OPPORTUNITIES AND CONSTRAINTS FOR EVANS CREEK

EARLY IMPLEMENTATION ACTIVITIES: UPPER SANTA ANA RIVER HABITAT CONSERVATION PLAN

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Contents

Tables

Figures

Acronyms and Abbreviations

AA	assessment area
CAL-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Covered Species	species covered under the Upper Santa Ana River Habitat Conservation Plan
CRAM	California Rapid Assessment Method
CRPR	California Rare Plant Ranking
CWA	Clean Water Act
FESA	Federal Endangered Species Act
GPS	global positioning system
HCP	Habitat Conservation Plan
ITP	incidental take permit
LiDAR	Light Detection and Ranging
NEPA	National Environmental Policy Act
O&M	operations and maintenance
OHWM	ordinary high water mark
Preliminary Design Report	*Site Characteristics and Preliminary Design of Santa Ana River Tributary Restoration Projects*
RWQCB	Regional Water Quality Control Board
SAR	Santa Ana River
SSC	Species of Special Concern
Upper SAR HCP	Upper Santa Ana River Habitat Conservation Plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

Executive Summary

The information provided in this report provides an assessment of the opportunities and constraints at Evans Creek restoration site (restoration site) that be will be used to offset some of the potential impacts on natural resources from water management activities in the Upper Santa Ana River Watershed. The water management activities (Covered Activities) are described in detail in the Upper Santa Ana River Habitat Conservation Plan (Upper SAR HCP) currently under development. Those activities have the potential to impact species protected under the Federal and State Endangered Species Acts as well as other Aquatic Resources (Federal and State Jurisdictional Waters). To this end, the Evans Creek restoration site has the potential to provide a means to (1) implement specific conservation measures identified in the Upper SAR HCP and (2) mitigate for impacts on Aquatic Resources. The information in this report builds on previous efforts completed in 2015 to describe restoration opportunities at the Evans Creek restoration site for Santa Ana sucker (*Catostomus santaanae*) (ICF 2015). That effort resulted in an initial description of site characteristics as well as preliminary designs for features that would restore, enhance, and/or establish Santa Ana sucker habitat. However, restoring, enhancing, or establishing habitat for other species and Aquatic Resources was not a focus at that time.

To address the potential for impacts on other species and Aquatic Resources, field assessments were conducted at the Evans Creek restoration site in the summer of 2018. That effort resulted in the following information:

- Field verification and baseline habitat assessment for Covered Species
- Vegetation mapping and special status plant surveys
- Jurisdictional Delineation of Aquatic Resources
- Wetland condition assessment (California Rapid Assessment Method [CRAM])

The following summarizes the results from the opportunities and constraints assessment at the Evans Creek restoration site.

The largest restoration opportunity at Evans Creek is the rehabilitation of the riparian, stream, wetland, transitional, and upland habitat. The site is currently vegetated with several different invasive species, including, but not limited to, Brazilian pepper (*Schinus terebinthifolia*), palm (*Phoenix canariensis* and *Washingtonia robusta*), tamarisk (*Tamarix* spp.), eucalyptus (*Eucalyptus* spp.), fig (*Ficus carica*), mustard (*Brassica* spp.), fennel (*Foeniculum vulgare*), and nonnative grasses. In addition, due to the presence of homeless encampments and transients there is substantial trash, debris, and illegal trails throughout the site. Removing the invasive species, trash, and debris; reclaiming the illegal trails; and replanting with native species would result in rehabilitation of the entire site. Other restoration opportunities include the following:

- Laying back the channel banks in a portion of the spillway channel.
- Creating a secondary/high flow channel in the spillway channel.
- Creating floodplain benches in the low-flow channel.
- Creating riffles and pools and adding wood and rock structure to the low-flow channel, providing supplemental flow to the low-flow channel.

- Creating a new low-flow channel west of the Santa Ana River (SAR) levee.
- Constructing a fish passage structure at the SAR levee.

There are several uncertainties, particularly related to activities associated with restoration for the Santa Ana sucker. The availability and amount of water to provide supplemental water to the low-flow channel is unknown at this time, and creating fish passage at the SAR levee that successfully brings sucker into the project site will have some challenges. This report identifies these uncertainties and presents restoration and rehabilitation actions that would support Santa Ana sucker habitat restoration.

Chapter 1
Introduction

1.1 Context

The Santa Ana River (SAR) watershed is the largest coastal stream system in Southern California, and has been the subject of many important water use and water rights agreements, judicial orders, judgments, and accords dating back to the early twentieth century.

The Upper SAR is home to dozens of water districts, local jurisdictions, and other stakeholders with a vested interest in the management of water supply resources (storage, conveyance, treatment, flood protection, and recreation) and sustainable stewardship (water quality and biological resource protection) of the watershed. Many of these entities have participated in integrated regional watershed management coordination efforts in the Upper SAR since the 1960s. Recent cooperative planning initiatives among the water districts and stakeholders have resulted in a comprehensive vision for sustainable stewardship and watershed management (e.g., the 2010 One Water, One Watershed Plan and the 2007 Upper SAR Watershed Integrated Regional Water Management Plan). However, several considerable controversies remain in the Upper SAR watershed, including modification of the Santa Ana River hydrogeomorphology, reduction of river flow, alteration of natural habitats, and the long-term effects of these changes to the functional ecology and native species of the watershed.

Development of a Habitat Conservation Plan is a comprehensive planning process with careful consideration taken to address the Federal Endangered Species Act (FESA) compliance needs of project proponents. The challenges facing water purveyors in the Upper SAR include the effects of population growth that increase water demand and decrease natural hydrological processes and groundwater recharge, the reduction of imported water availability, and the effects of climate change.

The primary purpose of the Upper Santa Ana River Habitat Conservation Plan (Upper SAR HCP) is to give the Upper SAR water agencies (permittees/project proponents) the ability to construct identified projects that would impact endangered species and require take coverage under the FESA. These public infrastructure projects have tremendous public value in that they would increase regional water supply reliability and improve flood protection. The Habitat Conservation Plan (HCP) permittees will provide long-term commitment to native resources by agreeing to conserve, monitor, and manage Covered Species and their habitats in perpetuity. In exchange, the permittees will receive assurances that the U.S. Fish and Wildlife Service (USFWS) will not require additional land, water, or other natural resources beyond the level agreed upon in the HCP as long as the HCP permittees are honoring the terms and conditions of the permit. Within this context, the HCP permittees engaged in efforts to implement mitigation actions that would offset potential impacts on protected species. The tributary restoration projects in this report address some of those efforts.

During the development process for the Upper SAR HCP it was recognized that an integrated approach that included development of an environmental framework that provided mechanisms to ensure compliance with other environmental statutory requirements (e.g., Section 404 of the Clean Water Act [CWA]) associated with their water management activities in the Upper SAR was needed. To this end, the HCP permittees also engaged in efforts to:

- Develop a compensatory mitigation bank or banks (Upper SAR Mitigation Bank) or other mitigation delivery method to offset potential impacts on regulated Aquatic Resources from water management activities on Aquatic Resources.
- Develop a programmatic environmental compliance process for environmental review (e.g., California Environmental Quality Act/ National Environmental Policy Act [CEQA/NEPA] and other permitting (e.g. Section 404 of the CWA) requirements as appropriate for water management projects (identified as Covered Activities in the Upper SAR HCP).

1.1.1 Covered Activities

The Upper SAR HCP must identify the activities that could result in take of Covered Species within the HCP Plan Area (Upper SAR HCP currently under development). The types of activities covered by the HCP (Covered Activities) include all actions that the HCP Team (HCP permittees) wants to have covered by FESA Section 10 and California Endangered Species Act (CESA) 2081(b) (California Endangered Species Act) permits. Covered Activities include both specific projects and ongoing activities (e.g., operations and maintenance actions).

- *Projects* are well-defined actions that occur **once** in a discrete location (e.g., construction of new facilities, infrastructure development, capital improvement projects).
- *Operations and maintenance activities* are actions that **occur repeatedly** in one area or over a wide area (e.g., bank stabilization, storm-damage repair, maintenance of facilities).

The proposed Covered Activities are listed in Table 1, and include construction, infrastructure development, and operations and maintenance (O&M) of water conservation, water infrastructure development, flood control, habitat restoration, and solar energy facility activities.

Table 1. Proposed Covered Activity Types Included in the Upper SAR HCP

Activity Type	Description
Treatment Facilities	Water quality treatment facilities, including associated administration buildings, and water conveyance infrastructure.
Diversions	Activities related to construction, operations, and maintenance of structures to divert water from streams or channels and associated conveyance structures.
Recharge Basins	Activities related to groundwater recharge basins, including construction of new basins, and operations and maintenance of existing basins.
Flood Control	Activities related to the construction of new flood control structures and the operation and maintenance of existing flood control facilities.
Wells and Water Infrastructure	Activities related to the creation of new groundwater wells, access roads, water treatment plants, discharge structures, and the maintenance of existing infrastructure.
Solar Energy	Activities related to construction of new solar facilities.
General Property and Facility Maintenance	Maintenance for specific permittee properties, roads, and buildings including weed control, inspection and litter control, and structure repair.

Activity Type	Description
Routine Operations and Maintenance	Activities that occur repeatedly in one location and/or in many locations over a wide area periodically and include minor construction, earth-moving, or vegetation clearing activities for infrastructure.
Habitat Enhancement and Monitoring	Activities that support the restoration and management of habitat values in the Plan Area.

1.1.2 Covered Species

The incidental take permit (ITP) issued by USFWS must name specific species for which take from the impacts of Covered Activities is authorized. These species, called *Covered Species*, are either currently listed as threatened or endangered or may become listed during the permit term. Although the primary intent of this HCP is to provide mitigation for effects on Covered Species, it would also contribute to the protection of native biological diversity, habitat for native species, natural communities, and local ecosystems. This broad scope would conserve a wide range of natural resources, including native species that are common as well as those that are rare.

There are 23 listed and non-listed species covered by the HCP (Table 2). The incidental take authorization under Section 10 of the FESA will apply to the wildlife species. The take of listed plant species is not prohibited under FESA or authorized under a Section 10(a)(1)(B) permit. However, plant species adequately conserved by this HCP are listed in the 10(a)(1)(B) permit in recognition of the conservation measures and benefits provided for them under the HCP such that the permittees will receive assurances pursuant to the USFWS "No Surprises" Rule. Federal authorization for incidental take of other species may be sought through the amendment process and in accordance with FESA Sections 10(a) and 7 (Table 2).

