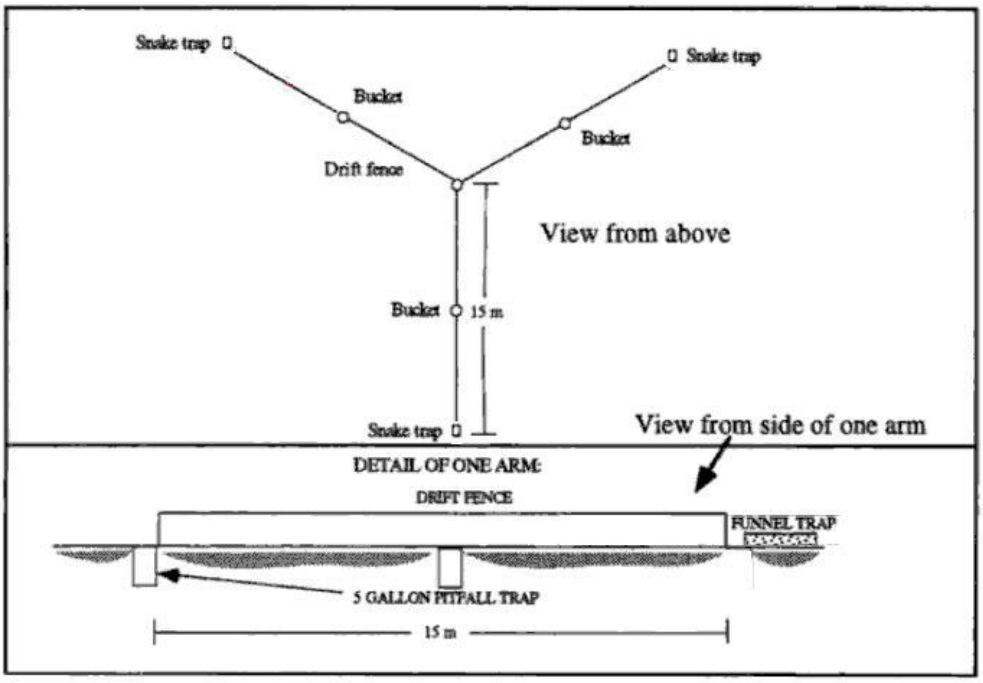


Figure 3. Lizard toe-clip numbering scheme

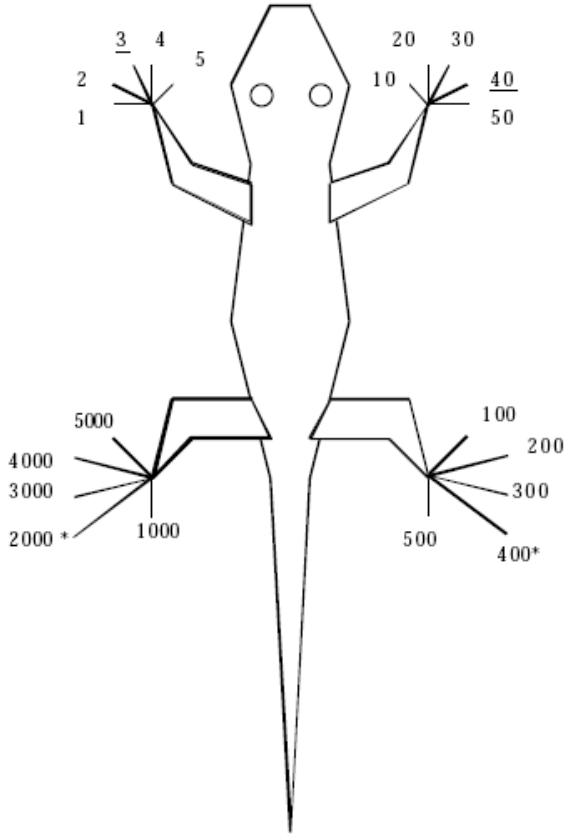


Figure 4. Amphibian toe-clip numbering scheme

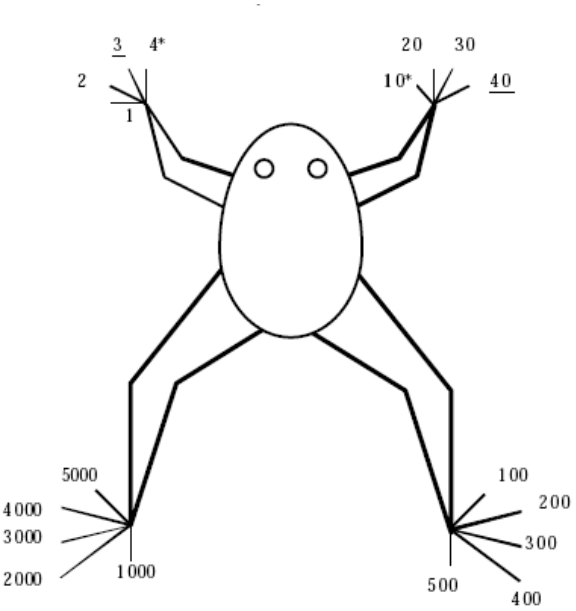
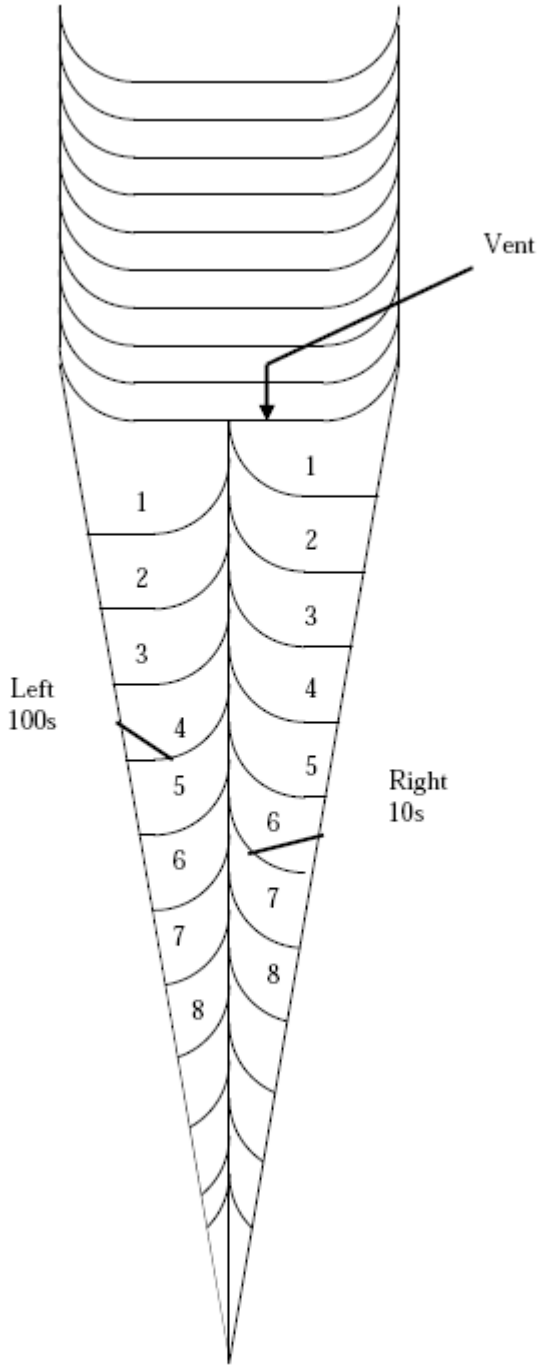


Figure 5. Snake scale-clip numbering scheme



Light-footed Clapper Rail Survey

An initial habitat survey was conducted to determine appropriate locations for conducting surveys in suitable habitat for of this USFWS Risk Group I species. The following protocol was used to determine presence/absence of the light-footed clapper rail at TRVRP:

1. An initial habitat survey was conducted to determine appropriate locations for conducting surveys in suitable habitat for the clapper rail.

2. Two surveys was conducted in all suitable emergent marsh habitats. However, because of the secretive, endangered status, and low detectability of the light-footed clapper rail, additional surveys may be recommended in the future

3. The surveys was conducted by a biologist that has a section 10(a) 1(a) Fish and Wildlife Service permit (permit), and a California Department of Fish and Game Memorandum of Understanding (MOU).

4. Two surveys were conducted at dusk. Dusk surveys begin two hours before sunset and continue until dark. Ideally, surveys shall be conducted during the peak in vocalization, which lasts through mid May.

5. No more than 20 hectare (50 acres) of emergent marsh habitat were surveyed by one biologist per each dusk survey.

6. Surveys were conducted from the edge of potential habitat. The surveyor should stay out of the habitat as much as possible to avoid disturbing clapper rails and other nesting species.

7. Surveys were only be conducted on warm evenings (greater than 50^{o} Farenheit (10^{o} Celsius). Active calling appears to be triggered by the first warm spell in the spring. Cold and rainy conditions were avoided. Surveys were not be conducted when wind speed exceeds 15miles per hour, or in heavy fog.

8. The surveys were conducted by stopping at stations approximately 300 feet (100 meters) apart along the perimeter of the survey area and listening for vocalizing light-footed clapper rails for five minutes. If rails are not detected passively, a call-prompt or digital vocalization of the light-footed clapper rail “dueting” shall be played with an MP3 player and amplified speakers for duration of twenty

seconds or the complete length of a clapper rail song. A response is listened for a period of one minute. If there is no response, this procedure is repeated two more times (for a total of three) before proceeding to the next survey station. If a clapper rail call is detected, call prompting is immediately stopped, and the surveyor moves at least 600 feet (200 meters) to the next station.

9. The location of all rails detected were mapped using GPS.

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Appendix B:

Complete Species Compendium

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Inventory of Plants and Animals Documented at Tijuana River Valley Regional Park during 2009 Surveys

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
PLANTS				
MONOCOTS				
CYPERACEAE (Sedge Family)				
Schoenoplectus (*Scirpus californicus*)	California Bulrush	-/--/--	No	-
ADOXACEAE (Adox Family)				
Sambucus mexicana	Blue Elderberry	--/--/--	No	-
AGAVACEAE (Agave Family				
Yucca schidigera	Mojave Yucca	--/--/--	No	-
LILIACEAE (Lily Family)				
Calochortus sp.	Mariposa Lily	--/--/--	No	-
MELANTHIACEAE (Camas Family)				
Zigadenus fremontii	Fremont's Camus	--/--/--	No	-
POACEAE (Grass Family)				
Achnatherum sp.	Needlegrass	--/--/--	No	-
**Arundo donax*	Giant Reed	--/--/--	No	-
Bothriochloa barbinodis	Cane Bluestem	--/--/--	No	-
**Bromus diandrus*	Ripgut Grass	--/--/--	No	-
**Bromus hordeaceus*	Soft Chess	--/--/--	No	-
**Bromus madritensis* ssp. *rubens*	Red Brome	--/--/--	No	-
**Cynodon dactylon*	Bermuda Grass	--/--/--	No	-
**Ehrharta erecta*	Panic Veldt Grass	--/--/--	No	-
Melica frutescens	Tall Melic	--/--/--	No	-
Muhlenbergia microsperma	Little-seed Muhly	--/--/--	No	-
Nassella lepida	Foothill Needlegrass	--/--/--	No	-
Nassella sp.	Needlegrass	--/--/--	No	-
**Polypogon monspeliensis*	Annual Beard Grass	--/--/--	No	-
**Schismus barbatus*	Mediterranean Schismus	--/--/--	No	-
**Vulpia myuros*	*Hairy* Rat-tail Fescue	--/--/--	No	-
TYPHACEAE (Cattail Family)				
Typha latifolia	Broad-leaf Cattail	--/--/--	No	-
DICOTS				
AIZOACEAE (Fig-Marigold Family)				
**Mesembryanthemum crystallinum*	Crystalline Iceplant	--/--/--	No	-
**Tetragonia tetraonioides*	New Zealand-Spinach	--/--/--	No	-
AMARANTHACEAE (Amaranth Family)				
Amaranthus sp.	Pigweed	--/--/--	No	-
**Atriplex semibaccata*	Australian Saltbush	--/--/--	No	-
**Chenopodium* sp.	Goosefoot	--/--/--	No	-
**Dysphania ambrosioides*	Mexican Tea	--/--/--	No	-
**Salsola tragus*	Prickly Russian-Thistle	--/--/--	No	-

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
ANACARDIACEAE (Sumac Family)				
Malosma laurina	Laurel Sumac	--/--/--	No	-
Rhus integrifolia	Lemonadeberry	--/--/--	No	-
APIACEAE (Carrot Family)				
Apiastrum angustifolium	Mock-Parsley	--/--/--	No	-
**Foeniculum vulgare*	Sweet Fennel	--/--/--	No	-
ASTERACEAE (Sunflower Family)				
Artemisia californica	Coastal Sagebrush	--/--/--	No	-
Artemisia douglasiana	Douglas Mugwort	--/--/--	No	-
Baccharis pilularis	Coyote Brush	--/--/--	No	-
Baccharis salicifolia	Mule-Fat	--/--/--	No	-
Baccharis sarothroides	Broom Baccharis	--/--/--	No	-
**Centauria melitensis*	Tocalote	--/--/--	No	-
**Chrysanthemum coronarium*	Crown Daisy	--/--/--	No	-
**Cirsium vulgare*	Bull Thistle	--/--/--	No	-
Conyza canadensis	Horseweed	--/--/--	No	-
Encelia californica	California Encelia	--/--/--	No	-
Eriophyllum confertiflorum	Golden-Yarrow	--/--/--	No	-
**Filago gallica*	Narrow-leaf Filago	--/--/--	No	-
Gnaphalium californicum	California Everlasting	--/--/--	No	-
**Gnaphalium luteo-album*	Everlasting Cudweed	--/--/--	No	-
Heterotheca grandiflora	Telegraph Weed	--/--/--	No	-
Isocoma menziesii	Coast Goldenbush	--/--/--	No	-
**Picris echioides*	Prickly Ox-Tongue	--/--/--	No	-
Porophyllum gracile	Odora	--/--/--	No	-
**Sonchus oleraceous*	Common Sow-Thistle	--/--/--	No	-
Bahiopsis (Viguiera) laciniata	**San Diego Sunflower**	**--/--/4.2**	**No**	**D**
Xanthium strumarium.	Cocklebur	--/--/--	No	-
BORAGINACEAE (Borage Family)				
Cryptantha sp.	Cryptantha	--/--/--	No	-
BRASSICACEAE (Mustard Family)				
**Brassica nigra*	Black Mustard	--/--/--	No	-
**Brassica tournefortii*	Sahara Mustard	--/--/--	No	-
**Hirschfeldia incana*	Short-pod Mustard	--/--/--	No	-
**Lepidium* sp.	Peppergrass	--/--/--	No	-
**Raphanus sativus*	Wild Radish	--/--/--	No	-
**Sisymbrium orientale*	Hare's-Ear Cabbage	--/--/--	No	-
**Sisymbrium irio*	London Rocket	--/--/--	No	-
CACTACEAE –(Cactus Family)				
Bergerocactus emoryi	Golden-Club Cactus	--/--/--	No	-
Ferocactus viridescens* var. *viridescens	**Coast Barrel Cactus**	**--/--/2.1**	**Yes**	**B**
Mammillaria dioica	Fish-Hook Cactus	--/--/--	No	-
Opuntia littoralis	Coast Prickly-Pear	--/--/--	No	-
CAPPARACEAE (Caper Family)				
Isomeris arborea	Bladderpod	--/--/--	No	-
CONVOLVULACEAE (Morning-Glory Family)				
Calystegia macrostegia ssp. *tenuifolia*	San Diego Morning-Glory	--/--/--	No	-