Species covered by the incidental take authorization under CESA are Santa Ana River woolly-star (*Eriastrum densifolium* ssp*. sanctorum*), slender-horned spineflower (*Dodecahema leptoceras*), mountain yellow-legged frog (*Rana Muscosa*), tricolored blackbird (*Agelaius tricolor*), western yellow-billed cuckoo (*Coccyzus americanus*), willow flycatcher (*Empidonax traillii extimus*), and least Bell's vireo (*Vireo bellii pusillus*). State authorization for incidental take of other wildlife species may be sought through the amendment process and in accordance with the applicable provisions of the California Fish and Game Code.

Table 2. Species Covered by the Upper SAR HCP

		Status	
Common Name	**Scientific Name**	**Federal**	**State**
Slender-horned Spineflower	*Dodecahema leptoceras*	Endangered	Endangered
Santa Ana River Woolly-star	*Eriastrum densifolium* ssp. *sanctorum*	Endangered	Endangered
Delhi Sands Flower-loving Fly	*Rhaphiomida terminatus abdominalis*	Endangered	None
Santa Ana Sucker	*Catostomus santaanae*	Threatened	None
Arroyo Chub	*Gila Orcuttii*	None	SSC
Santa Ana Speckled Dace	*Rhinichthys osculus ssp.*	None	SSC
Arroyo Toad	*Anaxyrus californicus*	Endangered	None
Mountain Yellow-legged Frog	*Rana muscosa*	Endangered	Endangered
Western Spadefoot	*Spea hammondii*	None	SSC
California Glossy Snake	*Arizona elegans occidentalis*	None	SSC
South Coast Garter Snake	*Thamnophis sirtalis sp.*	None	SSC
Western Pond Turtle	*Actinemys marmorata*	None	SSC
Tricolored Blackbird	*Agelaius tricolor*	None	Threatened
Burrowing Owl	*Athene cunicularia*	None	SSC
Cactus Wren	*Campylorhynchus brunneicapillus*	None	SSC
Yellow-breasted Chat	*Icteria virens*	None	SSC
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	Threatened	Endangered
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered	Endangered
Coastal California Gnatcatcher	*Polioptila californica*	Threatened	SSC
Least Bell's Vireo	*Vireo bellii pusillus*	Endangered	Endangered
Los Angeles Little Pocket Mouse	*Perognathus longimembris brevinasus*	None	SSC
San Diego Black-tailed Jackrabbit	*Lepus californicus bennettii*	None	SSC
San Bernardino Merriam's Kangaroo Rat	*Dipodomys merriami parvus*	Endangered	SSC

SSC = California Department of Fish and Wildlife Species of Special Concern

1.1.3 Early Implementation of Mitigation Activities

Mitigation actions associated with implementing HCPs are typically initiated following issuance of an ITP. The HCP permittees recognized that there was an advantage to implementing mitigation measures early in the process. To this end, the HCP permittees initiated efforts to assess potential Tributary Restoration Sites as part of early mitigation activities in 2013. These efforts included development of preliminary restoration designs for three Tributary Restoration Sites along the SAR in the Riverside area: Anza Drain/Old Farm Road (sites are adjacent and henceforth treated as one unless otherwise indicated), Lower Hole Creek, and Hidden Valley Wetlands. In 2015, ICF completed *Site Characteristics and Preliminary Design of Santa Ana River Tributary Restoration Projects* (ICF 2015), which described existing conditions for these sites and preliminary designs to create habitat for species covered under the Upper SAR HCP, with a focus on fish species. However, the preliminary designs for these sites were developed through analysis of existing site conditions and identification and evaluation of opportunities and constraints for restoring Santa Ana sucker habitat (ICF 2015).

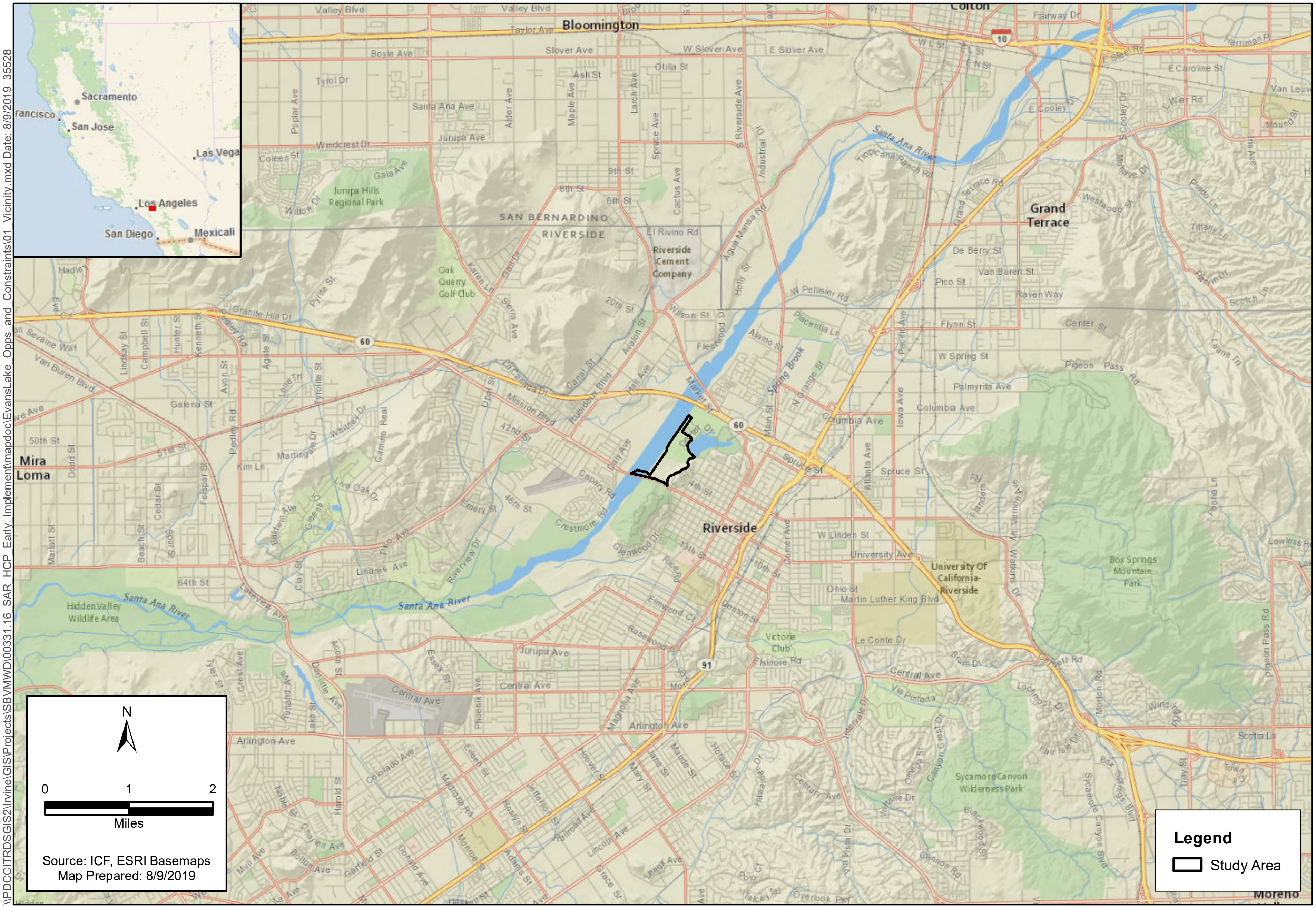
This report broadens the analysis of the initial 2015 report to assess additional site-wide opportunities and constraints for restoring habitat for the remaining species covered under the HCP and for restoring jurisdictional Aquatic Resources (wetlands and waters of the U.S. and State) to offset potential impacts from water management activities.

1.2 Purpose

The purpose of this report is to provide information on the value of Evans Creek to offset impacts from HCP Covered Activities on the HCP Covered Species and other Aquatic Resources (wetlands and waters of the U.S. and State). To this end, it documents the baseline conditions and identifies opportunities and constraints for restoring, enhancing or establishing ecological features that benefit Covered Species (in addition to Santa Ana sucker) as well as other Aquatic Resources. Additionally, this information will be available for future environmental review and project permitting efforts. Ultimately, and as appropriate, the results as well as the survey methods may also be incorporated into the HCP long-term monitoring and adaptive management program.

1.3 Project Location

The Evans Creek project site is located within the City of Riverside, Riverside County, California, north of Mission Inn Avenue, east of the Santa Ana River and west of Lake Evans. The center of the project is located at approximately 33.993997°, -117.385669° (Figures 1 and 2).



Source: ICF, ESRI Basemaps
Map Prepared: 8/9/2019

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Figure 1
Project Vicinity
Evans Creek Opportunities and Constraints Memo

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Figure 2
Aerial Image
Evans Creek Opportunities and Constraints Memo

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Chapter 2
Approach

2.1 Overview

This chapter summarizes the approach used to determine restoration opportunities and constraints, beginning with the methodology for baseline assessments of key resources, including the following.

- Field verification and baseline habitat assessment for the Covered Species
- Vegetation mapping and sensitive plant surveys
- Jurisdictional delineation of Aquatic Resources
- Wetland condition assessment

The comprehensive evaluation of the restoration opportunities and constraints is described in Chapter 4.

The identification of restoration opportunities utilized a top-down approach beginning with a high level evaluation of ecological conditions to identify restoration opportunities within the existing land use constraints. Historical ecology and current site conditions were considered when identifying opportunities. After the ecological restoration opportunities were identified, they were refined, building off the *Preliminary Design Report* to maximize benefits for Covered Species with prioritization given to Santa Ana sucker (ICF 2015). The restoration opportunities were then further evaluated and refined to address other Covered Species habitat needs as well as additional opportunities to enhance Aquatic Resources. The assessment also identifies uncertainties that relate to restoration opportunities or site constraints that may persist and require additional study, monitoring, or management.

2.2 Terminology

For the purpose of this document, *restoration opportunity* and *restoration constraint* are defined as follows.

- **Restoration opportunity:** An action that would directly or indirectly contribute to increased ecosystem functions and benefits to Covered Species and/or Aquatic Resources.
- **Restoration constraint:** Any existing condition on or adjacent to the site that poses a limitation on restoration opportunities including increased cost, design implications, long-term maintenance requirements, creditable mitigation area, or increased risk, including potential impacts on existing sensitive resources or adjacent land use/infrastructure as well as the potential for project failure.

In 2008, the U.S. Environmental Protection Agency and U.S. Army Corps of Engineers (USACE), through a joint rulemaking, expanded the Clean Water Act Section 404(b)(1) Guidelines to include more comprehensive standards for compensatory mitigation (USACE 2008a), including definitions of restoration types. This terminology has been informally adopted by other resource agencies and restoration practitioners as a way of uniformly describing activities. For the purpose of this document, the following definitions will be used.