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
CRASSULACEAE (Stonecrop Family)				
Crassula connata	Pygmyweed	--/--/--	No	-
Dudleya edulis	Ladies' Fingers	--/--/--	No	-
CUCURBITACEAE (Gourd Family)				
Marah macrocarpus	Wild-Cucumber	--/--/--	No	-
ERICACEAE (Heath Family)				
Ornithostaphylos oppositifolia	**Baja California Birdbush**	**--/SE/2.1**	**No**	**B**
Xylococcus bicolor	Mission Manzanita	--/--/--	No	-
EUPHORBIACEAE (Spurge Family)				
Acalypha californica	California Copperleaf	--/--/--	No	-
Croton californicus	California Croton	--/--/--	No	-
Euphorbia misera	**Cliff Spurge**	**--/--/2.2**	**No**	**B**
**Ricinus communis*	Castor-bean	--/--/--	No	-
FABACEAE (Legume Family)				
**Melilotus indica*	Indian Sweetclover	--/--/--	No	-
GERANIACEAE (Geranium Family)				
**Erodium* sp.	Filaree	--/--/--	No	-
HELIOTROPACEAE (Heliotrope Family)				
Heliotropium curassavicum	Salt Heliotrope	--/--/--/--	No	-
HYDROPHYLLACEAE (Waterleaf Family)				
Pholistoma sp.	Fiesta Flower	--/--/--	No	-
LAMIACEAE (Mint Family)				
Salvia mellifera	Black Sage	--/--/--	No	-
MALVACEAE (Mallow Family)				
**Malva parviflora*	Cheeseweed	--/--/--	No	-
MYRTACEAE (Myrtle Family)				
Eucalyptus sp.	Eucalyptus	--/--/--	No	-
NYCTANGINACEAE (Four O'clock Family)				
Mirabilis laevis var. *crassifolia*	Coastal Wishbone Plant	--/--/--	No	-
OROBANCHACEAE (Broom-Rape Family)				
Cordylanthus rigidus ssp. *setigerus*	BristlyBird's Beak	--/--/--	No	-
PLANTAGINACEAE (Plantain Family)				
Antirrhinum nuttallianum	Nuttall's Snapdragon	--/--/--	No	-
POLYGONACEAE (Buckwheat Family)				
Eriogonum fasciculatum	California Buckwheat	--/--/--	No	-
Polygonum lapathifolium	Willow Weed	--/--/--	No	-
Pterostegia drymarioides	Granny's Hairnet	--/--/--	No	-
Rumex salicifolius	Willow Dock	--/--/--	No	-

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
PRIMULACEAE (Primrose Family)				
**Anagallis arvensis*	Scarlet Pimpernel	--/--/--	No	-
RHAMNACEAE (Buckthorn Family)				
Ceanothus verrucosus	**Wart-Stem-Lilac**	**--/--/2.2**	**Yes**	**B**
Rhamnus crocea	Spiny Redberry	--/--/--	No	-
ROSACEAE (Rose Family)				
Adenostoma fasciculatum	Chamise	--/--/--	No	-
Heteromeles arbutifolia	Toyon	--/--/--	No	-
RUBIACEAE (Madder or Coffee Family)				
Galium porrigens	Climbing Bedstraw	--/--/--	No	-
RUTACEAE (Citrus Family)				
Cneoridium dumosum	Coastal Spice Bush	--/--/--/--	No	-
SALICACEAE (Willow Family)				
Salix exigua	Narrow-Leaf Willow	--/--/--	No	-
Salix gooddingii	Goodding's Black Willow	--/--/--	No	-
Salix lasiolepis	Arroyo Willow	--/--/--	No	-
SCROPHULARIACEAE (Broomrape Family)				
Scrophularia californica	California Figwort	--/--/--	No	-
SOLANACEAE (Nightshade Family)				
**Lycopersicon esculentum*	Garden Tomato	--/--/--	No	-
Solanum americanum	White Nightshade	--/--/--	No	-
TAMARICACEAE (Tamarisk Family)				
**Tamarix aphylla*	Athel	--/--/--	No	-
**Tamarix ramosissima*	Tamarisk/Saltcedar	--/--/--	No	-
TROPAEOLACEAE (Nasturtium Family)				
**Tropaeolum majus*	Garden Nasturtium	--/--/--	No	-
URTICACEAE (Nettle Family)				
Hesperocnide tenella	Western Nettle	--/--/--	No	-
**Urtica urens.*	Dwarf Nettle	--/--/--	No	-

[1] Status:

Federal: FE –federally endangered, FT – federally threatened.
State: SE – state endangered, ST – state threatened, SSC – species of special concern.
CNPS Listing: List 1A – presumed extinct in California; List 1B – plants rare, threatened, or endangered in California and elsewhere; List 2 - plants rare, threatened, or endangered in California, but more common elsewhere; List 3 – plants about which we need more information (a review list); List 4 – plants of limited distribution (a watch list).

***** Non-native Species
† Likely escaped captive
Sensitive species in boldface

[2] County of San Diego Listing Status for Plants: List A = rare, threatened, or endangered in California and elsewhere, List B = rare, threatened, or endangered in California, but more common elsewhere; List C = plants which may be rare, but need more information to determine their true rarity status; List D = Plants of limited distribution and are uncommon, but not presently rare or endangered.

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
Animals				
AMPHIBIA (Amphibians)				
ANURA (Frogs and Toads)				
Pipidae (Clawed Frogs, Surinam Toads)				
**Xenopus laevis*	African Clawed Frog	--/--	No	-
REPTILIA (Reptiles)				
SQUAMATA (Lizards and Snakes)				
Phrynosomatidae (Spiny lizards and relatives)				
Sceloporus occidentalis	Western Fence Lizard	--/--	No	-
Uta stansburiana	Side-Blotched Lizard	--/--	No	-
Scincidae (Skinks)				
Plestiodon skiltonianus	Western Skink	--/--	No	-
Teiidae (Whiptails and relatives)				
Aspidoscelis hyperythrus	**Orange-Throated Whiptail**	**--/SSC**	**Yes**	**2**
Anguidae (Alligator Lizards and relatives)				
Elgaria multicarinata	Southern Alligator Lizard	--/--	No	-
Colubridae (Colubrids)				
Hypsiglena torquata	Night Snake	--/--	No	-
Lampropeltis getula	Common Kingsnake	--/--	No	-
Masticophis flagellum	Coachwhip	--/--	No	-
Masticophis lateralis	California Whipsnake	--/--	No	-
Pituophis catenifer	Gopher Snake	--/--	No	-
Viperidae (Vipers)				
Crotalus viridis	Western Rattlesnake	--/--	No	-
AVES (Birds)				
ANSERIFORMES (Screamers, Ducks, and relatives)				
Anatidae (Swans, Geese, and Ducks)				
Anas strepera	Gadwall	--/--	No	-
Anas platyrhynchos	Mallard	--/--	No	-
Oxyura jamaicensis	Ruddy Duck	--/--	No	-
GALLIFORMES (Gallinaceous Birds)				
Odontophoridae (New World Quail)				
Callipepla californica	California Quail	--/--	No	-
PODICIPEDIFORMES (Grebes)				
Podicipedidae (Grebes)				
Podiceps nigricollis	Pied-Billed Grebe	--/--	No	-

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
CICONIIFORMES (Herons, Storks, New World Vultures, Ibises, and relatives)				
Ardeidae (Herons and Bitterns)				
Botaurus lentiginosus	American Bittern	--/--	No	-
Ardea herodias	Great Blue Heron	--/--	No	-
Butorides virescens	Green Heron	--/--	No	-
Cathartidae (New World Vultures)				
Cathartes aura	Turkey Vulture	--/--	No	-
FALCONIFORMES (Diurnal Birds of Prey)				
Accipitridae (Hawks, Kites, Eagles, and Harriers)				
Circus cyaneus	**Northern Harrier**	**--/SSC**	**Yes**	**1**
Accipiter cooperii	**Cooper's Hawk**	**--/--**	**Yes**	**1**
Buteo lineatus	Red-shouldered Hawk	--/--	No	-
Buteo jamaicensis	Red-tailed Hawk	--/--	No	-
Falconidae (Caracaras and Falcons)				
Falco sparverius	American Kestrel	--/--	No	-
GRUIFORMES (Cranes, rails, and relatives)				
Rallidae (Rails, coots)				
Fulica americana	American Coot	--/--	No	-
COLUMBIFORMES (Pigeons and Doves)				
Columbidae (Pigeons and Doves)				
**Columba livia*	Rock Pigeon	--/--	No	-
Zenaida macroura	Mourning Dove	--/--	No	-
CUCULIFORMES (Cuckoos and relatives)				
Cuculidae (Cuckoos and Roadrunners)				
Geococcyx californianus	Greater Roadrunner	--/--	No	-
Trochilidae (Hummingbirds)				
Archilochus alexandri	Black-chinned Hummingbird	--/--	No	-
Calypte anna	Anna's Hummingbird	--/--	No	-
PICIFORMES (Woodpeckers and relatives)				
Picidae (Woodpeckers and Wrynecks)				
Picoides nuttallii	Nuttall's Woodpecker	--/--	No	-
Picoides pubescens	Downy Woodpecker	--/--	No	-
PASSERIFORMES (Perching Birds)				
Tyrannidae (Tyrant Flycatchers)				
Empidonax traillii brewsteri	Willow Flycatcher	--/--	No	-
Empidonax difficilis	Pacific-Slope Flycatcher	--/--	No	-
Sayornis nigricans	Black Phoebe	--/--	No	-
Sayornis saya	Say's Phoebe	--/--	No	-
Myiarchus cinerascens	Ash-throated Flycatcher	--/--	No	-
Tyrannus vociferans	Cassin's Kingbird	--/--	No	-

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
Tyrannus verticalis	Western Kingbird	--/--	No	-
Vireonidae (Typical Vireos)				
Vireo bellii pusillus	**Least Bell's Vireo**	**FE/SE**	**Yes**	**1**
Vireo huttoni	Hutton's Vireo	--/--	No	-
Vireo gilvus	Warbling Vireo	--/--	No	-
Corvidae (Jays, Magpies, and Crows)				
†*Calocitta collei*	Black-throated Magpie-Jay	--/--	No	-
Corvus brachyrhynchos	American Crow	--/--	No	-
Corvus corax	Common Raven	--/--	No	-
Alaudidae (Larks)				
Eremophila alpestris	**Horned Lark**	**--/SSC**	**No**	**2**
Hirundinidae (Swallows)				
Tachycineta bicolor	Tree Swallow	--/--	No	-
Stelgidopteryx serripennis	Northern Rough-winged Swallow	--/--	No	-
Petrochelidon pyrrhonota	Cliff Swallow	--/--	No	-
Aegithalidae (Bushtit)				
Psaltriparus minimus	Bushtit	--/--	No	-
Troglodytidae (Wrens)				
Thryomanes bewickii	Bewick's Wren	--/--	No	-
Troglodytes aedon	House Wren	--/--	No	-
Cistothorus palustris	Marsh Wren	--/--	No	-
Polioptilidae (Gnatcatchers)				
Polioptila californica californica	**Coastal California Gnatcatcher**	**FT/SSC**	**Yes**	**1**
Turdidae (Thrushes)				
Catharus ustulatus	Swainson's Thrush	--/--	No	-
Timaliidae (Babblers)				
Chamaea fasciata	Wrentit	--/--	No	-
Mimidae (Mockingbirds and *Thrashers)*				
Mimus polyglottos	Northern Mockingbird	--/--	No	-
Toxostoma redivivum	California Thrasher	--/--	No	-
Sturnidae (Starlings & Allies)				
**Sturnus vulgaris*	European Starling	--/--	No	-
Parulidae (Wood Warblers and relatives)				
Vermivora celata	Orange-crowned Warbler	--/--	No	-
Dendroica petechia	Yellow Warbler	--/--	No	-
Wilsonia pusilla	Wilson's Warbler	--/--	No	-
Geothlypis trichas	Common Yellowthroat	--/--	No	-
Icteria virens	**Yellow-breasted Chat**	**--/SSC**	**No**	**1**
Emberizidae (Emberizids)				
Pipilo maculatus	Spotted Towhee	--/--	No	-
Pipilo crissalis	California Towhee	--/--	No	-