- ***Restoration*** means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to former Aquatic Resources that historically supported such functions, but no longer do so because of the loss of one or more required ecological factors or as a result of past disturbance. For the purpose of tracking net gains in an Aquatic Resource area, restoration is divided into two categories: re-establishment and rehabilitation.
    - ***Re-establishment*** means "the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource." Re-establishment results in rebuilding a former Aquatic Resource and results in a gain in Aquatic Resource area and functions.
    - ***Rehabilitation*** means "the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource." Rehabilitation results in a gain in Aquatic Resource function, but does not result in a gain in Aquatic Resource area.
- ***Establishment*** (creation) means the manipulation of the physical, chemical, or biological characteristics present to develop a habitat type or Aquatic Resource that did not previously exist. Establishment results in a gain in habitat and/or Aquatic Resource area and functions.
- ***Enhancement*** means "the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve one or more specific existing ecological function(s)." Enhancement results in the gain of selected ecological function(s), but may also lead to a decline in other ecological function(s). Enhancement will result in an increase or improvement in specific ecological function without a change in the amount of habitat or Aquatic Resource area.
- ***Preservation*** means the removal of a threat to, or prevention of the decline of, habitat or Aquatic Resources by an action in or near said habitat or Aquatic Resources. This term includes activities commonly associated with the protection and maintenance of habitat or Aquatic Resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of habitat or Aquatic Resource area or functions.

2.3 Assessment of Covered Species Habitat Baseline Conditions

An assessment of current site conditions was performed to assess baseline habitat suitability conditions and potential future post-restoration site conditions for the 23 Covered Species and additional special-status species to be considered during environmental review of the site. Baseline habitat condition assessments were conducted in two phases.

- Desktop assessment of site conditions relative to Covered Species' ranges and habitat requirements to screen out Covered Species that would be unlikely to occur.

- Site field surveys to verify the desktop analysis, assess baseline habitat conditions for Covered Species and other protected species, and identify restoration constraints and potential of the sites to benefit Covered Species.

The desktop assessment considered species' current and historic range and habitat requirements relative to the existing site conditions and overall constraints (the size and location of the site) to determine preliminarily the suitability for Covered Species. The site was determined to potentially provide habitat, currently and/or with restoration, for 11 of the 23 species covered by the Upper SAR HCP. Table 3 summarizes the results of the desktop assessment to support habitat for Covered Species.

Based on this preliminary evaluation, field surveys of the sites were then conducted in the summer of 2018. The objectives of the surveys were to (1) assess baseline habitat suitability conditions for Covered Species, (2) assess site potential to provide Covered Species' habitat following implementation of restoration activities, and (3) survey the sites for project-specific CEQA and NEPA considerations for protected plant and wildlife species.

The field surveys conducted are as follows.

- Vegetation Mapping and Special Status Plant Surveys
- Aquatic Species Habitat Assessment
- Riparian Bird Survey and Habitat Assessment
- Habitat Assessment and Surveys for Los Angeles Pocket Mouse and San Diego Black-tailed Jackrabbit

Habitat conditions for Santa Ana River woolly-star were assessed as part of vegetation surveys, which are described in Section 2.4, *Vegetation Mapping and Special-Status Plants*. Other Covered Species habitat assessments are summarized in the following sections. The survey results are referenced throughout Chapter 4, *Restoration Opportunities and Constraints,* as they inform the baseline conditions and restoration opportunities and constraints at each site.

2.3.1 Aquatic Species Habitat Assessment

The Evans Creek site was visited on foot on July 26, 2018. Survey staff walked the accessible extent of the restoration area. Documentation taken on the character of the permanent water included presence and attributes of surface waters, incidental native and/or nonnative aquatic species observations, and degree of anthropogenic disturbance. Photographs were taken to document the various habitat types present. High-quality digital aerial imagery of the sites gathered in 2015 was examined and compared to observations made during the field visit when designating habitat types for the various aquatic species. Light Detection and Ranging (LiDAR) imagery was used to locate channel centerlines, which were then digitized and used in conjunction with the aerial imagery.

Habitat quality attributes for western pond turtle and south coast garter snake were evaluated and rated qualitatively. Habitat quality for western pond turtle was graded on five attributes: presence of perennial pond habitat deeper than 1.6 feet, presence of intact adjacent upland habitat, degree of human use, presence of nonnative aquatic species, and canopy cover. Habitat quality for south coast garter snake was graded on four attributes: presence of surface waters, presence of intact adjacent upland habitat, degree of human use, and presence of nonnative aquatic species.

2.3.2 Riparian Bird Habitat Assessment and Survey

On June 15, July 3, and July 15, 2018, biologists conducted riparian bird surveys throughout the site to document the presence of covered riparian bird species and record the presence of other bird species to evaluate habitat use. On July 26, 2018, biologists conducted a riparian habitat assessment of the site to assess existing riparian bird habitat throughout the site. The purpose of the riparian bird habitat assessment and survey was to (1) assess existing riparian bird habitat at the sites; (2) conduct surveys for least Bell's vireo, Southwestern willow flycatcher, and yellow-breasted chat (*Icteria virens*) (species covered by the HCP); and (3) record the presence of other bird species to document habitat use at the site.

2.3.3 Habitat Assessment and Surveys for Los Angeles Pocket Mouse and Black-tailed Jackrabbit

Habitat for Los Angeles pocket mouse (*Perognathus longimembris brevinasus*) and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*) was assessed on July 26, 2018. Baseline habitat for these species was assessed at the site to inform restoration opportunities and constraints.

Table 3. Restoration Site Potential Habitat Suitability for Upper SAR HCP Covered Species Prior to Field Verification

Species	Habitat Description	Habitat Suitability
Santa Ana River Woolly-star (*Eriastrum densifolium* ssp. *sanctorum*)	Alluvial terraces of open floodplains with intermittent flooding, light surface disturbance, and relatively low cover of annuals or perennials. Occurs on nutrient-poor sands. Habitat type is transient in nature and is an early-mid successional stage, which requires disturbance to maintain over a large scale.	S
Slender-horned Spineflower (*Dodecahema leptoceras*)	Found on stable older alluvium away from active channels in areas with little flooding disturbance but infrequent surface flows. Habitat generally associated with undisturbed mature alluvial scrub.	–
Delhi Sands Flower-loving Fly (*Rhaphiomidas terminatus abdominalis*)	Characteristic feature of occupied habitat is fine wind-blown sandy soils, often wholly or partly sand dunes stabilized by sparse native vegetation.	–
Santa Ana Sucker (*Catostomus santaanae*)	Perennial waters with temperatures that are typically less than 72°F (but can tolerate much higher) with low turbidity, coarse substrate, and pool-riffle morphology. Riparian vegetation. Benthic algae and associated invertebrates.	R
Arroyo Chub (*Gila orcutti*)	Nearly perennial waters with temperatures = 50–75°F, depths >16 inches, substrate variable (fine sediments preferred). High tolerance for seasonal and interannual fluctuations in water quality and flow. Low tolerance for invasive species. High potential for introduction to suitable habitat.	R
Santa Ana Speckled Dace (*Rhinichthys osculus* ssp.)	Riffle reaches of perennial streams with temperatures below 68°F and gravel/cobble substrates. Overhanging riparian vegetation. Low tolerance for nonnative fishes. High potential for introduction to suitable habitat.	R
Arroyo Toad (*Anaxyrus* [*Bufo*] *californicus*)	Nearly perennial slow lotic to lentic aquatic habitats. High seasonal flow variability in a low-confinement channel. Friable upland soils with low density of riparian vegetation. Low tolerance for invasive, predatory aquatic species.	–
Mountain Yellow-legged Frog (*Rana muscosa*)	Perennial streams, often rocky with relatively high velocities. Little aquatic vegetation. May have low tolerance for nonnative fishes.	–
Western Spadefoot (*Spea hammondii*)	Sandy or gravelly alluvial soils that have surface water for periods of at least 3 weeks during seasons compatible with water temperatures of up to <86°F. Low tolerance for invasive aquatic crayfish or vertebrates. Proximity to upland habitat in native nonforest vegetation types.	–
Western Pond Turtle (*Actinemys marmorata*)	Perennial standing or slow-moving waters. Prefers habitats with emergent basking sites, such as logs, rocks, and shorelines; and with underwater refugia with adjacent upland habitats to reproduce, aestivate, and overwinter. Hatchlings require shallow aquatic habitat with dense submergent vegetation in which to feed.	R

Species	**Habitat Description**	**Habitat Suitability**
South Coast Garter Snake (*Thamnophis sirtalis sp.*)	Essential habitat factors include permanent water source, low gradient topography, and dense multi-storied riparian vegetation.	R
California Glossy Snake (*Arizona elegans occidentalis*)	Prefers open areas in a variety of habitats including light shrubby to barren desert, grassland, chaparral, and coastal sage scrub. High uncertainty regarding species needs.	–
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	Dense riparian tree or shrub cover (*Tamarix* or *Salix* usually). Surface hydrology during nesting season.	R
Least Bell's Vireo (*Vireo bellii pusillus)*	Early-successional dense riparian shrub and woodland. Low tolerance for brown-headed cowbird parasitism.	S
Tricolored Blackbird (*Agelaius tricolor*)	Habitat requirements for a breeding colony include open water; appropriate nesting substrate such as cattails, bulrushes, willows, and forbs; and nearby foraging habitat. Foraging areas include grasslands, open fields, and agricultural areas.	–
Western Yellow-billed Cuckoo (*Coccyzus americanus*)	Extensive, dense, woody riparian vegetation of at least 200 acres in size.	-
Yellow-breasted Chat (*Icteria virens*)	Dense, early successional shrubby riparian vegetation.	S
Burrowing Owl (*Athene cunicularia*)	Upland habitat, open, low relief, well-drained soils. Substantial small mammal populations to provide burrows and a forage base.	–
Cactus Wren (*Campylorhynchus brunneicapillus*)	Coastal sage scrub with substantial amounts of cactus.	–
Coastal California Gnatcatcher (*Polioptila californica californica*)	Coastal sage scrub in multiple successional states, in a matrix of other native vegetation types. Habitat patch continuity.	-
Los Angeles Pocket Mouse (*Perognathus longimembris brevinasus*)	Well-drained sandy upland soils in native vegetation types with a predominance of shrubs but mostly bare soils (i.e., little herb cover). Proximity to channels kept relatively free of vegetation by periodic peak flows.	R
San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*)	Multiple seral states of alluvial fan sage scrub within active alluvial floodplains. Alluvial disturbance regimes that can provide the multiple seral states.	–
San Diego Black-tailed Jackrabbit (*Lepus californicus bennettii*)	Prefers open areas with sparse vegetation with scattered shrubs; does not readily occur in areas with tall grass or forests where visibility is obscured.	R

S = existing known or potentially occupied

R = future potentially occupied post restoration

– = not suitable habitat

2.4 Vegetation Mapping and Special-Status Plants

2.4.1 Plant Community Mapping

Vegetation surveys were performed to map existing plant communities within the site. Vegetation communities were classified based on the dominant and characteristic plant species, in accordance with *Vegetation Classification, A Manual of California Vegetation* (Sawyer et al. 2009). Vegetation mapping was performed on July 18, 2018, by walking meandering transects and from select vantage points that allowed expansive views of the site. Vegetation community mapping was done using iPad devices running the ESRI Collector application. Digital imagery for the study area was loaded into ESRI Collector, which allowed for digitally creating and editing data (points, polygons, and lines) at any scale. The minimum mapping unit size was 1 acre for upland communities and 0.5 acre for riparian communities. All plant species observed within the study area were recorded and identified to species, subspecies, or variety as applicable. Taxonomy is in accordance with *The Jepson Manual: Higher Plants of California* (Baldwin et al. 2012).