Scientific Name	Common Name	Status[1]	South County MSCP-covered	County Sensitivity List[2]
Aimophila ruficeps canescens	**Rufous-crowned Sparrow**	**--/SSC**	**Yes**	**1**
Melospiza melodia	Song Sparrow	--/--	No	-
Cardinalidae (Tanagers, Cardinals, Grosbeaks & Allies)				
Piranga ludovicianus	Western Tanager	--/--	No	-
†*Cardinalis cardinalis*	Northern Cardinal	--/--	No	-
Pheucticus melanocephalus	Black-headed Grosbeak	--/--	No	-
Passerina caerulea	Blue Grosbeak	--/--	No	-
Icteridae (Blackbirds, Orioles & Allies)				
Agelaius phoeniceus	Red-winged Blackbird	--/--	No	-
Molothrus ater	Brown-headed Cowbird	--/--	No	-
Icterus cucullatus	Hooded Oriole	--/--	No	-
Icterus bullockii	Bullock's Oriole	--/--	No	-
Fringillidae (Cardueline Finches)				
Carpodacus mexicanus	House Finch	--/--	No	-
Spinus psaltria	Lesser Goldfinch	--/--	No	-
Spinus tristis	American Goldfinch	--/--	No	-
Passeridae (Old World Sparrows)				
**Passer domesticus*	House Sparrow	--/--	No	-
MAMMALIA (Mammals)				
INSECTIVORA (Insectivores)				
Soricidae (Shrews)				
Notiosorex crawfordi	Grey Shrew	--/--	No	-
RODENTIA (Squirrels, Rats, Mice, and relatives)				
Geomyidae (Pocket Gophers)				
Thomomys bottae	Botta's Pocket Gopher	--/--	No	-
Heteromyidae (Pocket Mice and Kangaroo Rats)				
Chaetodipus californicus	California Pocket Mouse	--/--	No	-
Muridae (Mice, Muskrats, Rats, and Voles)				
Microtus californicus	California Vole	--/--	No	-
**Mus musculus*	House Mouse	--/--	No	-
Peromyscus maniculatus	Deer Mouse	--/--	No	-
Peromyscus eremicus	Cactus Mouse	--/--	No	-
Reithrodontomys megalotis	Western Harvest Mouse	--/--	No	-

[1] Status: Federal: FE –federally endangered, FT – federally threatened.
State: SE – state endangered, ST – state threatened, SSC – species of special concern.
***** Non-native Species
† Likely escaped captive
Sensitive species in boldface

[2] County of San Diego Listing Status for Animals: Group 1: Animal species that have a very high level of sensitivity either because they are listed as threatened or endangered or because they have very specific natural history requirements; Group 2: Animal species that are becoming less common, but are not yet so rare that extirpation or extinction is imminent without immediate action (these species tend to be prolific within their suitable habitat types).

Appendix C:

Plant Data per Transect

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Plant Species Identified at Vegetation Monitoring Plots

Plot Name	Species	Method[1]
SD_TJ_CHP_101	Adenostoma fasciculatum	TX
	Artemisia californica	QD, TX
	Brassica tournefortii	QD, TX
	Bromus madritensis ssp. rubens	QD, TX
	Cneoridium dumosum	QD, TX
	Cryptantha species	QD
	Cynodon dactylon	QD
	Cynodon dactylon	TX
	Eriogonum fasciculatum	QD, TX
	Filago gallica	QD
	Galium species	QD
	Gnaphalium californicum	TX
	Hirschfeldia incana	QD, TX
	Isomeris arborea	QD, TX
	Lepidium species	QD, TX
	Malosma laurina	QD, TX
	Marah macrocarpus	TX
	Mirabilis laevis	QD
	Nassella species	QD
	Rhamnus crocea	TX
	Ricinus communis	QD
	Viguiera laciniata	QD, TX
SD_TJ_CHP_102	Adenostoma fasciculatum	QD, TX
	Antirrhinum nuttallianum	QD
	Apiastrum angustifolium	QD
	Bromus madritensis ssp. rubens	QD, TX
	Ceanothus verrucosus	QD, TX
	Cneoridium dumosum	QD, TX
	Crassula connata	QD
	Eriophyllum confertiflorum	QD
	Galium porrigens	QD, TX
	Gnaphalium californicum	QD
	Malosma laurina	QD, TX
	Marah macrocarpus	TX
	Mirabilis laevis	QD
	Pterostegia drymarioides	QD, TX
	Ricinus communis	QD
	Salvia mellifera	QD, TX
	Schismus barbatus	QD
	Sonchus oleraceus	QD
	Xylococcus bicolor	QD, TX
	Yucca schidigera	TX
SD_TJ_CSS_101	Baccharis salicifolia	QD
	Chrysanthemum coronarium	QD, TX
	Isocoma menziesii	QD, TX
	Melilotus indica	QD, TX
	Mesembryanthemum crystallinum	QD, TX
	Mirabilis laevis	QD
	Ricinus communis	QD
	Urtica urens	TX

Plot Name	Species	Method[1]
SD_TJ_CSS_102	Acalypha californica	QD, TX
	Achnatherum species	QD, TX
	Bothriochloa barbinodis	QD
	Brassica tournefortii	QD, TX
	Bromus madritensis ssp. rubens	QD, TX
	Calystegia macrostegia	QD
	Cneoridium dumosum	QD, TX
	Dudleya edulis	QD, TX
	Eriogonum fasciculatum	QD, TX
	Euphorbia misera	QD, TX
	Ferocactus viridescens	QD
	Isomeris arborea	QD, TX
	Lepidium species	QD, TX
	Melica frutescens	TX
	Mirabilis laevis	QD, TX
	Muhlenbergia microsperma	QD, TX
	Nassella lepida	QD
	Pholistoma species	QD
	Porophyllum gracile	TX
	Ricinus communis	QD
	Viguiera laciniata	QD, TX
SD_TJ_GR_1	Baccharis salicifolia	QD
	Chrysanthemum coronarium	QD, TX
	Heliotropium curassavica	QD
	Isocoma menziesii	QD, TX
	Melilotus indica	QD, TX
	Mesembryanthemum crystallinum	QD, TX
	Mirabilis laevis	QD
	Ricinus communis	QD
SD_TJ_GR_2	Bromus diandrus	QD
	Bromus madritensis ssp. rubens	QD, TX
	Chenopodium species	TX
	Chrysanthemum coronarium	QD, TX
	Hirschfeldia incana	QD, TX
	Malva parviflora	QD
	Mirabilis laevis	QD
	Ricinus communis	QD
	Salsola tragus	QD, TX
	Sisymbrium irio	QD, TX
	Urtica urens	QD, TX
SD_TJ_GR_3	Bromus diandrus	TX
	Bromus hordeaceus	QD, TX
	Bromus madritensis ssp. rubens	QD, TX
	Chrysanthemum coronarium	QD, TX
	Mirabilis laevis	QD
	Ricinus communis	QD
	Vulpia myuros	QD, TX

[1] TX = transects; QD = quadrats

Plant Species Identified at Vegetation Monitoring Plots

Plot Name	Species	Method[1]
SD_TJ_MFS_1	Baccharis salicifolia	QD, TX
	Brassica nigra	QD
	Brassica tournefortii	QD, TX
	Centaurea melitensis	QD, TX
	Chrysanthemum coronarium	QD, TX
	Croton californicus	QD, TX
	Erodium species	QD
	Heterotheca grandiflora	QD
	Hirschfeldia incana	QD, TX
	Mirabilis laevis	QD
	Raphanus sativus	QD, TX
	Ricinus communis	QD
	Salix lasiolepis	QD
	Urtica urens	QD, TX
SD_TJ_MFS_2	Baccharis salicifolia	QD, TX
	Bromus madritensis ssp. rubens	QD, TX
	Chrysanthemum coronarium	QD, TX
	Cynodon dactylon	QD
	Melilotus indica	QD, TX
	Mesembryanthemum crystallinum	QD, TX
	Mirabilis laevis	QD
	Raphanus sativus	QD
	Ricinus communis	QD
	Tamarix ramosissima	QD, TX
SD_TJ_SWRF_1	Baccharis salicifolia	TX
	Salix gooddingii	TX
	Salix lasiolepis	TX
	Solanum americana	TX
	Sonchus oleraceus	TX
SD_TJ_SWRF_2	Baccharis salicifolia	TX
	Chrysanthemum coronarium	TX
	Conyza canadensis	TX
	Cynodon dactylon	TX
	Dysphania ambrosioides	TX
	Foeniculum vulgare	TX
	Lycopersicon sp.	TX
	Polygonum lapathifolium	TX
	Polypogon interruptus	TX
	Raphanus sativus	TX
	Ricinus communis	TX
	Rumex salicifolius	TX
	Salix gooddingii	TX
	Sisymbrium species	TX
	Tropaeolum majus	TX
	Xanthium strumarium	TX
SD_TJ_SWRF_3	Baccharis salicifolia	TX
	Hirschfeldia incana	TX
	Raphanus sativus	TX
	Salix gooddingii	TX
	Salix lasiolepis	TX
	Scrophularia californica	TX
	Tamarix ramosissima	TX
SD_TJ_SWS_1	Artemisia douglasiana	TX
	Baccharis salicifolia	TX
	Cirsium vulgare	TX
	Ehrharta erecta	TX
	Hirschfeldia incana	TX
	Picris echioides	TX
	Polypogon monspiliensis	TX
	Salix gooddingii	TX
	Salix lasiolepis	TX
	Urtica urens	TX
SD_TJ_SWS_2	Baccharis salicifolia	TX
	Rhus integrifolia	TX
	Salix gooddingii	TX
	Salix lasiolepis	TX
	Tamarix ramosissima	TX
SD_TJ_SWS_3	Baccharis salicifolia	TX
	Bromus diandrus	TX
	Calochortus species	TX
	Dysphania ambrosioides	TX
	Raphanus sativus	TX
	Salix gooddingii	TX
	Scrophularia californica	TX

[1] TX = transects; QD = quadrats

Appendix D:

Pitfall Array Data

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Collector	Date	Time	Array	Bucket	Type	Species	CommonName	ScientificName	Clip	Age	WtG	MinWt	MaxWt	LnMm	MinLn	MaxLn	Sex	Recap
MRO	6/3/2009	10:40 AM	1	C	Bird	ANPL	Mallard	Anas platyrhynchos	0	J							U	U
DM, MS	7/14/2009	5:45 AM	1	ST-1	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	42	A	7.9			69			M	N
DM, MS	7/16/2009	5:51 AM	1	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	101	A	6.2			68			M	N
DM, MS	7/15/2009	6:14 AM	7	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	5	A	6.2			67			M	R
DM, MS	7/17/2009	6:17 AM	8	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	104	A	4.5			56			M	N
DM, MS	7/16/2009	6:17 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	102	A	3.0			54			F	N
DM, MS	7/15/2009	6:23 AM	7	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	50	A	7.0			66			M	N
DM, MS	7/14/2009	6:24 AM	8	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	43	A	5.5			61			M	N
DM, MS	7/17/2009	6:32 AM	9	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	105	A	3.2			50			F	N
DM, MS	7/17/2009	6:34 AM	9	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	110	A	4.0			55			M	N
DM, MS	7/15/2009	6:35 AM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	51	A	5.0			65			M	N
DM, MS	7/16/2009	6:42 AM	7	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus		A							M	Y
DM, MS	7/14/2009	6:50 AM	7	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	90	A	6.0			63			M	N
DM, MS	7/16/2009	6:56 AM	7	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	5	A	6.5			65			M	Y
DM, MS	7/16/2009	6:59 AM	7	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	103	A	3.9			57			F	N
DM, MS	7/17/2009	6:59 AM	7	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	50	A	7.0			65			M	Y
DM, MS	7/15/2009	7:04 AM	2	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	52	A	6.5			65			M	N
DM, MS	7/15/2009	7:07 AM	2	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus		A							M	
DM, MS	7/16/2009	7:07 AM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	51	A	4.8			65			M	Y
DM, MS	7/17/2009	7:12 AM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus		A							M	
DM, MS	7/14/2009	7:17 AM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	44	A	5.2			65			M	N
DM, MS	7/14/2009	7:22 AM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	45	A	5.0			58			M	N
DM, MS	7/14/2009	7:42 AM	2	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	46	A	5.2			58			F	N
DM, MS	7/17/2009	7:42 AM	2	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	46	A							F	Y
DM, MS	7/15/2009	8:05 AM	8	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	52	A	4.5			56				N
MRO	6/3/2009	8:15 AM	9	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	5000	A	5.0	0.1	12.0	61	22	77	F	N
MRO	6/5/2009	8:19 AM	8	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	10	A	4.0	0.1	12.0	59	22	77	M	Y
DM, MS	7/15/2009	8:20 AM	9	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	53	A	4.0			54			F	N
DM, MS	7/15/2009	8:23 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	54	A	3.8			57			F	N
MRO	6/4/2009	8:28 AM	9	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	43	A	4.0	0.1	12.0	55	22	77	M	Y
MRO	6/2/2009	8:28 AM	8	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	12	A	6.0	0.1	12.0	58	22	77	M	Y
MRO	6/4/2009	8:33 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	3	SA	2.5	0.1	12.0	49	22	77	U	Y
MRO	6/5/2009	8:37 AM	9	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	101	A	5.0	0.1	12.0	61	22	77	F	N
MRO	6/4/2009	8:39 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	21	A	5.5	0.1	12.0	61	22	77	M	Y
MRO	6/2/2009	8:40 AM	9	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	0	A		0.1	12.0		22	77	M	N
MRO	6/2/2009	8:41 AM	9	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	0	A		0.1	12.0		22	77	F	N
DM, MS	7/15/2009	8:43 AM	9	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	55	A	4.8			58			F	N
MRO	6/5/2009	8:43 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	102	A	4.3	0.1	12.0	57	22	77	M	N
MRO	6/2/2009	8:46 AM	9	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	42	A	4.0	0.1	12.0	52	22	77	F	N
DM, MS	7/15/2009	8:48 AM	9	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	100	A	3.2			54			F	N
MRO	6/5/2009	8:48 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	103	A	4.5	0.1	12.0	54	22	77	M	N
MRO	6/2/2009	8:50 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	43	A	4.3	0.1	12.0	56	22	77	M	N
MRO	6/2/2009	9:00 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	44	A	5.5	0.1	12.0	59	22	77	F	N
MRO	6/3/2009	9:01 AM	7	ST-1	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	50	A	5.0	0.1	12.0	59	22	77	F	Y