2.4.2 Special-Status Plants

Special-status plant surveys were conducted concurrently with vegetation mapping. Special-status plant species were defined to include all species listed or proposed for listing, at the time of the survey, by the following agencies and entities as well as California Native Plant Society ranked plants.

- United States Fish and Wildlife Service (USFWS)
- California Department of Fish and Wildlife (CDFW)
- California Native Plant Society's (CNPS) California Rare Plant Ranking (CRPR) for species listed 1A through 4 (California Native Plant Society 2016)

A list of special-status plant species known to occur within the general vicinity of the site was acquired by database searches that included: California Natural Diversity Database (CNDDB) (CDFW 2016) records of special-status plants within 1-mile of the site, and a CNPS rare plant inventory within the U.S. Geological Survey 7.5' Riverside West Quadrangle. Potential to occur within the site for these special status species was assessed based on the presence or absence of suitable habitat and distance of the site to extant occurrences of these special-status plants.

2.4.3 Invasive Plants

An invasive plant survey was performed to identify any existing populations of invasive species rated as highly or moderately invasive species by the California Invasive Plant Council (CAL-IPC) (2016). The Cal-IPC rating scale is defined as follows.

- **High**: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

- **Moderate**: These species have substantial and apparent, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbances. Ecological amplitude and distribution may range from limited to widespread.
- **Limited**: These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Invasive species listed as Limited on CAL-IPC or not listed on CAL-IPC were only mapped within the study areas if the invasions were causing a negative impact on native vegetation communities. Sub-meter accuracy global positioning system (GPS) units were used to map invasive plants. Individual invasive plants were mapped as points, and larger populations were mapped as polygons.

Many annual and biennial invasive species including London rocket (*Sisymbrium irio*), short-pod mustard (*Hirschfeldia incana*), black mustard (*Brassica nigra*), golden crownbeard (*Verbesina encelioides*), poison hemlock (*Conium maculatum*), rip-gut brome (*Bromus diandrus*), wild oat (*Avena fatua*), barley (*Hordeum Marinum*), prickly lettuce (*Lactuca serriola*), and tocalote (*Centaurea melitensis*) were observed to be pervasive throughout the entire site and were not mapped unless the species was dominant within an area.

On August 1, 2018, two Certified Arborists surveyed the restoration area to map nonnative palms (*Phoenix canariensis* and *Washingtonia robusta*) and nonnative, broadleaf trees (*Eucalyptus citriodora*, *Eucalyptus sideroxylon, ficus carica,* and *ailanthus altissima*). Locations of these exotic trees were recorded using polygons and points using ESRI Collector on an iPad, and information on the size and number of trees was documented.

2.5 Jurisdictional Delineation

A desktop assessment was performed prior to performing the field surveys to determine potential areas of USACE, Regional Water Quality Control Board (RWQCB), and CDFW jurisdiction. This assessment included a review of aerial photography, U.S. Geological Survey topographic maps, the national hydrography dataset, and National Wetlands Inventory maps. Based on the pre-field analysis it was determined that there was a potential for both wetland and non-wetland features to occur within the project site.

The jurisdictional delineation was performed on July 31, August 1, and August 3, 2018. Potential jurisdictional features were evaluated for the presence of a definable channel and/or wetland vegetation, hydric soils, and wetland hydrology using the methodology set forth in the 1987 USACE *Wetland Delineation Manual* (Environmental Laboratory 1987) and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008b).

Lateral limits of non-wetland waters were identified using field indicators (e.g., ordinary high water mark [OHWM]) according to *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008c). Plant species were evaluated using the most recently updated *National Wetland Plant List* (Lichvar et al. 2016). In the field, select points along each of the jurisdictional features were recorded in the Arc Collector application (ESRI software) on iPads using visible landmarks on recent aerial imagery layers, and were mapped using Arc Collector with a Trimble R1 Global Navigation Satellite Systems Receiver unit, which provided sub-meter accuracy. A final delineation map was created in the office using aerial imagery and the field data points to interpolate the boundaries of the wetland and waters on site.

2.6 California Rapid Assessment Method

The wetlands identified during the delineations were surveyed to assess the condition of each wetland. Wetland condition was evaluated using the California Rapid Assessment Method (CRAM). The overall goal of CRAM is to “provide rapid, scientifically defensible, standardized, cost-effective assessments of the status and trends in the condition of wetlands and related policies, programs, and projects throughout California” (CWMW 2013). One of the benefits of CRAM is that it does not require an intensive watershed-level assessment to calibrate variable scores. Instead, CRAM has been calibrated throughout California and in various wetland types. CRAM is designed to collect a coarse assessment of the site’s ambient conditions but can be used to measure progress toward meeting success criteria established for wetland function/condition, and can be repeated over the long term if necessary or desired. CRAM is being used for this project to provide baseline CRAM scores for comparison as the habitat restoration design effort proceeds.

The final CRAM score for each assessment area (AA) is composed of four main attribute scores (buffer and landscape context, hydrology, physical structure, and biotic structure), which are based on the metric and submetric scores (a measurable component of an attribute). The CRAM practitioners assign a letter rating (A–D) for each metric/submetric based on a defined set of condition brackets ranging from an “A” as the theoretical best case achievable for the wetland class across California to a “D,” the worst-case achievable. Each metric condition level (A–D) has a fixed numerical value (A=12, B=9, C=6, D=3), which, when combined with the other metrics, results in a score for each attribute. That number is then converted to a percentage of the maximum score achievable for each attribute and represents the final attribute score ranging from 25 to 100%. The final overall CRAM score is the sum of the four final attribute scores, ranging from 25 to 100%. A detailed summary of the CRAM methodology is included in Appendix G and can be found on cramwetlands.org.

Prior to visiting the site, ICF CRAM practitioners reviewed and analyzed site maps depicting existing conditions within the sites to determine the locations of potential CRAM AAs. Based on the pre-field analysis it was determined that there was a potential for riverine features within the site. ICF CRAM practitioners conducted a CRAM analysis of the site on August 1 and 2, 2018.The CRAM practitioners walked each AA and documented information used to score each metric. In addition, photographs were collected at the upstream, downstream, and middle of the AAs. After recording observations within the AAs, the ICF CRAM practitioners scored each CRAM metric/submetric and calculated the attribute scores and a final overall CRAM score.

2.7 Cultural Assessment

A cultural assessment has not been conducted at the site; however, cultural resources are known to occur in the vicinity. A cultural assessment should be conducted in the future to determine if resources are in fact on site and if there are any associated constraints.

Chapter 3
Baseline Information

This chapter provides an overview of the existing site, including a general summary of site conditions, as well as vegetation, sensitive species, Aquatic Resource jurisdiction, and wetland condition information.

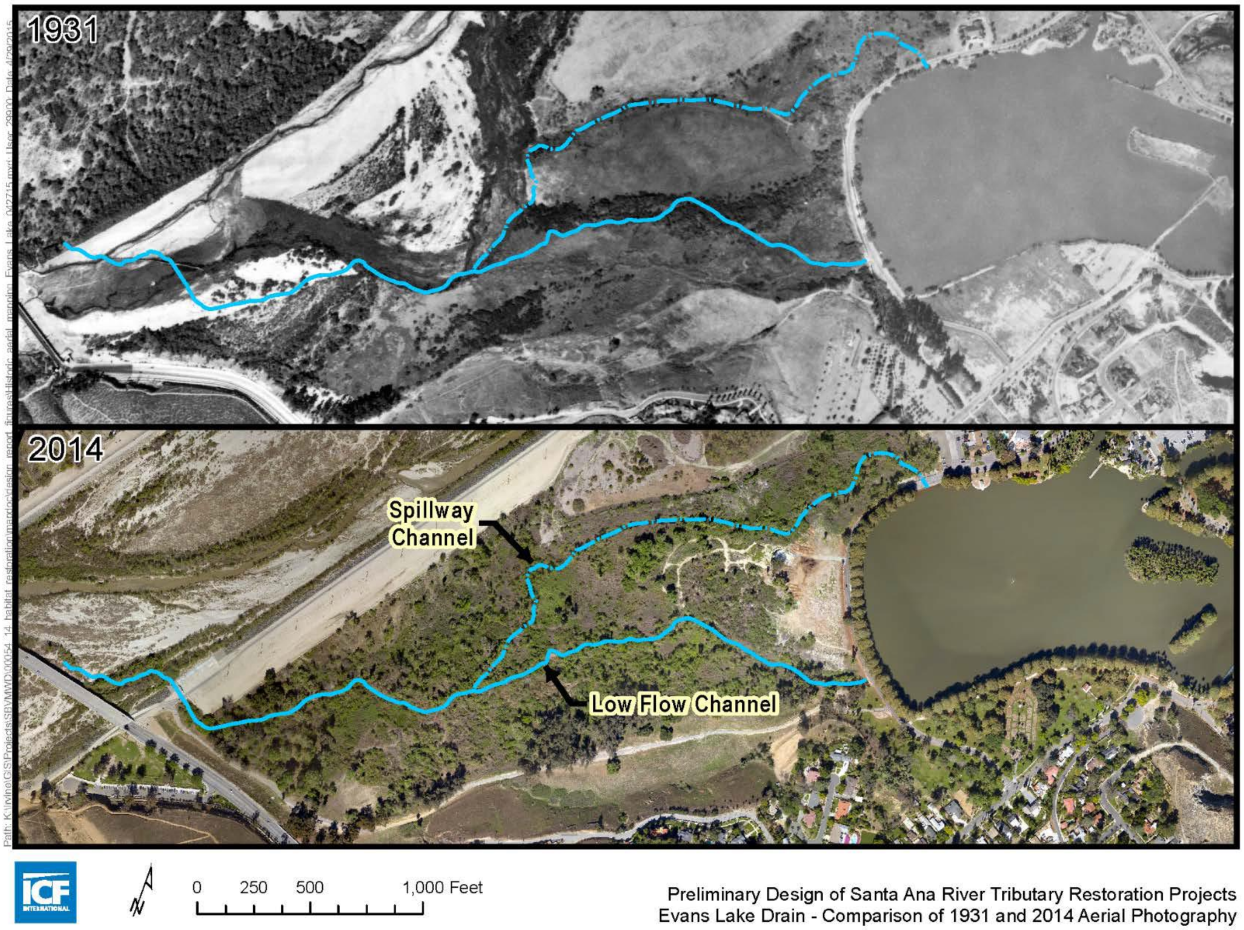
3.1 Baseline Summary

The Evans Creek site is approximately 115.2 acres in the City of Riverside's Fairmount Park and is bounded to the northeast by Lake Evans, to the west by the levee along the Santa Ana River, and to the east and south by the Santa Ana River bicycle trail. Elevations at the site range from 792 feet at Lake Evans down to 770 feet where Evans Creek empties into the Santa Ana River. The land at the site is owned by the City of Riverside. The watershed area upstream of the lake covers approximately 9 square miles with two major drainage channels, Spring Brook Wash and University Wash, providing most of the runoff to the lake (Northwest Hydraulic Consultants 2015a, see Appendix A). The natural channels were converted into flood control channels and are maintained by Riverside County Flood Control District. Locally high groundwater elevations likely supported the lake's water historically but with the declines in groundwater levels the lake's water is now maintained by pumping from wells to support recreation (Northwest Hydraulic Consultants 2015a). Soils on site consist of Grangeville fine sandy loan (GuB) and Dello loamy fine sane (DoA). Both soils are derived from the Santa Ana River, which was a part of the site prior to construction of the Santa Ana River levee.