Collector	Date	Time	Array	Bucket	Type	Species	CommonName	ScientificName	Clip	Age	WtG	MinWt	MaxWt	LnMm	MinLn	MaxLn	Sex	Recap
MRO	6/2/2009	9:03 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	45	A	4.3	0.1	12.0	54	22	77	M	N
MRO	6/5/2009	9:08 AM	7	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	41	A	5.0	0.1	12.0	61	22	77	M	Y
MRO	6/5/2009	9:13 AM	7	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	5	A	4.5	0.1	12.0	58	22	77	M	Y
MRO	6/4/2009	9:15 AM	7	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	54	A	5.3	0.1	12.0	61	22	77	F	N
MRO	6/3/2009	9:23 AM	7	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	53	A	4.0	0.1	12.0	62	22	77	F	N
MRO	6/2/2009	9:24 AM	7	ST-1	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	0	A		0.1	12.0		22	77	M	N
MRO	6/4/2009	9:26 AM	7	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	55	A	7.3	0.1	12.0	69	22	77	F	N
MRO	6/2/2009	9:28 AM	7	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	50	A	6.0	0.1	12.0	56	22	77	F	N
MRO	6/2/2009	9:41 AM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	51	A	6.0	0.1	12.0	60	22	77	M	N
MRO	6/2/2009	9:46 AM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	52	A	5.5	0.1	12.0	58	22	77	F	N
MRO	5/8/2009	9:51 AM	8	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	33	A	6.5	0.1	12.0	57	22	77	M	N
MRO	5/6/2009	9:56 AM	8	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	12	A	6.0	0.1	12.0	63	22	77	M	N
MRO	6/4/2009	9:58 AM	1	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	100	A	4.5	0.1	12.0	57	22	77	F	N
MRO	6/4/2009	10:04 AM	1	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	0	A		0.1	12.0		22	77	M	N
MRO	6/3/2009	10:14 AM	2	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	32	A	5.0	0.1	12.0	59	22	77	M	Y
MRO	5/8/2009	10:23 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	34	A	5.5	0.1	12.0	59	22	77	F	N
MRO	5/8/2009	10:26 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	35	A	6.0	0.1	12.0	58	22	77	F	N
MRO	5/8/2009	10:36 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	3	SA	2.3	0.1	12.0	48.5	22	77	U	Y
MRO	5/8/2009	10:41 AM	9	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	0	U	0.0	0.1	12.0	0	22	77	U	U
MRO	5/6/2009	11:03 AM	9	ST-1	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	13	A	7.5	0.1	12.0	60.5	22	77	M	N
MRO	5/8/2009	11:06 AM	7	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	40	A	4.3	0.1	12.0	60	22	77	F	N
MRO	5/6/2009	11:11 AM	9	2B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	2	A	5.0	0.1	12.0	61	22	77	M	Y
MRO	5/8/2009	11:18 AM	7	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	41	A	5.0	0.1	12.0	58	22	77	M	N
MRO	5/6/2009	11:18 AM	9	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	14	A	6.0	0.1	12.0	60	22	77	M	N
MRO	5/5/2009	11:40 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	1	A	6.0	0.1	12.0	56	22	77	M	N
MRO	5/6/2009	11:40 AM	7	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	15	A	6.0	0.1	12.0	62	22	77	F	N
MRO	5/5/2009	11:44 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	2	A	5.5	0.1	12.0	59	22	77	M	N
MRO	5/5/2009	11:47 AM	9	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	3	SA	2.5	0.1	12.0	45	22	77	U	N
MRO	5/5/2009	12:14 PM	7	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	4	A	8.0	0.1	12.0	60	22	77	F	N
MRO	5/6/2009	12:17 PM	7	ST-2	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	20	A	6.3	0.1	12.0	57	22	77	F	N
MRO	5/5/2009	12:22 PM	7	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	0	SA	0.0	0.1	12.0	0	22	77	U	N
MRO	5/6/2009	12:25 PM	7	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	21	A	7.0	0.1	12.0	64	22	77	M	N
MRO	5/5/2009	12:29 PM	7	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	5	A	4.0	0.1	12.0	50	22	77	M	N
MRO	5/5/2009	12:33 PM	7	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	10	A	3.5	0.1	12.0	47	22	77	F	N
MRO	5/6/2009	12:42 PM	2	ST-1	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	0	A	0.0	0.1	12.0	0	22	77	U	U
MRO	5/6/2009	1:08 PM	2	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	22	A	7.0	0.1	12.0	60	22	77	M	N
MRO	5/6/2009	1:27 PM	1	1B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	23	A	3.5	0.1	12.0	51	22	77	F	N
MRO	5/6/2009	1:39 PM	1	C	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	24	A	5.0	0.1	12.0	55	22	77	F	N
MRO	5/5/2009	2:15 PM	2	3B	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	11	A	4.0	0.1	12.0	51	22	77	M	N
MRO	5/7/2009	5:18 PM	1	ST-3	Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	24	A	5.0	0.1	12.0	55	22	77	F	Y
MRO	5/7/2009				Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	25									N
MRO	5/7/2009				Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	30									N
MRO	5/7/2009				Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	31									N
MRO	5/7/2009				Lizard	ASHY	Orange-Throated Whiptail	Aspidoscelis hyperythrus	32									N

Collector	Date	Time	Array	Bucket	Type	Species	CommonName	ScientificName	Clip	Age	WtG	MinWt	MaxWt	LnMm	MinLn	MaxLn	Sex	Recap
MRO	6/3/2009	12:08 PM	7	ST-2	Mouse/Rat	CHCA	California Pocket Mouse	Chaetodipus californicus	0	A		0.0	4000.0				U	U
MRO	6/4/2009	12:10 PM	7	ST-1	Mouse/Rat	CHCA	California Pocket Mouse	Chaetodipus californicus	0	A		0.0	4000.0				U	U
MRO	6/4/2009	12:10 PM	1	ST-3	Mouse/Rat	CHCA	California Pocket Mouse	Chaetodipus californicus	0	A		0.0	4000.0				U	U
DM, MS	7/14/2009	5:34 AM	1	ST-2	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
DM, MS	7/14/2009	5:45 AM	1	ST-1	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax										
DM, MS	7/16/2009	6:42 AM	7	ST-2	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							M	
DM, MS	7/14/2009	6:43 AM	7	ST-2	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							M	
DM, MS	7/14/2009	6:46 AM	7	ST-2	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							U	
DM, MS	7/16/2009	6:50 AM	7	ST-1	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
DM, MS	7/16/2009	7:04 AM	7	ST-3	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
DM, MS	7/17/2009	7:04 AM	7	3B	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
DM, MS	7/14/2009	7:08 AM	7	ST-1	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
DM, MS	7/17/2009	7:12 AM	7	ST-3	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
DM, MS	7/14/2009	7:15 AM	7	ST-3	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
DM, MS	7/15/2009	8:42 AM	9	3B	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax		A							F	
MRO	6/3/2009	12:07 PM	9	ST-2	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax	0	J		0.0	4000.0				U	U
MRO	5/5/2009	1:01 PM	7	ST-1	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax	0	A	0.0	0.0	4000.0				U	U
MRO	6/3/2009	1:05 PM	2	ST-2	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax	0	A		0.0	4000.0				U	U
MRO	6/2/2009	2:10 PM	7	ST-1	Mouse/Rat	CHFA	San Diego Pocket Mouse	Chaetodipus fallax	0	A		0.0	4000.0				U	U
MRO	6/5/2009	7:58 AM	8	ST-1	Snake	CRVI	Western Rattlesnake	Crotalus viridis	0	A							U	U
MRO	6/5/2009	9:50 AM	1	C	Lizard	ELMU	Southern Alligator Lizard	Elgaria multicarinata	3	SA	8.5	0.1	150.0	78	25	175	U	N
MRO	5/6/2009	12:13 PM	7	ST-2	Lizard	ELMU	Southern Alligator Lizard	Elgaria multicarinata	2	SA	6.0	0.1	150.0	60	25	175	M	N
MRO	5/5/2009	1:50 PM	2	C	Lizard	ELMU	Southern Alligator Lizard	Elgaria multicarinata	1	SA	6.0	0.1	150.0	61	25	175	U	N
MRO	5/8/2009	9:44 AM	8	C	Lizard	PLSK	Western Skink	Plestiodon skiltonianus	1	A	2.0	0.1	25.0	41	5	80	U	N
MRO	5/8/2009	9:31 AM	8	3B	Snake	HYTO	Night Snake	Hypsiglena torquata	0	A	9.0	1.0	18.0	255	95	360	U	N
DM, MS	7/15/2009	7:52 AM	8	ST-3	Snake	LAGE	California Kingsnake	Lampropeltis getula	370	A	60+			810			U	N
DM, MS	7/15/2009	8:29 AM	9	ST-1	Snake	LAGE	California Kingsnake	Lampropeltis getula	380	A	60+			795			U	N
MRO	5/5/2009	11:00 AM	8	ST-3	Snake	LAGE	Common Kingsnake	Lampropeltis getula	330	A	250.0	4.0	800.0	890	140	1200	U	N
MRO	5/5/2009	11:16 AM	8	ST-3	Snake	LAGE	Common Kingsnake	Lampropeltis getula	340	A	125.0	4.0	800.0	825	140	1200	U	N
MRO	5/5/2009	2:03 PM	2	ST-2	Snake	LAGE	Common Kingsnake	Lampropeltis getula	350	A	190.0	4.0	800.0	805	140	1200	U	N
MRO	5/7/2009		8	ST-3	Snake	LAGE	Common Kingsnake	Lampropeltis getula	360	A							U	N
MRO	5/6/2009	10:26 AM	8	ST-3	Snake	MAFL	Coachwhip	Masticophis flagellum	330	A	500.0	5.0	700.0	1185	130	1350	U	N
MRO	6/3/2009	9:31 AM	7	ST-3	Snake	MALA	California Whipsnake	Masticophis lateralis	330	A	290.0	3.0	350.0	924	130	1250	U	N
MRO	5/6/2009	9:35 AM	8	ST-1	Snake	MALA	California Whipsnake	Masticophis lateralis	340	A	90.0	3.0	350.0	765	130	1250	U	N
MRO	5/7/2009				Snake	MALA	California Whipsnake	Masticophis lateralis	330	A							U	N
MRO	6/3/2009	10:07 AM	2	3B	Other Mammal	MICA	California Vole	Microtus californicus	0	A		0.0	4000.0				U	U
MRO	6/2/2009	10:16 AM	2	ST-3	Other Mammal	MICA	California Vole	Microtus californicus	0	A		0.0	4000.0				U	U
MRO	5/6/2009	11:00 AM	9	1B	Other Mammal	MICA	California Vole	Microtus californicus	0	A	0.0	0.0	4000.0				U	U
MRO	5/6/2009	11:09 AM	9	2B	Other Mammal	MICA	California Vole	Microtus californicus	0	A	0.0	0.0	4000.0				U	U
MRO	5/8/2009	11:31 AM	2	C	Other Mammal	MICA	California Vole	Microtus californicus	0	A	0.0	0.0	4000.0				U	U
MRO	5/6/2009	11:57 AM	7	C	Other Mammal	MICA	California Vole	Microtus californicus	0	A	0.0	0.0	4000.0				U	U
MRO	5/5/2009	12:28 PM	7	C	Other Mammal	MICA	California Vole	Microtus californicus	0	A		0.0	4000.0				U	N
DM, MS	7/14/2009	7:45 AM	2	C	Mouse/Rat	MUMU	House Mouse	Mus Musculus		A							M	
MRO	6/4/2009	12:09 PM	9	3B	Mouse/Rat	MUMU	House Mouse	Mus musculus	0	A		0.0	4000.0				U	U

Collector	Date	Time	Array	Bucket	Type	Species	CommonName	ScientificName	Clip	Age	WtG	MinWt	MaxWt	LnMm	MinLn	MaxLn	Sex	Recap
MRO	6/2/2009	2:11 PM	7	3B	Mouse/Rat	MUMU	House Mouse	Mus musculus	0	A		0.0	4000.0				U	U
MRO	6/5/2009	9:10 AM	7	3B	Other Mammal	NOCR	Grey Shrew	Notiosorex crawfordi	0	A		0.0	4000.0				U	U
MRO	6/3/2009	3:44 PM	7	3B	Other Mammal	NOCR	Grey Shrew	Notiosorex crawfordi	0	A		0.0	4000.0				U	U
DM, MS	7/17/2009	6:40 AM	9	ST-3	Mouse/Rat	PEER	Cactus Mouse	Peromyscus eremicus		SA							F	
DM, MS	7/15/2009	8:11 AM	9	ST-2	Mouse/Rat	PEER	Cactus Mouse	Peromyscus eremicus		A							F	
DM, MS	7/16/2009	6:08 AM	8	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							F	
DM, MS	7/17/2009	6:19 AM	8	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							M	
DM, MS	7/15/2009	6:27 AM	7	ST-1	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							F	
DM, MS	7/15/2009	6:29 AM	7	ST-1	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/15/2009	7:13 AM	2	ST-3	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							F	
DM, MS	7/16/2009	7:18 AM	2	ST-3	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/16/2009	7:19 AM	2	ST-3	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/15/2009	7:23 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							F	
DM, MS	7/17/2009	7:24 AM	2	1B	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							F	
DM, MS	7/15/2009	7:26 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/15/2009	7:28 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							F	
DM, MS	7/15/2009	7:30 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							F	
DM, MS	7/15/2009	7:31 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							F	
DM, MS	7/16/2009	7:31 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/16/2009	7:32 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		SA							F	
DM, MS	7/15/2009	7:33 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							F	
DM, MS	7/16/2009	7:35 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/17/2009	7:35 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							F	
DM, MS	7/16/2009	7:37 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/17/2009	7:37 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							F	
DM, MS	7/17/2009	7:39 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/14/2009	7:41 AM	2	1B	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							F	
DM, MS	7/17/2009	7:42 AM	2	3B	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		A							M	
DM, MS	7/14/2009	7:53 AM	2	3B	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		SA							M	
DM, MS	7/14/2009	7:55 AM	2	ST-3	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							M	
DM, MS	7/14/2009	7:59 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		SA							F	
DM, MS	7/14/2009	8:02 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		U							U	
DM, MS	7/14/2009	8:02 AM	2	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		U							U	
DM, MS	7/15/2009	8:03 AM	8	ST-1	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J								
DM, MS	7/15/2009	8:09 AM	8	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							M	
DM, MS	7/15/2009	8:10 AM	8	ST-2	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus		J							F	
MRO	5/6/2009	9:53 AM	8	C	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus	0	A	0.0	0.0	4000.0				U	U
MRO	6/3/2009	1:00 PM	2	ST-3	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus	0	A		0.0	4000.0				U	U
MRO	6/2/2009	2:07 PM	8	C	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus	0	J		0.0	4000.0				U	U
MRO	6/2/2009	2:08 PM	9	ST-1	Mouse/Rat	PEMA	Deer Mouse	Peromyscus maniculatus	0	A		0.0	4000.0				U	U
DM, MS	7/15/2009	5:48 AM	1	ST-3	Snake	PICA	Gopher Snake	Pituophis catenifer	450	A	60+			1020			U	N
DM, MS	7/17/2009	5:52 AM	1	ST-1	Snake	PICA	Gopher Snake	Pituophis catenifer	460	A	60+			1090			U	N
MRO	6/3/2009	8:44 AM	7	ST-1	Snake	PIME	Gopher Snake	Pituophis catenifer	340	A		6.0	1200.0	860	210	1410	U	Y
MRO	5/7/2009	5:16 PM	1	ST-2	Snake	PIME	Gopher Snake	Pituophis catenifer	440	A		6.0	1200.0	1115	210	1410	U	N

Collector	Date	Time	Array	Bucket	Type	Species	CommonName	ScientificName	Clip	Age	WtG	MinWt	MaxWt	LnMm	MinLn	MaxLn	Sex	Recap
MRO	5/7/2009	5:19 PM	1	ST-1	Snake	PIME	Gopher Snake	Pituophis catenifer	340	A	400.0	6.0	1200.0	1036	210	1410	U	N
MRO	5/7/2009	5:20 PM	1	ST-1	Snake	PIME	Gopher Snake	Pituophis catenifer	330	A	210.0	6.0	1200.0	848	210	1410	U	N
DM, MS	7/14/2009	5:42 AM	1	C	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							M	
DM, MS	7/17/2009	5:42 AM	1	3B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis										
DM, MS	7/15/2009	5:46 AM	1	ST-2	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/16/2009	5:47 AM	1	ST-1	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/15/2009	6:22 AM	7	ST-2	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/15/2009	6:32 AM	7	ST-3	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							M	
DM, MS	7/16/2009	6:47 AM	7	ST-1	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							M	
DM, MS	7/16/2009	6:49 AM	7	ST-1	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/15/2009	7:02 AM	2	3B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/17/2009	7:02 AM	7	1B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/14/2009	7:05 AM	7	1B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		SA							M	
DM, MS	7/17/2009	7:06 AM	7	3B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/14/2009	7:09 AM	7	ST-1	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/17/2009	7:10 AM	7	ST-3	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							M	
DM, MS	7/14/2009	7:12 AM	7	3B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							M	
DM, MS	7/16/2009	7:21 AM	2	3B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
DM, MS	7/16/2009	7:29 AM	2	2B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis		A							F	
MRO	5/8/2009	11:35 AM	2	2B	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis	0	A	0.0	0.0	4000.0				U	U
MRO	5/6/2009	12:56 PM	2	C	Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis	0	A	0.0	0.0	4000.0				U	U
MRO	5/7/2009		2		Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis	0	A							U	U
MRO	5/7/2009		2		Mouse/Rat	REME	Western Harvest Mouse	Reithrodontomys megalotis	0	A							U	U
DM, MS	7/14/2009	5:36 AM	1	ST-2	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	22	A	10.8			65			M	N
DM, MS	7/15/2009	5:38 AM	1	2B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	5	A	9.5			72			M	Y
DM, MS	7/15/2009	5:43 AM	1	2B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	24	A	7.8			59			F	N
DM, MS	7/14/2009	5:49 AM	1	ST-3	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	23	A	8.3			57			F	N
DM, MS	7/16/2009	6:53 AM	7	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	1000	A	9.2			62			M	Y
DM, MS	7/15/2009	7:09 AM	2	ST-3	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	25	A	8.1			66			F	N
DM, MS	7/17/2009	7:27 AM	2	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	31	A	11.2			66			F	N
DM, MS	7/16/2009	7:40 AM	2	ST-1	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	30	A	11.2			59			M	N
DM, MS	7/17/2009	7:46 AM	2	ST-3	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	32	A	10.2			63			F	N
MRO	6/3/2009	8:02 AM	8	ST-2	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	23	A	8.5	0.1	25.0	57	10	90	F	N
MRO	6/5/2009	8:23 AM	8	3B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	31	A	10.8	0.1	25.0	66	10	90	F	N
DM, MS	7/15/2009	8:45 AM	9	3B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	30	J	0.5			26			M	N
MRO	6/4/2009	8:46 AM	9	ST-2	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	25	A	9.0	0.1	25.0	62	10	90	F	N
MRO	6/3/2009	9:12 AM	7	2B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	24	A	15.5	0.1	25.0	75	10	90	F	N
MRO	6/5/2009	9:24 AM	2	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	32	A	9.0	0.1	25.0	67	10	90	F	N
MRO	6/5/2009	9:27 AM	2	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	2	A	11.0	0.1	25.0	67	10	90	F	Y
MRO	6/4/2009	9:54 AM	1	3B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	0	A		0.1	25.0		10	90	U	N
MRO	6/5/2009	10:00 AM	1	3B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	33	A	17.0	0.1	25.0	72	10	90	M	N
MRO	6/3/2009	10:01 AM	2	ST-2	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	0	A		0.1	25.0		10	90	M	N
MRO	6/4/2009	10:08 AM	1	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	30	A	9.3	0.1	25.0	60	10	90	F	N
MRO	6/2/2009	10:10 AM	2	3B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	22	A	6.0	0.1	25.0	53	10	90	M	N

Collector	Date	Time	Array	Bucket	Type	Species	CommonName	ScientificName	Clip	Age	WtG	MinWt	MaxWt	LnMm	MinLn	MaxLn	Sex	Recap
MRO	6/3/2009	10:18 AM	2	ST-3	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	0	A		0.1	25.0		10	90	F	N
MRO	6/2/2009	10:36 AM	1	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	334	A	7.5	0.1	25.0	59	10	90	F	N
MRO	5/6/2009	10:55 AM	9	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	10	A	10.5	0.1	25.0	61	10	90	F	N
MRO	5/6/2009	10:59 AM	9	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	0	A	0.0	0.1	25.0	0	10	90	M	N
MRO	5/8/2009	11:39 AM	2	ST-2	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	21	A	12.3	0.1	25.0	66	10	90	F	N
MRO	5/6/2009	11:58 AM	7	C	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	10	A	13.0	0.1	25.0	65	10	90	F	N
MRO	5/5/2009	12:18 PM	7	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	1	A	11.0	0.1	25.0	61	10	90	M	N
MRO	5/6/2009	1:09 PM	2	3B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	11	A	15.0	0.1	25.0	70	10	90	F	N
MRO	5/6/2009	1:30 PM	1	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	12	A	5.0	0.1	25.0	51	10	90	M	N
MRO	5/6/2009	1:33 PM	1	C	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	13	A	10.0	0.1	25.0	62	10	90	M	N
MRO	5/5/2009	1:41 PM	2	C	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	2	A	10.0	0.1	25.0	58	10	90	F	N
MRO	5/6/2009	1:44 PM	1	ST-3	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	14	A	9.5	0.1	25.0	58	10	90	M	N
MRO	5/5/2009	1:48 PM	2	C	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	3	A	12.0	0.1	25.0	58	10	90	F	N
MRO	5/6/2009	1:51 PM	1	ST-2	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	15	A	13.5	0.1	25.0	69	10	90	M	N
MRO	5/5/2009	2:29 PM	1	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	4	A	10.0	0.1	25.0	57	10	90	F	N
MRO	5/5/2009	2:31 PM	1	1B	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	5	A	5.0	0.1	25.0	54	10	90	M	N
MRO	5/7/2009	5:21 PM	1	ST-1	Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	0	A	0.0	0.1	25.0	0	10	90	M	U
MRO	5/7/2009				Lizard	SCOC	Western Fence Lizard	Sceloporus occidentalis	20									N
MRO	5/8/2009	11:26 AM	2	ST-1	Other Mammal	THBO	Botta's Pocket Gopher	Thomomys bottae	0	A	0.0	0.0	4000.0				U	U
DM, MS	7/14/2009	6:41 AM	7	ST-2	Mouse/Rat	CHsp	unknown mouse	unknown mouse		A							F	
DM, MS	7/14/2009	6:10 AM	9	3B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	30	J	0.5			26			U	N
DM, MS	7/15/2009	6:11 AM	7	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	33	A	3.0			47			F	R
DM, MS	7/16/2009	6:19 AM	9	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	50	J	0.5			25			U	N
DM, MS	7/15/2009	6:19 AM	7	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	40	J	0.5			23			U	N
DM, MS	7/14/2009	6:21 AM	8	3B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	31	J	0.5			25			U	N
DM, MS	7/16/2009	6:22 AM	9	3B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	51	J	0.5			39			U	N
DM, MS	7/17/2009	6:28 AM	9	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana		J	0.5			26			U	N
DM, MS	7/17/2009	6:29 AM	9	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	43	J	0.5			25.5			U	Y
DM, MS	7/17/2009	6:36 AM	9	3B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	52	A	4.0			55			F	N
DM, MS	7/15/2009	6:51 AM	2	ST-1	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	2									Y
DM, MS	7/15/2009	6:53 AM	2	ST-1	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	4									Y
DM, MS	7/14/2009	6:53 AM	7	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	31	A	3.2			46			M	N
DM, MS	7/14/2009	6:55 AM	7	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	32	J	0.5			26			M	N
DM, MS	7/15/2009	6:58 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	24	A	3.2			48			F	Y
DM, MS	7/14/2009	6:59 AM	7	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	33	A	3.5			47			F	N
DM, MS	7/17/2009	7:07 AM	7	3B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	53	J	0.5			24			U	N
DM, MS	7/15/2009	7:16 AM	2	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	41	J	0.5			22			U	N
DM, MS	7/15/2009	7:19 AM	2	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	42	J	0.5			23			U	N
DM, MS	7/16/2009	7:24 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	24	A	3.7			51			F	Y
DM, MS	7/16/2009	7:26 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	41	J	0.5			20			U	Y
DM, MS	7/17/2009	7:29 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	24	A	3.5			46			F	Y
DM, MS	7/17/2009	7:32 AM	2	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	42	J	0.5			22			J	Y
DM, MS	7/14/2009	7:46 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	34	A	3.4			44			F	N
DM, MS	7/14/2009	7:50 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	35	J	0.5			26			U	N

Collector	Date	Time	Array	Bucket	Type	Species	CommonName	ScientificName	Clip	Age	WtG	MinWt	MaxWt	LnMm	MinLn	MaxLn	Sex	Recap
MRO	6/2/2009	8:13 AM	8	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	30	A	3.0	0.1	10.0	42	10	65	F	N
DM, MS	7/15/2009	8:15 AM	9	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	43	J	0.5			22			U	N
DM, MS	7/15/2009	8:18 AM	9	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	44	J	0.5			20			U	N
DM, MS	7/15/2009	8:25 AM	9	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	45	J	0.5			24			U	N
MRO	6/3/2009	9:06 AM	7	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	32	A	3.8	0.1	10.0	43	10	65	M	N
MRO	6/4/2009	9:41 AM	2	3B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	33	A	4.0	0.1	10.0	44	10	65	F	Y
MRO	6/2/2009	10:00 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	120	A	4.0	0.1	10.0	45	10	65	M	N
MRO	6/3/2009	10:02 AM	2	ST-2	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	15	A		0.1	10.0		10	65	M	Y
MRO	6/2/2009	10:04 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	15	A	4.5	0.1	10.0	46	10	65	M	Y
MRO	6/3/2009	10:04 AM	2	ST-2	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	0	A		0.1	10.0		10	65	U	U
MRO	6/3/2009	10:12 AM	2	3B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	33	A	4.0	0.1	10.0	44	10	65	F	N
MRO	6/2/2009	10:27 AM	1	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	31	A	4.5	0.1	10.0	47	10	65	M	N
MRO	5/8/2009	10:33 AM	9	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	25	A	3.3	0.1	10.0	41	10	65	F	N
MRO	5/8/2009	11:01 AM	7	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	23	A	4.0	0.1	10.0	47	10	65	M	Y
MRO	5/8/2009	11:32 AM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	0	A	0.0	0.1	10.0	0	10	65	M	N
MRO	5/6/2009	11:47 AM	7	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	10	A	4.0	0.1	10.0	41	10	65	F	N
MRO	5/6/2009	11:51 AM	7	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	12	A	3.0	0.1	10.0	42	10	65	F	N
MRO	5/6/2009	12:40 PM	2	ST-1	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	13	A	4.0	0.1	10.0	48	10	65	M	N
MRO	5/6/2009	12:49 PM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	14	A	3.5	0.1	10.0	46	10	65	M	N
MRO	5/6/2009	12:58 PM	2	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	15	A	4.0	0.1	10.0	46	10	65	M	N
MRO	5/5/2009	1:30 PM	2	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	1	A	4.0	0.1	10.0	44	10	65	F	N
MRO	5/5/2009	1:33 PM	2	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	2	A	4.5	0.1	10.0	42	10	65	F	N
MRO	5/5/2009	1:35 PM	2	1B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	3	SA	3.5	0.1	10.0	41	10	65	F	N
MRO	5/6/2009	1:36 PM	1	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	20	A	5.0	0.1	10.0	45	10	65	F	N
MRO	5/5/2009	1:45 PM	2	C	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	4	A	3.5	0.1	10.0	47	10	65	F	N
MRO	5/5/2009	1:56 PM	2	2B	Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	5	A	3.0	0.1	10.0	43	10	65	F	N
MRO	5/7/2009				Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	21									N
MRO	5/7/2009				Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	22									N
MRO	5/7/2009				Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	23									N
MRO	5/7/2009				Lizard	UTST	Side-Blotched Lizard	Uta stansburiana	24									N
DM, MS	7/17/2009	5:44 AM	1	C	Other	XELA	African Clawed Frog	Xenopus laevis	1	A	57.8			84			U	N