The low-flow channel and spillway channel downstream of Lake Evans receive water either via a culvert or from water that is released or spilled from the lake at two locations. A sluice box located near the southwest corner of the lake allows water to flow under Dexter Drive and into the low-flow channel, which travels 3,400 feet before passing into twin reinforced concrete culverts at the Santa Ana River levee. Water was not flowing through the sluice box during a site visit in April 2014 but was flowing during the Jurisdictional Delineation and CRAM field work in August 2018 and during a site visit in October 2018. A culvert that carries flows from Spring Brook Wash and a higher elevation spillway is located at the northwest section of Lake Evans. The 200-foot-long spillway is formed by a dip in Dexter Drive at an elevation of 792 feet. The 2,750-foot-long spillway channel flows to the southwest before joining the low-flow channel about 1,500 feet upstream of the levee.

Historic aerial photography from 1931 was mapped alongside the 2014 imagery acquired for this project (Figure 3). Inspection of the historic imagery shows how the site has changed over the 83-year period from 1931–2014. The present day existing and proposed channels are shown as blue lines on both the 1931 and 2014 images to serve as a guide in comparing the same locations on the two images.

Lake Evans in Fairmount Park was constructed in the early 1900s. The footprint of Lake Evans was the same in 1931 as it is today. The greatest differences apparent in the two images are that the Santa Ana River levee did not exist in 1931 and a large meander bend of the Santa Ana River looped into the site to the east side of the present day levee. The downstream end of the present day spillway channel follows the perimeter of the 1931 meander loop, and traces of the meander are observed in the vegetation patterns in 2014. Nearly the entire lower half of the 2014 low-flow channel is located in an area that used to be occupied by the Santa Ana River channel or its active floodplain in 1931. This explains why the elevation gradient of the 2014 low-flow channel decreases as it approaches the levee. It appears that, in 1931 the drainage from Lake Evans took a more central location than present day, as evident in the riparian corridor in the central portion of the 1931 image. Overall, the vegetation appears less dense in 1931 compared to 2014 conditions. Lake Evans also traps bedload sediment and prevents it from supplying the channel below.



Preliminary Design of Santa Ana River Tributary Restoration Projects
Evans Lake Drain - Comparison of 1931 and 2014 Aerial Photography

Sources:
2014 Imagery - Sierra Romeo; 1931 Imagery - U. California Santa Barbara, Aerial Imagery Research Service

Figure 3. Comparison of 1931 and 2014 Aerial Photography at Lake Evans

Figure 4. Low-flow channel 400 feet upstream of Santa Ana River. Area is highly disturbed by human visitation (3/14/2014)

Figure 5. Dense vegetation within channel (3/14/2014)

Figure 6. Undercut bank of spillway channel on the left with dense riparian vegetation (8/2/2018)

Figure 7. Looking west across site from Dexter Drive with disturbed habitat in the foreground. Remnants of fire can be seen on palm trees (8/2/2018)

Figure 8. Looking west across site from the center of the site with dense grape vine in the foreground and palm trees in the background (8/2/2018)

Figure 9. Trash and debris from homeless encampments

3.2 Vegetation

3.2.1 Vegetation Communities

The dominant vegetation community within the site is a heavily disturbed cottonwood (*Populus fremontii*)-wild grape (*Vitis girdiana*) forest alliance. This community is surrounded by Lake Evans spillway to the northeast, the Santa Ana River levee to the northwest, and upland areas consisting of nonnative communities including: semi-natural woodland stands, California annual grassland alliance, black mustard (*Brassica nigra*) and other mustards herbaceous semi-natural alliance, and disturbed areas. In addition to the cottonwood-wild grape forest alliance, several native vegetation communities also provide vegetation cover within the site and include: cottonwood forest alliance, black willow (*Salix gooddingii)* woodland alliance, California walnut (*Juglans California*) woodland alliance, and arrow weed (*Pluchea sericea*) shrublands. Table 4 summarizes the vegetation communities and land cover types on the site, and Figure 10 illustrates the location of each vegetation community within the site. A detailed description of each vegetation community observed on site is provided below, and a complete list of the plant species observed is provided in Appendix C.

Cattail (*Typha* ssp.) Herbaceous Alliance: Cattail herbaceous alliance is dominated by cattail, a perennial, emergent monocot that often forms uniform stands. Cattails typically occur in perennially wet or ponded freshwater areas with little flow. Within the site cattail herbaceous alliance is located within the stream channel at the head of the sluice box on Dexter Road and is dominated by broadleaf cattail (*Typha latifolia)*. This vegetation community provides nesting habitat for avian species such as the red-winged blackbird (*Agelaius phoeniceus*) and marsh wren (*Cistothorus palustris*) and provides foraging habitat for numerous avian species.

Cottonwood (*Populus fremontii*) Forest Alliance: Cottonwood forests are found in streambeds and other wet areas, and are composed of tall tree species such as cottonwood, sycamore (*Platanus racemosa*) and willows. The understory is usually composed of shrubby willows such as sandbar willow (*Salix exigua*), mule fat (*Baccharis salicifolia*), and perennial herbs such as California mugwort (*Artemisia douglasiana*) and tarragon (*Artemisia dracunculus*). Within the site, the tree canopy is dominated by red willows (*Salix Laevigata*), velvet ash (*Fraxinus velutina*), sycamore, and cottonwood with an understory made up of native and nonnative species including: mule fat, arroyo willows (*Salix lasiolepis*), poison oak (*toxicodendron diversilobum*), giant reed (*Arundo donax*), edible fig (*ficus carica*), and poison hemlock (*Conium maculatum)*. This vegetation community occurs in the southern portion of the site, and provides nesting habitat for species such as the yellow warbler (*Setophaga petechia*), yellow breasted chat, Cooper's hawk (*Accipiter cooperii*), and least Bell's vireo.

Southern Cottonwood (*Populus Fremontii*) – Wild Grape (*Vitis girdiana*) Forest Alliance: The cottonwood – wild grape forest alliance is the most common vegetation community within the site. This community is best described as a degraded cottonwood riparian forest composed of an open to closed canopy of tall trees that includes both native and nonnative species. The understory is dominated by native wild grape, which can form large monotypic stands within this community while in other areas the understory may be dominated by nonnative annuals and perennials herbs such as poison hemlock. Native tree species such as cottonwood and red willow are scattered within this community, and shrubby willows species can dominate the streambed channel in certain areas. Exotic trees such as tree of heaven (*Ailanthus altissima*), edible figs, and palms including Canary Island date palm (*Phoenix canariensis*) and Mexican fan palm (*Washingtonia robusta*) are also scattered throughout this community. This vegetation community classification does not fit into the standard alliance level nomenclature defined by Sawyer et al. (2009) but represents a best fit description of a highly disturbed riparian area with a mosaic of natives and nonnatives species. This community supports a high avian diversity and abundance, and provides nesting habitat for species such as yellow warbler, yellow breasted chat, Cooper's hawk, and least Bell's vireo.

Arrow Weed (*Pluchea sericea*) Shrubland Alliance: This disturbance maintained shrubland community is dominated by arrow weed and is commonly found along streams, floodplains, and ditches. This early seral community is maintained by frequent flooding, and absent disturbance most stands would succeed to cottonwood (*Populus fremontii*) or western sycamore (*Platanus racemosa*) dominated riparian forests or woodlands. The understory is composed of weedy annuals and biennials such as nonnative mustards and poison hemlock. This vegetation community is located in a large swathe on the north side of the site, and is used for both nesting and foraging for many avian species, including least Bell's vireo.

Tamarisk (*Tamarix ssp.*) Semi-Natural Shrubland Stands: This nonnative riparian vegetation community is dominated by and often forms monocultures of an invasive, nonnative tree species known as saltcedar or tamarisk (*Tamarix spp.)*. These stands often occur as a result of major disturbance. Tamarisk outcompetes native species in several ways including: an extensive lateral root system that can draw down the water table, a prolonged seed dispersal period, and secretion of salt crystals that when introduced into the soil can prevent native plants from establishing. Tamarisk semi-natural shrubland stands occur as several small patchy areas within the site and consist of monotypic stands of saltcedar (*Tamarix ramosissima*) with little to no understory. This shrubland habitat provides extremely low ecological functions and values compared to native riparian vegetation communities.

Eucalyptus (*citriodora*, *sideroxylon*) Semi-Natural Woodland Stands: This habitat often consists of monotypic stands of introduced eucalyptus trees (*Eucalyptus* spp.). The understory is typically depauperate or sparse due to allelopathic properties of the eucalyptus leaf litter. This community is widespread throughout southern California, often occupying large tracts of land and displacing native plant communities. Eucalyptus woodlands within the site are located in the southern and southwestern boundaries of the sites and consist of mixed stands of lemon scented gum (*Eucalyptus citriodora*) and red iron bark (*Eucalyptus sideroxylon*). Eucalyptus woodland stands provide habitat and foraging value for many native animals, and are utilized by raptors for nesting and roosting sites, and therefore may be considered a resource for those species.

Brazilian Pepper (*Schinus terebinthifolia*) Semi-Natural Woodland Stands: This nonnative vegetation community is dominated by and often forms monocultures of an invasive, evergreen tree species known as Brazilian pepper. The understory is sparse or void of plants altogether due to the allelopathic suppression of the leaf litter. Brazilian pepper woodland stands are restricted to a small area located within the northwestern portion of the site. Although this vegetation community may provide some habitat value such as roosting and nesting sites, pollen and nectar for pollinators, and foraging opportunities, the monocultures this species forms displace native habitat with greater diversity and ecological values and functions.