BH = Bradford Hollingsworth
MT = Melinda Taini
MS = Melissa Stepek
DM = Dana McLaughlin
MRO = Mark Roll

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Appendix E:

Bird Survey Data

Avian Point Count, Maximum Numbers by Station

Species / Station →	1	→	2	→	3	→	4	→	5	→	6	→	7	→	8	→	9	→	10	→	11	→	12	→	13	→	14
Gadwall		2	1																						2		
Mallard		1			1																				4		
Ruddy Duck																									1		
California Quail							1																				
Pied-billed Grebe		1																									
Great Blue Heron																									1		
Northern Harrier																	1										
Cooper's Hawk											2														1		1
Red-shouldered Hawk							1		1		1												1				
Red-tailed Hawk							1								1						2						
American Kestrel													1														
American Coot		1																							3		
Rock Pigeon							1																				
Mourning Dove	1				1														1		5		2				2
Greater Roadrunner																	1	1									
Black-chinned Hummingbird																							1				
Anna's Hummingbird	2		1				1		1		1		1		1		1						2				
Nuttall's Woodpecker											1								1								1
Downy Woodpecker						1					1														1		
Willow Flycatcher (migrant)																								1			
Pacific-slope Flycatcher	2				1						1												2		1		1
Black Phoebe											1												1				
Western Kingbird																					1						
Bell's Vireo	3	2	1		3						2								2				2		2		2
Warbling Vireo																							1				
Black-throated Magpie-Jay (e)																									1		
American Crow	1								3						1				1								
Common Raven											1																
Horned Lark													1		2						3						
Tree Swallow		1																									1
Northern Rough-winged Swallow		5							1																		3
Cliff Swallow		3	2		2				3				1								20				12		3
Bushtit	12						1						2		6				8				3		8		6
Bewick's Wren					1		1					1					2						1				2
House Wren																									1		3
Marsh Wren		3																									
California Gnatcatcher													1														
Swainson's Thrush																							1				
Wrentit			1		1		1						2		1		1										
Northern Mockingbird							1		1																		
California Thrasher							1					1															
Orange-crowned Warbler	1		2		2		1				3								3								1
Yellow Warbler	6	1	2		1				1		7								2				4		4		2
Common Yellowthroat	2	1	2		1				1		2						3		2		1		4		5		6
Wilson's Warbler					1				1														1				2
Yellow-breasted Chat	5		2		3						3	1					1		2				3		4		2
Spotted Towhee							1				1								1				1		1		1
California Towhee	2		1				2						3		2										2		
Rufous-crowned Sparrow													1														
Song Sparrow	4		3		4				1		5	1					3		3		2		5		3		5
Western Tanager																							1				
Northern Cardinal (e)																	1						1				
Black-headed Grosbeak		1	1						1		3																
Blue Grosbeak																				2	1				1		1
Red-winged Blackbird		3																							15		
Brown-headed Cowbird					1						1														1		
Hooded Oriole															1												
House Finch			1				3		5		1		1				5				2		6		3		6
Lesser Goldfinch																							1				
American Goldfinch	4		2		2		1		1										2		2		1		1		2
House Sparrow									1																		

(e) escaped captive

Raptors Maximum Numbers by Station

Species	Station →	1	2	3
Turkey Vulture			1	
Cooper's Hawk				1
Northern Harrier		1	1	
Red-shouldered Hawk				1
Red-tailed Hawk		2	1	
American Kestrel		1	1	
Say's Phoebe		2		
Cassin's Kingbird				2
Western Kingbird		1	1	3
Common Raven		1		
Cliff Swallow		15		
European Starling		2		
Yellow-rumped Warbler		1		
Bullock's Oriole			1	
House Finch		1		

Station 1: Spooner's Mesa, east end

Station 2: 19th Street; north of Monument Rd

Station 3: Sunset Avenue; east end, northeast of ballfields

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Appendix F:

Focused Survey Reports for Light-Footed Clapper Rail and Southwestern Willow Flycatcher

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August 28, 2009

Ms. Sandy Marquez
Recovery Permit Coordinator
Carlsbad Field Office
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92011

Subject: Results of southwestern willow flycatcher (*Empidonax traillii extimus*) monitoring surveys conducted for the Tijuana River Valley Regional Park, County of San Diego Department of Parks and Recreation.

Dear Ms. Marquez,

The purpose of this report is to summarize the results of southwestern willow flycatcher (*Empidonax traillii extimus*) (SWWF) Year-1 monitoring surveys that were conducted on behalf of the County of San Diego Department of Parks and Recreation (DPR) within suitable habitats of the Tijuana River Valley Regional Park (TRVRP). TRVRP is owned by the County of San Diego Department of Parks and Recreation (DPR) with the exception of four parcels owned by the City of San Diego. In 1996, the County of San Diego and City of San Diego entered into a Joint Exercise of Powers Agreement for operation of City owned properties within the TRVRP. TRVRP is located within the City of San Diego Multiple Species Conservation Program (MSCP) Sub-area Plan. As manager of the Preserve, DPR is responsible for all MSCP-required biological monitoring.

Technology Associates (TAIC) conducted six monitoring surveys for the federally and state endangered SWWF following a monitoring protocol drafted by the U.S. Fish and Wildlife Service (USFWS) for the purpose of MSCP animal monitoring in the region (USFWS 2008). The monitoring surveys were conducted to detect the presence specifically of the subspecies *E. t. extimus* in the survey area, and to determine if required conditions of this MSCP-covered species' habitat are being met within TRVRP, and to develop management recommendations.

PROJECT LOCATION

TRVRP occupies much of the Tijuana River valley floodplain and is located south of the city of Imperial Beach in the southwestern corner of San Diego County (Figure 1). The area surveyed within TRVRP consisted of suitable habitat as identified by the USFWS (USFWS 2008) and TAIC habitat assessments, and was restricted to the east end of TRVRP. The survey area is located on the Imperial Beach 7.5-minute U.S. Geologic Survey quadrangle map at sections 34 and 35, Township 18 South, Range 2 West; and sections 2 and 3, Township 19 South, Range 2 West (Figure 2).

9089 Clairemont Mesa Blvd., Suite 200, San Diego, CA 92123
(858) 300-2346; (858) 300-2353 fax

PROJECT DESCRIPTION

This project is for monitoring and management according to MSCP provisions to monitor and manage conserved natural and cultural resources in perpetuity. The objective of resources management in TRVRP is to preserve and manage the biological and cultural resources within TRVRP while balancing the need to provide appropriate passive recreational opportunities. It is the goal of DPR to promote natural and cultural resource management and conservation in balance with recreation and economic development. TRVRP is located within the City of San Diego Multiple Species Conservation Program (MSCP) Subarea Plan area and contains many of the MSCP-covered species and conserved habitats. It is identified as a Core Resource Area in the MSCP, the habitat of which, if lost, could not be mitigated or replaced elsewhere. Because this region contains one of the most productive and important riparian wetlands area in the County, the MSCP proposes to conserve approximately 94 percent of the valley core area, in association with the many sensitive and MSCP-covered species in the area.

METHODS

Three focused surveys of two days per survey (a total of six surveys) were conducted in suitable habitat within the survey area between 28 May and 8 July 2009 by Geoffrey Rogers based on the most current USFWS survey protocol for the species (USFWS 2000). The survey area consisted of suitable riparian habitat within TRVRP (Figure 3) that could be covered in six visits using the Sogge guidelines (1997) (Figure 4). A one-day habitat assessment was performed prior to the survey to rank suitable habitat areas by presence of surface water—an important factor in willow flycatcher habitat; presence of existing trails or mapped indication of proposed trails and ready access due to protocol time limitations. The survey area (Figure 4) was determined as follows:

- The density of vegetation with no trail network rendered a vast area of suitable habitat in the center of the riparian floodplain as inaccessible.
- Areas along the Tijuana River west of Hollister Avenue with an adequate existing trail network were considered lacking in surface water.
- The area along Dairy Mart Road immediately south of Interstate 5 has nearly permanent surface water, provides adequate habitat for many species, and has good accessibility. Both sides of Dairy Mart Road were surveyed.
- The portion of survey area south of the old Tijuana River channel near the intersection of Dairy Mart and Monument roads does have a limited trail network and at the time had limited surface water.

The surveys were conducted by Mr. Rogers under authorization of federal permit #TE801346-4 (expires 2011). Mr. Rogers is experienced with the species and its habitat requirements. Surveys were conducted by slowly walking through suitable habitat and periodically playing a recording of the species advertising song. After playing the recording, periods of silence were used to listen for flycatcher vocalizations. Mr. Rogers also positioned himself in areas to allow for visual observations. Potential habitat was assessed

based on personal knowledge and published data on the species. All surveys were conducted in the three survey periods (Table 1) as recommended by the USFWS (2000) (each survey period included two consecutive days). Other avian species observed were also recorded (see attached list of observed avian species).

Table 1: Survey Times and Conditions

Survey Number	Date	Surveyors[1]	Start Time	End Time	Temperature (ºF)	Cloud Cover (% cover)	Wind (mph)
1	5/28/09	GR	0550	1015	55-64	100	0
2	5/29/09	GR	0600	1005	55-62	100	0-2
3	6/18/09	GR	0600	1015	55-65	100	0
4	6/19/09	GR	0600	1005	55-67	100	0
5	7/7/09	GR	0545	1000	57-70	100-0	0-2
6	7/8/09	GR	0545	1000	60-72	100-20	0

[1] Geoffrey Rogers (GR)

RESULTS

The SWWF was not detected during the 2009 focused surveys; therefore, this species is considered absent from the survey area at this time. The SWWF is an obligate riparian species and typically inhabits structurally diverse woodland along watercourses, including willow forests, oak woodlands, and mule fat scrub. It has been found to nest only in dense riparian vegetation associated with streams, rivers, lakes, springs, and other watercourses and wetlands (Sogge et al. 1997)." Although the species is currently absent, suitable riparian habitat for the SWWF is present within the survey area.

The survey area encompassed two separate areas covered over two consecutive days (a total of three survey periods). The more northerly area included the large pond on the west side of Dairy Mart Road immediately south of Interstate 5, a smaller area along the east side of Dairy Mart Road, and an extension of riparian habitat to the south along Dairy Mart Road. The second area, to the south, included portions of the Tijuana River channel immediately west of the new Dairy Mart Road bridge and an extended area along the south edge of the old river channel near the intersection of Dairy Mart and Monument roads. Both areas support structurally diverse willow riparian forest and scrub that appears sufficient for the southwestern willow flycatcher (Figure 3 and 4). Although the majority of the survey area contains habitat for flycatchers, small portions are covered only with weedy annuals such as black mustard (*Brassica nigra*), crown daisy (*Chrysanthemum coronarium*), and patchy stands of mule fat (*Baccharis salicifolia*). In areas of mature riparian forest, the canopy is composed of well developed Goodding's black willow (*Salix gooddingii*), arroyo willow (*S. lasiolepis*), narrow-leaved willow (*S. exigua*), and a variety of non-native species including giant reed (*Arundo donax*), castor bean (*Ricinus communis*), Brazilian pepper (*Schinus terebinthifolius*), and occasionally salt-cedar (*Tamarix* sp.). The shrub layer within the survey area at the north end of Dairy Mart Road is minimally developed in most places and generally comprised of younger growth of the previously mentioned species; however, in the southern

survey area where it crosses the old river channel just west of the Dairy Mart Road bridge are treeless thickets with dense desert fragrance (*Hymenoclea monogyra*), mule fat, cocklebur (*Xanthium strumarium*), crown daisy, and black mustard. Saltbush (*Atriplex* sp.) grows in scattered patches while cocklebur is sometimes fairly widespread. The ground cover/herb layer under the densest trees contains extensive detritus except for minimal patches of garden nasturtium (*Tropaeolum majus*) and a few other invasives.

DISCUSSION

The SWWF was not detected in the survey area during the 2009 surveys. However, the subspecies of willow flycatcher that migrates through San Diego County, *E. t. brewsteri*, was detected. *E. t. brewsteri*, the little willow flycatcher, breeds in central California and is state-listed as Endangered but not federally listed. Unitt (2004) indicates that *E. t. brewsteri* passes through San Diego County starting in May with peak movement in early June. This is the only subspecies of willow flycatcher previously recorded in the Tijuana River Valley (Unit 2004). Field identification of the two subspecies is dependant on date of sighting, quality and delivery of vocalizations, and plumage. The individual judged by these criteria to be *E. t. brewsteri* was detected on 29 May at 3601238mN; 492969mE (UTM Zone 11, NAD 83). It was not detected in subsequent survey visits. Several brown-headed cowbirds (*Molothrus ater*) were observed within the survey area and are expected to parasitize species nesting in the survey area.

Suitable habitat for the SWWF is present within the survey area, and therefore it conceivably may nest here in the future. However, future monitoring efforts should be limited unless new information indicates a nesting presence on-site.

I certify that the information in this survey report and attached exhibits fully and accurately represents the work conducted and conclusions reached for this project.

Sincerely,

Geoffrey Rogers
Wildlife Biologist

Christina Schaefer
Senior Conservation Biologist

Enclosures: Figures 1-4, List of Observed Species, and Willow Flycatcher Survey Detection Form.

REFERENCES

Sogge, M. K. R. M. Marshall, S. J. Sferra, and T. J. Tibbits. 1997. A southwestern willow flycatcher natural history summery and survey protocol. National Park Service Colorado Plateau Research Station at Northern Arizona University, Flagstaff. Technical Report NPS/NAUCPRS/NRTR-97/12. 37 pp.