Mexican Fan Palm (*Washingtonia robusta*) Semi-Natural Woodland Stands: This highly disturbed vegetation community has displaced native cottonwood forest alliance within the site and is characterized by a tree canopy dominated by Mexican fan palms with a variable understory composed of shrubby willows, mulefat, and wild grape or composed almost entirely of weedy annual species and pond frond litter. This community occurs in a large area in the central portion of, and scattered pockets throughout, the site. Similar to eucalyptus woodlands, this habitat can provide foraging value for many native animals, and is utilized by raptors for nesting and roosting, and therefore may be considered a resource for those species.

Tree of Heaven (*Ailanthus altissima*) Semi-Natural Woodland Stands: This nonnative vegetation community is dominated by and often forms monocultures of an invasive, deciduous tree species known as tree of heaven. Within the site, other exotic palms and broadleaf tree species are prevalent in this vegetation community, but tree of heaven dominates the cover within the tree canopy. The understory is composed of weedy nonnative annuals and perennial species. This vegetation community is located within a large area within the middle of the site adjacent to other semi-natural woodland stands. Tree of heaven is a fast growing, highly invasive species that can exhaust the water table and rapidly displace native riparian vegetation. Similar to other semi-natural woodland stands, this habitat can provide some habitat value such as roosting and nesting sites, pollen and nectar for pollinators, and foraging opportunities; however, the monocultures this species forms displace native habitat with greater diversity and ecological values and functions.

Black Willow (*Salix gooddingii*) Woodland Alliance: Black willow woodland alliance is a woodland community dominated by 50% or greater relative canopy cover of black willows, often with associated riparian tree species such as cottonwood or red willow. Black willow woodland alliance within the site is composed of a monotypic stand of black willows with a continuous closed canopy and a sparse understory composed of weedy annuals and biennials such as nonnative mustards and nonnative grasses. This area provides valuable raptor nesting and roosting habitat as well as foraging and nesting habitat for species such as the yellow warbler and yellow breasted chat.

California Walnut (*Juglans californica*) Woodland Alliance: California walnut woodland alliance is a woodland community dominated by 50% or greater relative canopy cover of California walnut. Coast live oak (*Quercus agrifolia*) and elderberry (*Sambucus nigra*) are associate tree species within this community on site, but California walnuts dominated the tree canopy with a sparse understory composed of weedy annuals and biennials such as nonnative mustards and nonnative grasses. This habitat provides habitat for nesting and roosting raptors such as the white-tailed kite, Cooper's hawk, and red-shoulder hawk and provides foraging and nesting habitat for numerous passerine avian species.

California Annual Grassland Alliance: California annual grasslands are areas densely covered with nonnative annual grass species such as wild oats, bromes, and barley. This vegetation community often occurs where native habitats such as native grassland and coastal sage scrub have been disturbed or removed. It is often associated with numerous species of native wildflowers, especially in years of favorable rainfall. Within the site, common species found in this vegetation community include: rip-gut brome (*Bromus diandrus*), wild oat (*Avena barbata*), filaree (*Erodium spp.),* black mustard, horehound (*Marrubium vulgare*), prickly lettuce (*Lactuca serriola*), and tocalote (*Centaurea melitensis*). This habitat supports a variety of small native mammals, avian species, and native reptiles and is often of value to raptors as foraging areas.

Black Mustard (*Brassica nigra*) and Other Mustards Herbaceous Semi-Natural Stand Alliance: This ruderal vegetation community is dominated by disturbance-loving, nonnative, broadleaf weed species that do not naturally and historically occur in the region. Black mustard is the dominant cover within this community on site, but other nonnative mustards are common, such as London rocket and short podded mustard (*Hirschfeldia incana*). Additionally invasive species such as tobacco tree (*Nicotiana glauca*), Russian thistle (*Salsola tragus*), and gold crownbeard (*Verbesina encelioides*) also heavily infest this area, and nonnative trees and shrubs such as pepper (*Schinus* spp.) and tamarisk (*Tamarix* spp.) are scattered throughout. Although this vegetation community may provide some support for native wildlife species in the form of shelter, foraging habitat, and roosting or nesting habitat, it is generally understood to degrade natural conditions and may result in the exclusion of certain native wildlife species that are dependent upon natural plant species and habitats for their survival.

Disturbed Habitat: Disturbed habitat consists of areas that have experienced persistent mechanical disturbance, resulting in severely limited native plant growth, and may be void of vegetation altogether or may have a sparse cover of nonnative weedy species but may also include scattered and isolated nonnative trees such as pepper (*Schinus* spp.), eucalyptus (*Eucalyptus* spp.), and tamarisk (*Tamarix* spp.).

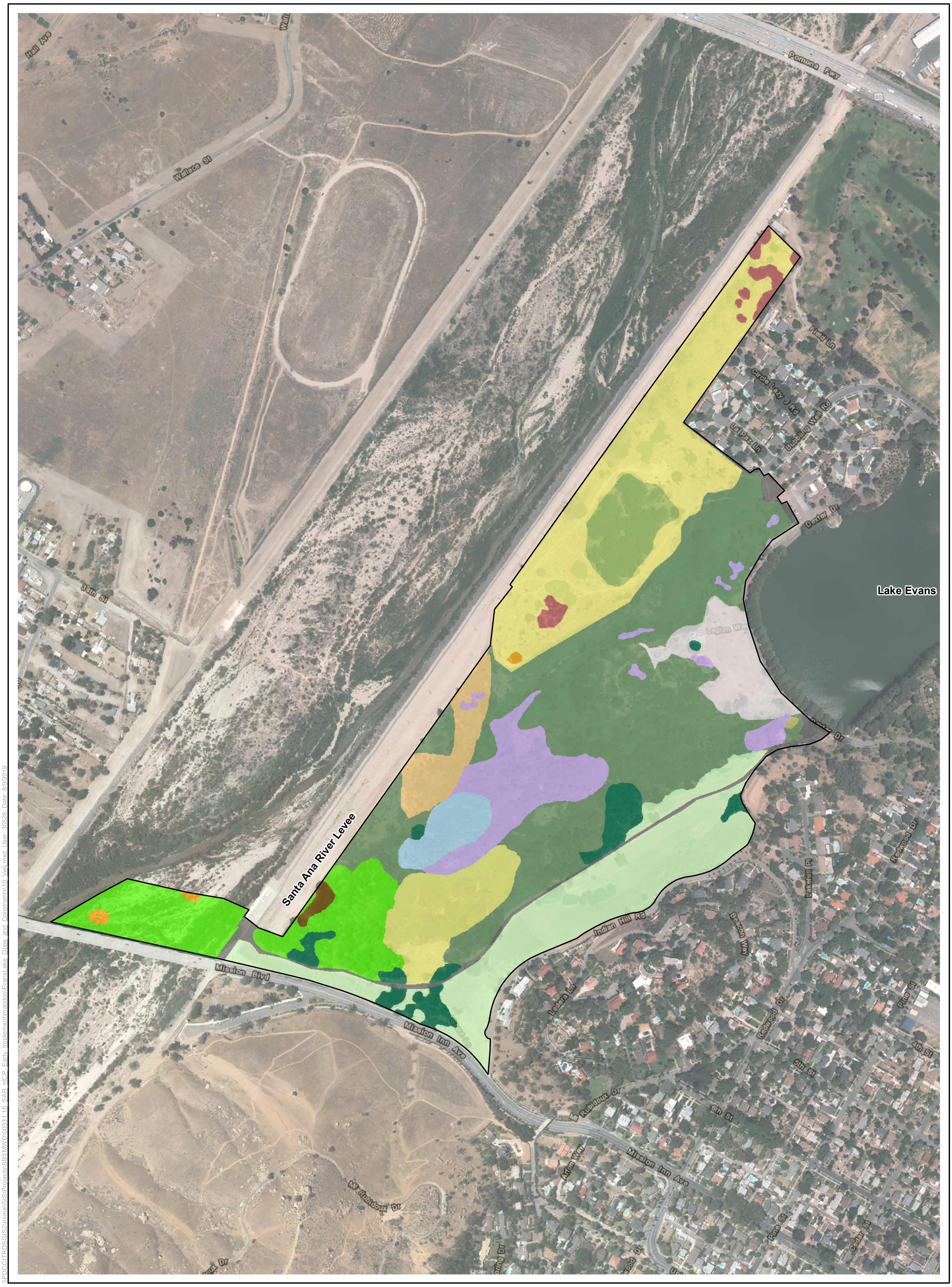
Urban/Developed: This land cover is characterized by areas that have been constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported. Developed land is characterized by permanent or semi-permanent structures, pavement or hardscape, and landscaped areas that often require irrigation. Areas where no natural land is evident due to a large amount of debris or other materials being placed upon it may also be considered urban/developed (e.g., car recycling plant, quarry). Little to no vegetation occurs in these areas other than ruderal, disturbance-loving species and a variety of ornamental (usually nonnative) plants.

Table 4. Vegetation Communities and Land Cover Types

Common Name	Alliance(s)	Acres
Native Communities		**52.18**
Arrow Weed Shrubland	*Pluchea sericea*	3.32
Black Willow Woodland	*Salix gooddingii*	3.96
California Walnut Woodland	*Juglans californica*	0.41
Southern Cottonwood-Wild Grape Forest	*Populus fremontii – Vitis girdiana*	33.99
Cattail Herbaceous	*Typha* ssp.	0.07
Cottonwood Forest	*Populus fremontii*	10.43
Nonnative Communities		**55.75**
Black Mustard and Other Mustards Herbaceous	*Brassica nigra, Hirschfeldia incana., Sisymbrium irio*	24.21
Brazilian Pepper Semi-Natural Woodland	*Schinus terebinthifolia*	1.23
California Annual Grassland	*Bromus, Avena, Erodium,* spp., etc.	16.01
Eucalyptus Semi-Natural Woodland	*Eucalyptus globulus, Eucalyptus camaldulensis*	3.67
Mexican Fan Palm Semi-Natural Woodland	*Washingtonia robusta*	7.86
Tamarisk Semi-Natural Woodland	*Tamarix* spp.	0.30
Tree of Heaven Semi-Natural Woodland	*Ailanthus altissima*	2.47
Land Cover Types		**7.19**
Disturbed Habitat	Vacant (disturbed bare ground)	4.78
Urban/Developed	Urban/Developed	2.41
Total		**115.12**

3.2.2 Invasive Plant Species

Invasive vegetation was mapped and categorized according to the California Invasive Plant Counsel (CAL-IPC) ratings. Invasive species were organized in four categories: High, Moderate, Limited, and Not Listed. The site contains 58.56 acres of invasive plant species with the majority falling into the Moderate category. Table 5 summarizes the invasive species on the site, and Figure 11 illustrates the location of each invasive species.



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Legend

□ Study Area

Alliance

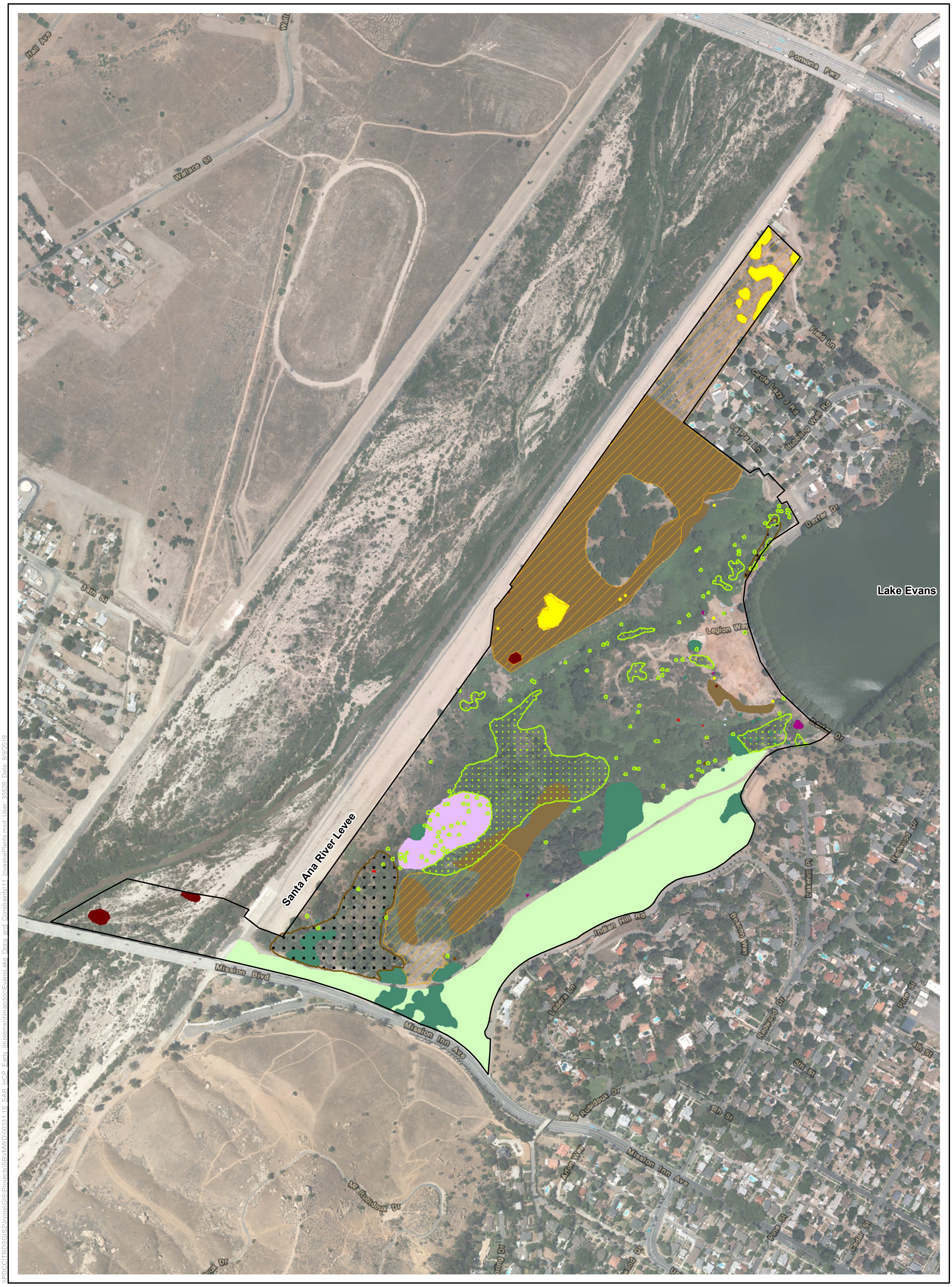
- 🟦 Tree of Heaven (Ailanthus altissima) Semi-Natural Woodland Stands
- 🟪 Mexican Fan Palm (Washingtonia robusta) Semi-Natural Woodland Stands
- 🟥 Brazilian Pepper (Schnus terebinthifolia) Semi-Natural Woodland Stands
- 🟧 Arrowweed *(Pluchea sericea)* Shrubland Alliance
- 🟨 Black Mustard (Brassica nigra) and Other Mustards Herbaceous Semi-Natural Stand Alliance
- 🟩 Black Willow (Salix goodingii) Woodland Alliance
- 🟩 California Annual Grassland Alliance
- 🟫 California Walnut *(Juglans californica)* Woodland Alliance
- 🟨 Cattail *(Typha ssp.)* Herbaceous Alliance
- 🟩 Cottonwood *(Populus fremontii)* Forest Alliance
- 🟩 Eucalyptus *(globulus, camaldulensis)* Semi-Natural Woodland Stands
- 🟩 Southern Cottonwood (populus Fremontii) – Wild Grape *(Vitis girdiana)* Forest Alliance
- 🟧 Tamarisk *(Tamarix ssp.)* Semi-Natural Shrubland Stands
- ⬜ Disturbed Habitat
- ⬛ Urban/Developed

Source: ICF; SBVMWD; ESRI 2019

N

0 250 500 Feet
1:6,000

Figure 10
Vegetation Communities
Evans Creek Opportunities and Constraints Memo



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Legend

☐ Study Area

Invasive Plants (CAL-IPC Ratings)

High

🟥 Giant reed *(Arundo donax)*

🟫 Tamarisk *(Tamarix ramosissima)*

Moderate

🟨 Brazilian pepper tree *(Schinus terebinthifolius)*

▨ Edible fig *(Ficus carnica)*

🟩 Nonnative grasses *(Bromus spp. and Avena spp.)*

▨ Nonnative mustards *(Brassica nigra, Sisymbrium irio)*

▨ Palm (various)

🟫 Tobacco tree *(Nicotiana glauca)*

🟪 Tree of heaven *(Ailanthus altissima)*

Limited

🟪 Castor bean *(Ricinis communis)*

🟩 Eucalyptus *(citriodora, sideroxylon)*

Not Listed

🟦 Mexican palo verde *(Parkinsonia aculeata)*

Source: ICF; SBVMWD; ESRI 2019

N

0 250 500 Feet

1:6,000

Figure 11
Invasive Plants
Evans Creek Opportunities and Constraints Memo

Table 5. Invasive Plant Species and CAL-IPC Rating

Plant Species and CAL-IPC rating	Sum of Acres
High	**0.31**
Giant reed (*Arundo donax*)	0.003
Tamarisk (*Tamarix ramosissima*)	0.31
Limited	**3.94**
Castor bean (*Ricinus communis*)	0.04
Eucalyptus (*citriodora, sideroxylon*)	3.9
Moderate	**75.86**
Brazilian pepper tree (*Schinus terebinthifolius*)	1.3
Edible fig (*Ficus carica*)	5.05
Nonnative grasses (*Bromus spp. and Avena spp.)*	16.0
Nonnative mustards (*Brassica nigra, Sisymbrium irio*)	24.2
Palm (various)	8.49
Tobacco tree (*Nicotiana glauca*)	18.35
Tree of heaven (*Ailanthus altissima*)	2.47
Not Listed	**0.01**
Mexican Palo Verde (*Parkinsonia aculeata*)	0.01
Total	**80.12**

3.2.3 Special-Status Plants

Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*), a State and Federally listed species; San Diego ambrosia (*Ambrosia pumila*), a federally listed species; and nine CNPS-listed species were determined to have varying potential to occur within the site. Table 6 provides details on all 11 special-status plant species and their potential to occur within the site. Of these 11 potential species, only California Walnut (CRPR 4.2) was detected within the site (Figure 10). Additionally, Santa Ana River woolly-star, prairie wedge grass (*Sphenopholis obtusata*), Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*), and smooth tarplant (*Centromadia pungens*) were determined to have a high potential to occur but were not observed during the survey. The remaining 7 species were determined to have low to moderate potential to occur. Sensitive plant surveys coincided with the blooming periods of 8 of these species. Blooming periods for Brand's star phacelia (*Phacelia stellaris*), CRPR 1B.1; chaparral ragwort (*Senecio aphanactis*), CRPR 1B.1; and Coulter's goldfield (*Lasthenia glabrata* spp. *coulteri*), CRPR: 1B1 did not coincide with the timing of the survey; however, these 3 plant species are not expected to occur due to the lack of suitable habitat within the site. Individual rare plants were mapped as points, and larger populations were mapped as polygons using iPad devices running the ESRI Collector application.

Table 6. Potentially Occurring Special-Status Plant Species within the Site

Species and special status designation	Life Form and Habitat Description	Potential to Occur
Ambrosia pumila (*Ambrosia pumila*) USFWS: endangered	Perennial rhizomatous herb. Chaparral, coastal scrub, valley and foothill grassland, vernal pools on	Low: marginally suitable habitat exists and nearest occurrence is several miles from the site.

Species and special status designation	Life Form and Habitat Description	Potential to Occur
CRPR: 1B.1	sandy loam or clay soils, often in disturbed areas, sometimes alkaline.	
Plummer's mariposa lily (*Calochortus plummerae*) CRPR 4.2	Perennial bulbiferous herb. Granitic, rocky substrates within chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland	Low: suitable habitat does not exist within the site.
Smooth tarplant (*Centromadia pungens* ssp. *laevis*) CRPR 1B.1	Annual herb. Chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grassland.	High: known occurrence within a mile of the site and suitable habitat occurs within the project site.
Paniculate tarplant (*Deinandra paniculata*) CRPR 4.2	Annual herb. Often vernally mesic, sometimes sandy habitat within coastal scrub, valley and foothill grassland, California annual grassland, and vernal pools.	Moderate: annual grassland habitat within the site is likely to arid to support this species.
Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*) USFWS: Endangered CDFW: Endangered CRPR: 1B.1	Perennial herb. Sage scrub on alluvial terraces.	High: suitable habitat exists for portions of the site within the Santa Ana River floodplain and known occurrences within the immediate vicinity of the site.
California walnut (*Juglans californica*) CRPR: 4.2	Perennial deciduous tree. Chaparral, coastal sage, cismontane woodland and riparian woodland.	Present
Coulter’s goldfield (*Lasthenia glabrata ssp. coulteri*) CRPR: 1B1	Annual herb. Marshes and swamps (coastal salt), playas, and vernal pools	Low: suitable habitat does not exists within the site.
Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii)* CRPR: 4.3	Annual herb, Chaparral, and coastal scrub.	High: CNDDB records for this species occur within the project site.
Brand’s star phacelia (*Phacelia stellaris*) CRPR: 1B.1	Annual herb. Coastal dunes, and coastal scrub	Low: suitable habitat does not exists within the site.
Chaparral ragwort (*Senecio aphanactis*)	Annual herb. Chaparral, cismontane woodland, and coastal scrub	Low: suitable habitat does not exists within the site.
Prairie wedge grass (*Sphenopholis obtusata*) CRPR: 2B.2	Perennial herb, Mesic sites within cismontane woodland, meadows and seeps.	High: suitable habitat exists and CNDDB records for this species occur immediate northeast of the site within the Santa Ana River floodplain.