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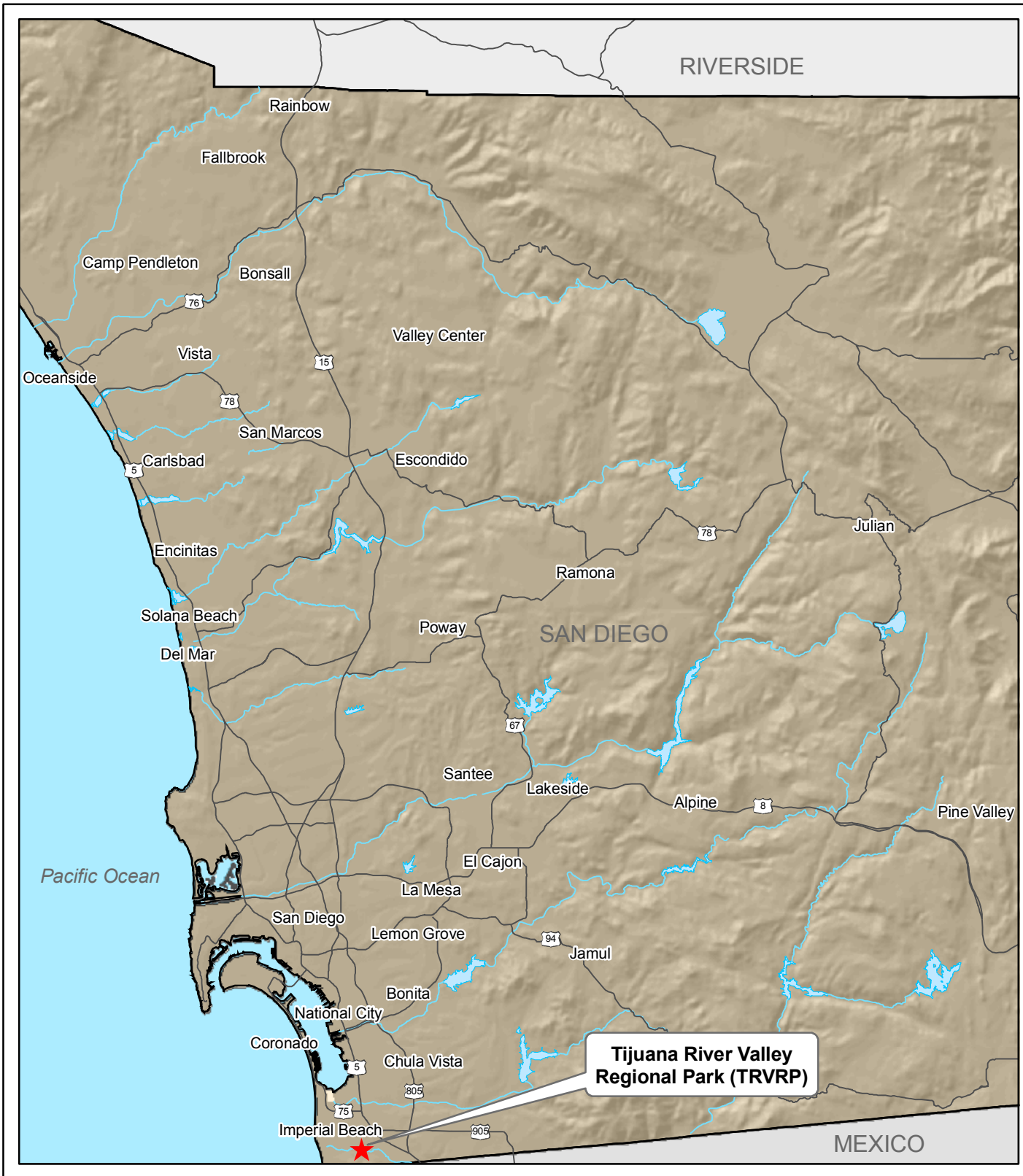
U.S. Fish and Wildlife Service (USFWS). 1998. Draft Recovery Plan for the Least Bell's Vireo. U.S. Fish and Wildlife Service, Portland, OR. 139 pp.

Ibid. 2000. Southwestern Willow Flycatcher Protocol Revision 2000. 3 pp.

Ibid. 2004. Updated Southwestern Willow Flycatcher Survey Forms. 3 pp.

Ibid. 2008. San Diego Multiple Species Conservation Program Animal Monitoring Protocols. Prepared for the City of San Diego; funded by California Department of Fish and Game Local Assistance Grant. February 2008.



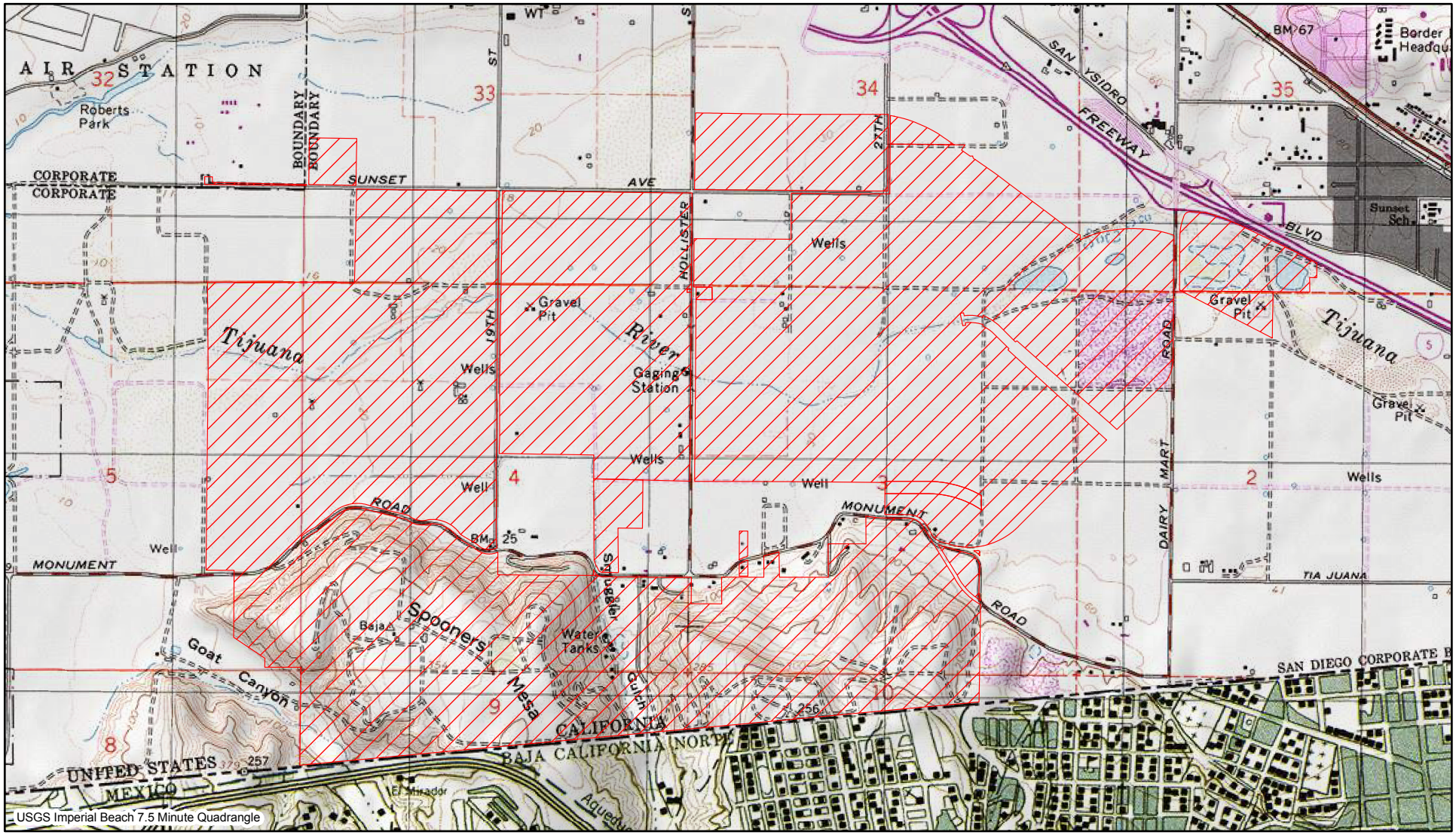
MSCP Monitoring
TRVRP

Regional Location Map

Figure 1

File: T:\projects\DPR_MSCPMonitoring\plots\TRVRP\TRVRP Figures\Regional Location Portrait.mxd

Date: Jun 01, 2009



Legend

TRVRP MSCP Monitoring Study Area

N

Feet

0 2,000

MSCP Monitoring
TRVRP

USGS Topographic Quadrangle

Figure 2

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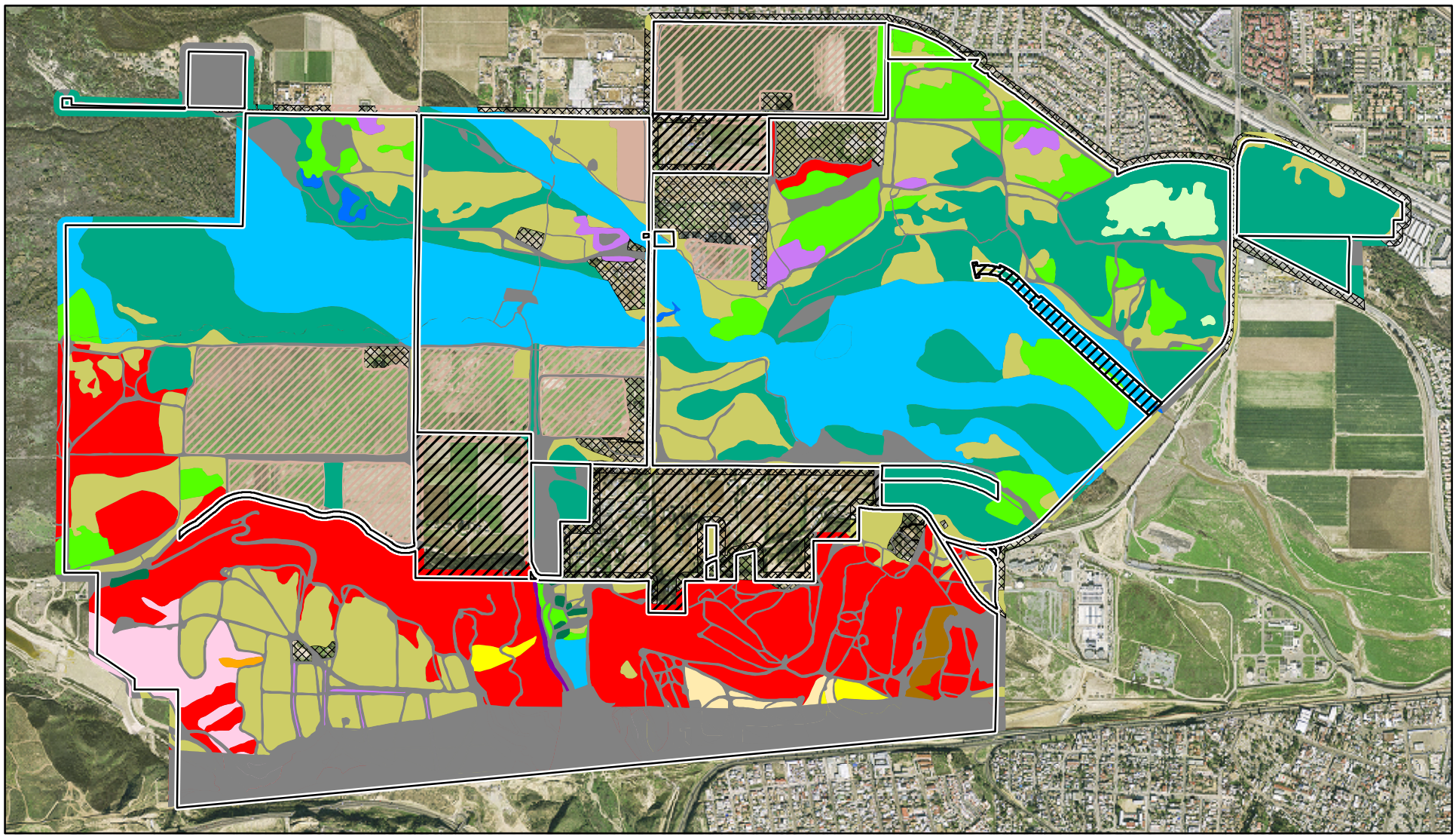
Date: Aug 12, 2009



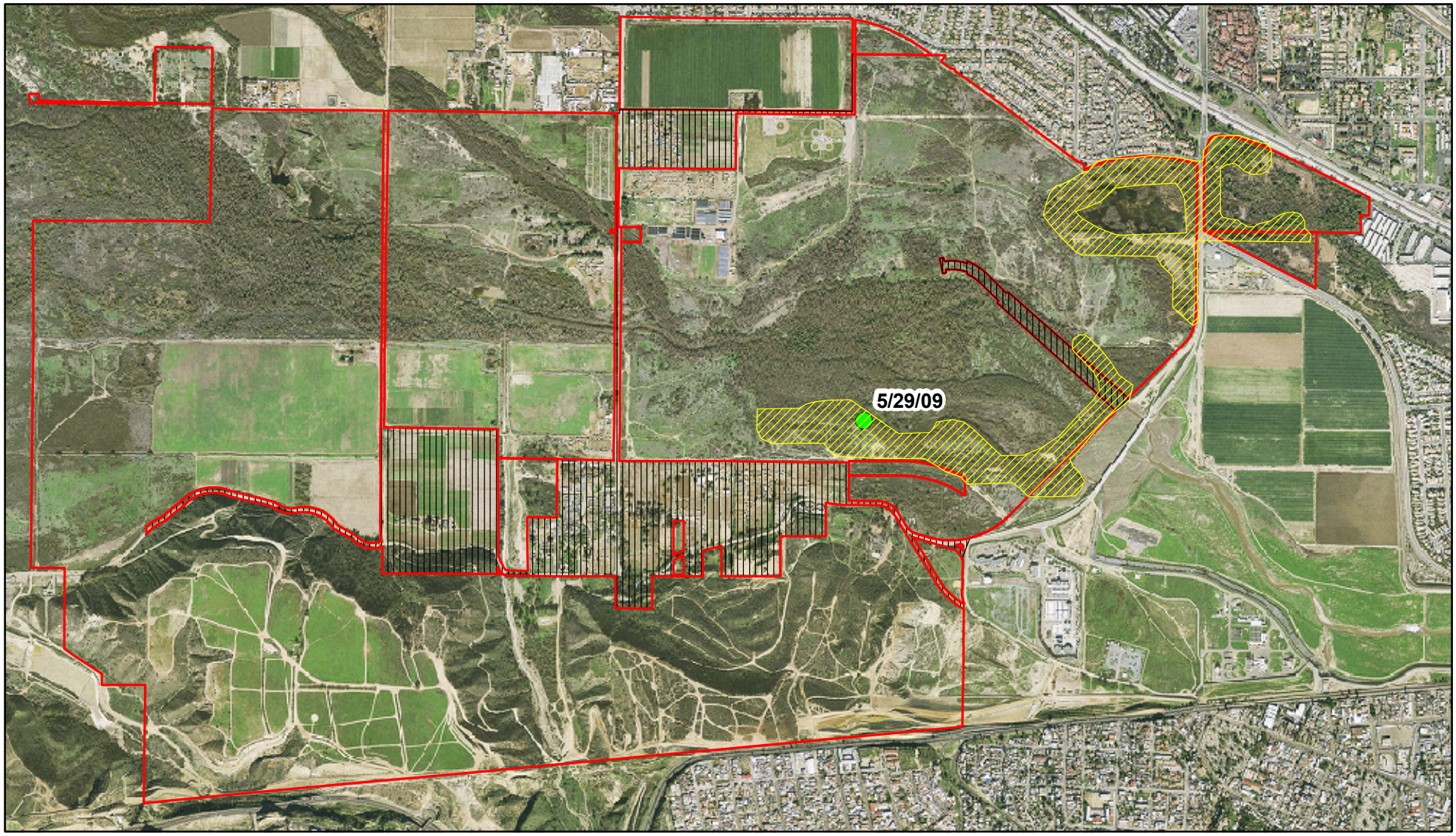
MSCP Monitoring
TRVRP

Vegetation Communities

Figure 3

File: T:\projects\DPR_MSCPMonitoring\plots\TRVRP\TRVRP Figures\Vegetation.mxd

Date: Aug 12, 2009



MSCP Monitoring
TRVRP

Southwestern Willow Flycatcher Survey

Figure 4

File: T:\projects\DPR_MSCPMonitoring\plots\TRVRP\TRVRP Figures\SWWillowFlycatcher10a\Survey Area.mxd

Date: Aug 13, 2009

List of Observed Avian Species

Common Name	Scientific Name
Birds	
Gadwall	*Anas strepera*
Mallard	*Anas platyrhynchos*
Ruddy Duck	*Oxyura jamaicensis*
Pied-Billed Grebe	*Podiceps nigricollis*
American Bittern	*Botaurus lentiginosus*
Great Blue Heron	*Ardea herodias*
Green Heron	*Butorides virescens*
Cooper's Hawk	*Accipiter cooperii*
Red-shouldered Hawk	*Buteo lineatus*
American Coot	*Fulica americana*
Mourning Dove	*Zenaida macroura*
Anna's Hummingbird	*Calypte anna*
Nuttall's Woodpecker	*Picoides nuttallii*
Downy Woodpecker	*Picoides pubescens*
Willow Flycatcher	*Empidonax traillii brewsteri*
Pacific-Slope Flycatcher	*Empidonax difficilis*
Black Phoebe	*Sayornis nigricans*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Cassin's Kingbird	*Tyrannus vociferans*
Bell's Vireo	*Vireo bellii*
Hutton's Vireo	*Vireo huttoni*
American Crow	*Corvus brachyrhynchos*
Tree Swallow	*Tachycineta bicolor*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow	*Petrochelidon pyrrhonota*
Bushtit	*Psaltriparus minimus*
Bewick's Wren	*Thryomanes bewickii*
House Wren	*Troglodytes aedon*
Marsh Wren	*Cistothorus palustris*
Northern Mockingbird	*Mimus polyglottos*
European Starling	*Sturnus vulgaris*
Orange-crowned Warbler	*Vermivora celata*
Yellow Warbler	*Dendroica petechia*
Common Yellowthroat	*Geothlypis trichas*
Yellow-breasted Chat	*Icteria virens*
Spotted Towhee	*Pipilo maculatus*
California Towhee	*Pipilo crissalis*
Song Sparrow	*Melospiza melodia*
Northern Cardinal (*escaped*)	*Cardinalis cardinalis*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Blue Grosbeak	*Passerina caerulea*
Red-winged Blackbird	*Agelaius phoeniceus*
Brown-headed Cowbird	*Molothrus ater*
Hooded Oriole	*Icterus cucullatus*

List of Observed Avian Species (continued)

Common Name	Scientific Name
Birds	
House Finch	*Carpodacus mexicanus*
Lesser Goldfinch	*Spinus psaltria*
American Goldfinch	*Spinus tristis*

Willow Flycatcher Survey and Detection Form (revised April, 2004)

Site Name TIJUANA RIVER VALLEY State CA County SAN DIEGO
USGS Quad Name IMPERIAL BEACH Elevation 20-35 (feet) meters (circle one)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ☒ *Yes* ☐ *No*

Site Coordinates: Start: N 3601336 E 492517 UTM (WEST; SEE SURVEY AREA MAP)
Stop: N 3601898 E 494478 UTM (EAST)
Datum WGS 84 (NAD27 preferred) Zone 11

*** Fill in additional site information on back of this page ****

Survey # / Observer(s) (Full Name)	Date (m/d/y) / Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N	Cowbirds Detected? Y or N	Presence of Livestock, Recent sign, If Yes, Describe Y or N	Comments about this survey (e.g., bird behavior, evidence of pairs or breeding, number of nests, nest contents or number of fledges seen; potential threats)
1 ROGERS	Date 5/28/09 Start 0550 Stop 1015 Total hrs 4.5	0	0	0	0	N	N	—
2 ROGERS	Date 5/29/09 Start 0600 Stop 1005 Total hrs 4.1	1	0	0	0	Y	N	MIGRANT SSP. BREWSTERI BASED ON DATE, CALL, & PLUMAGE
3 ROGERS	Date 6/8/09 Start 0600 Stop 1015 Total hrs 4.3	0	0	0	0	N	N	—
4 ROGERS	Date 6/19/09 Start 0545 Stop 1000 Total hrs 4.8	0	0	0	0	N	N	—
5 ROGERS	Date 7/7/09 Start 0545 Stop 1000 Total hrs 4.8	0	0	0	0	N	N	—

Overall Site Summary (Total resident WIFLs only)	Adults	Pairs	Territories	Nests	Were any WIFLs color-banded? Yes (No)
Total survey hrs 27.3	1	0	0	0	If yes, report color combination(s) in the comments section on back of form

Reporting Individual GEOFFREY L. ROGERS Date Report Completed 8/13/09
US Fish and Wildlife Service Permit # 801346-4 AZ Game and Fish Department (or other state) Permit # —

Submit original form by August 1st. Retain a copy for your records.

6) ROGERS 7/8/09
0545
1000
4.8

E-mail: oreortyx@earthlink.net

Fill in the following information completely. Submit original form by August 1st. Retain a copy for your records.

Reporting Individual GEOFFREY L. ROGERS Phone # (619) 284-5046
Affiliation TECHNOLOGY ASSOCIATES E-mail ~~geoffreyrogers@cox.net~~
Site Name TIJUANA RIVER VALLEY, 2 SITES Date Report Completed 8/3/09
AT EAST END WITHIN TIJUANA RIVER VALLEY REGIONAL PARK
Did you verify that this site name is consistent with that used in previous years? Yes / No (circle one)
If name is different, what name(s) was used in the past? UNKNOWN
If site was surveyed last year, did you survey the same general area this year? Yes / No If no, summarize in comments below.
Did you survey the same general area during each visit to this site this year? Yes / No If no, summarize in comments below.

Management Authority for Survey Area (circle one): Federal (Municipal/County) State Tribal Private
Name of Management Entity or Owner (e.g., Tonto National Forest) COUNTY OF SAN DIEGO

Length of area surveyed: ~.75 mi (specify units, e.g., miles = mi, kilometers = km, meters = m)
FOR EACH AREA

Vegetation Characteristics: Overall, are the species in tree/shrub layer at this site comprised predominantly of (check one):

- ☐ Native broadleaf plants (entirely or almost entirely, includes high-elevation willow)
- ☒ Mixed native and exotic plants (mostly native)
- ☐ Mixed native and exotic plants (mostly exotic)
- ☐ Exotic/introduced plants (entirely or almost entirely)

Identify the 2-3 predominant tree/shrub species: SALIX CASIOLEPIS, S. GOODINGII S. EXIGUA

Average height of canopy (Do not put a range): 20 FEET (specify units)

Was surface water or saturated soil present at or adjacent to site? (Yes) / No (circle one)
Distance from the site to surface water or saturated soil: ON SITE (specify units)

Did hydrological conditions change significantly among visits (did the site flood or dry out)? Yes / (No) (circle one)
If yes, describe in comments section below.

Remember to attach a copy of a USGS quad/topographical map (REQUIRED) of the survey area, outlining the survey site and location of WIFL detections. Also include a sketch or aerial photograph showing details of site location, patch shape, survey route in relation to patch, and location of any willow flycatchers or willow flycatcher nests detected. Such sketches or photographs are welcomed, but DO NOT substitute for the required USGS quad map. Please include photos of the interior of the patch, exterior of the patch, and overall site and describe any unique habitat features.

Comments (attach additional sheets if necessary)
SINGLE INDIVIDUAL OF MIGRANT (THROUGH SAN DIEGO COUNTY) SUBSPECIES E.T. BREWSTERI DETECTED ON 5/29.

WIFL Detection Locations:

Date Detected	N UTM	E UTM	Date Detected	N UTM	E UTM
5/29/09	3601238	492969			

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Konecny Biological Services
Biological Consulting, Research, Conservation

July 29, 2009

TAIC
9089 Clairemont Mesa Blvd., Suite 200
San Diego,CA 92123

Attn: Ms. Christina Schaefer

Re: Results of a Light-footed Clapper Rail Survey and Habitat Assessment at the Tijuana River Valley River Park, San Diego, California, 2009.

Dear Ms. Schaefer:

This letter documents the results of a habitat assessment and focused survey for the light-footed clapper rail (*Rallus longirostris levipes*) at the Tijuana River Valley River park (TRVRP) in southern San Diego County, California. Light-footed clapper rails have been detected sporadically within the TRVRP, more specifically at the Dairy Mart Ponds and north Tijuana River channel, with one or two pairs being present since the 1980's. Two pairs were present in 2003, and one pair was detected in 2004, 2005, and 2007 (Zembal *et al* 2007).

The Dairy Mart Ponds are the most conspicuous feature of the TRVRP and are composed of a three pond complex located southwest of Interstate 5 in southern San Diego County. Two ponds are located west of Dairy Mart Road and one pond east. The eastern-most pond may have had freshwater marsh present at some time, but today it has matured into southern willow riparian forest with little or no cattails (*Typha* sp.) or bulrush (*Scirpus* sp.). In its current state, it is not light-footed clapper rail habitat. Of the two western ponds, the northern pond is the most suitable for the light-footed clapper rail. This pond features open water and has emergent patches of bulrush around the periphery with smaller patches of cattails. The southern pond, like the eastern pond is a more mature southern willow riparian forest vegetation community, but does have some open water with cattails and bulrush present. The degree of open water is likely dependant on the amount of rainfall, so consequently, as a result of drought year, the amount of freshwater marsh present in this pond is relatively small. Small patches of emergent freshwater marsh are present in the North Tijuana River channel west of the Dairy Mart Ponds. Light-footed clapper rails were detected in this channel in 2003 (Konecny, pers. obs). Two small isolated ponds are present southwest of the North Channel. These ponds had very little emergent freshwater marsh vegetation and are possibly maintained in that condition. In their present state, they are not light-footed clapper rail habitat.

Two focused dusk surveys were conducted around the entire perimeter of the Dairy Mart Pond site utilizing digital vocalizations of the light-footed clapper rail on May 17th and May 24th, 2009. All potential clapper rail habitat was surveyed within the area bordered on the north by Servando Avenue, on the east by Dairy Mart Road, and on the south by the County Park dirt access road. The freshwater marsh in the North River Channel, southern pond, and the two little ponds was also surveyed. The digital vocalizations were also played for the eastern pond from Dairy Mart Road. No light-footed clapper rails were detected in any of these areas during these surveys.

1501 East Grand Avenue #2403, Escondido, California, 92027
Tel (760) 489-5276 E-mail jkonecny@cox.net

Konecny Biological Services
Biological Consulting, Research, Conservation

The TRVRP area is located immediately east of the Tijuana Marsh National Wildlife Refuge (NWR). One hundred and forty-two pairs of light-footed clapper rails were present at this site in 2007 (Zembal *et al* 2007), the second largest population in the state. They occur there as a permanent resident of coastal salt marsh traversed by tidal sloughs, characterized by cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia* spp.). Light-footed clapper rails have also been documented in freshwater marsh characterized by cattails and bulrush at Buena Vista, Agua Hedionda, Batiquitos, San Elijo, and San Dieguito Lagoons in San Diego County (Zembal *et al* 2007), as well as the San Diego River; and in spiny rush (*Juncus acutus*) at Naval Air Station (NAS) Point Mugu.

The TRVRP area is likely a natural dispersing corridor for the rails at the Tijuana Marsh NWR. The habitat quality of the northern pond is very good quality for wintering and breeding. The North Channel is much more tenous, but as long as freshwater marsh habitat is present, remains viable as light-footed clapper rail habitat. The southern pond appears to undergo some seasonal variation in water level, and the quality of rail habitat varies from none to poor.

These areas should be systematically surveyed at least every other year and more preferably every year. If you have any questions or need additional information, please feel free to contact me.

Sincerely,

John K. Konecny
Wildlife Biologist

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