3.3 Sensitive Fish and Wildlife

Site surveys for sensitive wildlife species were conducted to assess existing habitat suitability, document species occurrences on site or near the site, and document potential habitat restoration opportunities.

Existing fish habitat is limited on site. The existing low-flow channel and the spillway channel do not provide an appropriate amount of water necessary to support habitat for Santa Ana sucker. If the lake elevation drops below the elevation of the sluice box at Dexter Drive, or the sluice box is not functioning correctly, little to no water spills from the lake to the low-flow channel or the spillway channel. No Santa Ana sucker, speckled dace, or arroyo chub were observed during the site visit and are not known to occur in the low-flow channel or the spillway channel. It is unlikely that these fish species would occur based on current habitat conditions.

Potential aquatic habitat for both western pond turtle and south coast garter snake is highly degraded and is limited to the low-flow channel and the spillway channel. The low-flow and spillway channels provide a water source but do not have deep pools that are required by western pond turtles. Numerous turtles were observed in Lake Evans during the field surveys. While some of these turtles were identified as nonnative red-eared sliders (*Trachemys scripta elegans*), some were not positively identified and could be native western pond turtles. South coast garter snakes have not been documented on the site, nor were they observed during site visits.

Sensitive bird species documented at the site during field visits include least Bell's vireo, yellow-breasted chat, and yellow warbler (*Setophaga petechia*) (Figure 12). Riparian bird habitat was evaluated to be moderate to high quality throughout the site, though much of the habitat quality is degraded mainly because of the extent of nonnative vegetation and human disturbance.

No Los Angeles pocket mouse or San Diego black-tailed jackrabbit were documented during site visits, and there are no historical documented occurrences of these species at the site. The site does support small patches of potential habitat for these species, primarily along where the site borders the Santa Ana River Trail. The ability of the site to support populations of these species is severely limited due to the dense vegetation throughout most of the site, the intra-site patchiness of habitat, and the lack of connectivity to suitable habitat in the region.

3.4 Jurisdictional Delineations

The site contains two separate channels fed by Lake Evans (a low-flow channel and a spillway channel) that converge into a single channel approximately in the middle of the site and then flow through a culvert in the levee to join the SAR. In addition there is a small concrete drainage located at the north-east end of the site. A total of 5.03 acres of waters of the U.S and 71.19 acres of CDFW jurisdiction were mapped on site. Of the 5.03 acres of waters of the U.S., 2.81 acres are non-wetland waters of the U.S. that meet all three wetland criteria (hydric soil, wetland hydrology, hydrophytic vegetation) but are located below the OHWM and therefore were mapped as non-wetlands.[1] A total of 2.12 acres are non-wetland waters of the U.S. that do not meet all three wetland criteria, and 0.1

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[1] Per direction from Michael LaDouceur, Senior Project Manager, of the U.S. Army Corps of Engineers – Carlsbad Field Office at the October 30, 2018, Upper Santa Ana River field visit.

acre is non-wetland, concrete-lined waters of the U.S. Of the 71.19 acres of CDFW jurisdiction, 66.15 acres are riparian and 5.04 acres are streambed. Table 7 outlines the jurisdictional features, acreages, and linear feet. Figures 13 and 14 depict each feature. The summary below includes descriptions of each drainage feature. Refer to Appendix A for the Jurisdictional Delineation memorandum.

Table 7. Jurisdictional Waters and Wetlands within the Evans Creek Site

	Waters of the U.S. (USACE/RWQCB)				CDFW Jurisdiction			
Features	**Non-wetland[*] (acres)**	**Non-wetland (acres)**	**Non-wetland, Concrete-lined (acres)**	**Total (acres)**	**Streambed (acres)**	**Riparian (acres)**	**Total (acres)**	**Linear Feet**
Low-flow Channel	1.98	--	0.08	2.06	2.05	62.82	65.85	3,489
Spillway Channel	0.83	0.14	--	0.97	0.98			2,624
Santa Ana River	--	1.98	--	1.98	1.99	3.33	5.32	640
Concrete Drainage	--	--	0.02	0.02	0.02	--	0.02	122
Total	**2.81**	**2.12**	**0.10**	**5.03**	**5.04**	**66.15**	**71.19**	**6,875**

[*] Meets three-parameter wetland but because they are contained within a riverine feature and are located below the OHWM they were mapped as non-wetland waters of the U.S.

Santa Ana River

The SAR is located at the far western end of the site. The SAR within the site consists of the main river channel and its floodplain and a channel that outflows from a large culvert underneath the SAR levee/bike path and flows south. A meander bend in the river historically occupied a large portion of the Fairmont Park area and the site, but the river has since been cut off by construction of the SAR levee and bike path. Habitat within the SAR is dominated by Fremont cottonwood, red willow, arroyo willow, and mulefat, with a few patches of tamarisk. Primary OHWM indicators consisted of a defined bed and bank and changes in vegetation characteristics. CDFW jurisdiction was mapped as the entire river channel from the levee on the east side of the river to the project boundary on the west side.

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Legend

▭ Study Area

Avian Observations (July 2018)

● Least Bell's vireo

● Yellow warbler

● Yellow-breasted chat

Source: ICF; SBVMWD; ESRI 2019

N

0 250 500 Feet

1:6,000

Figure 12
Sensitive Avian Species
Evans Creek Opportunities and Constraints Memo

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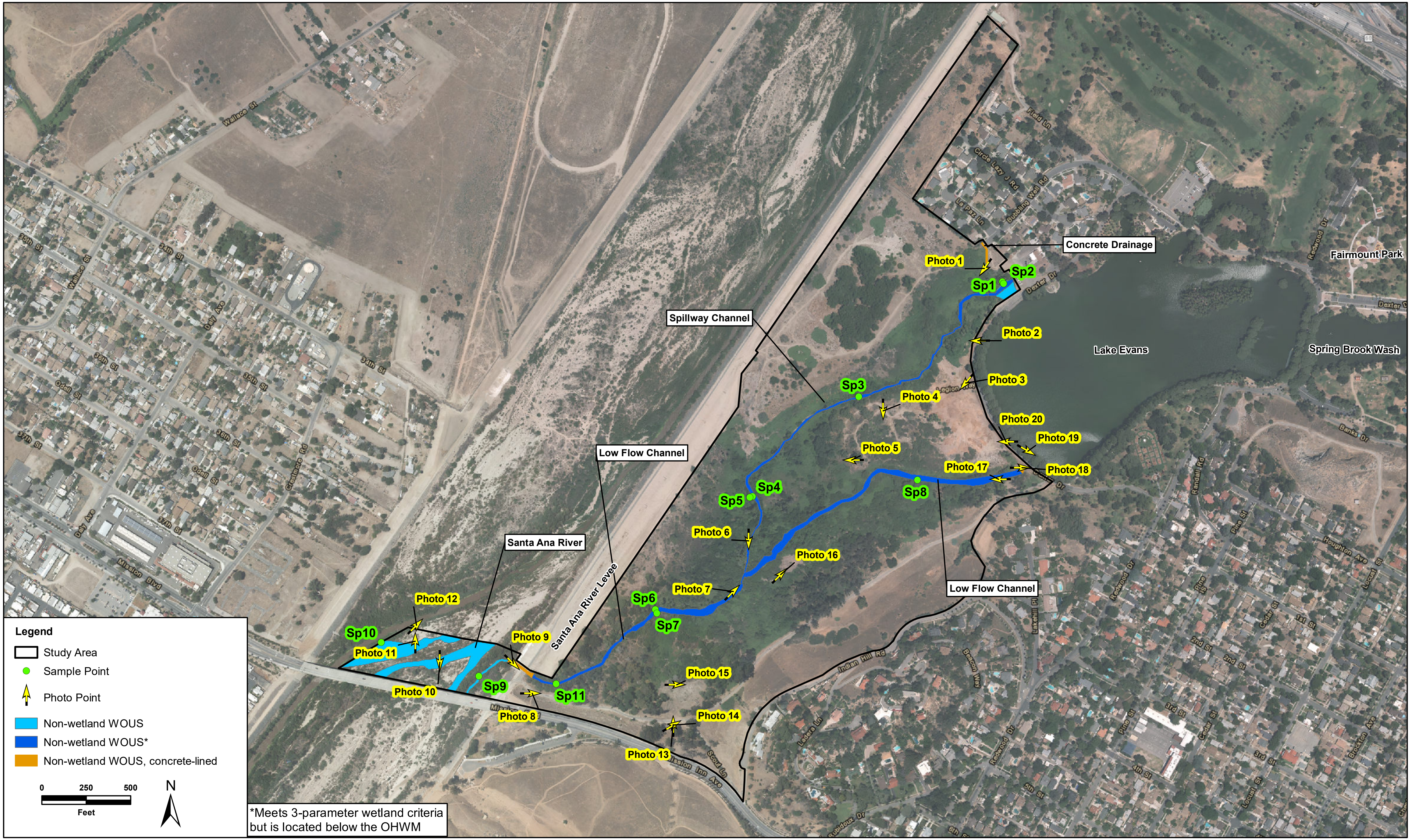

Figure 13
Waters of the U.S.
Evans Creek Opportunities and Constraints Memo

Source: ICF 2018; RivCo GIS; NHD

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Figure 14
CDFW Jurisdiction
Evans Creek Opportunities and Constraints Memo

Low-flow Channel

The low-flow channel flows from northeast to southwest within the site and eventually flows beneath the SAR levee/bike path through a large culvert where it turns towards the southwest and into the SAR floodplain. The channel originates at a culvert just west of Dexter Drive and is fed by water overtopping a riser/sluice gate within Lake Evans. During fieldwork water was flowing into the riser and slowly in the channel. The low-flow channel had active flow to a location just upstream of the confluence with the spillway channel, after which water flows subsurface. The entire low-flow channel is non-wetland waters of the U.S. Although the majority meets all three parameters of a wetland, because it is located below the OHWM it was mapped as non-wetlands. CDFW jurisdiction consisted of the low-flow channel and adjacent riparian habitat, which consisted primarily of Fremont cottonwood (*Populus fremontii*) and wild grape (*Vitis girdiana*), Mexican fan palm (*Washingtonia robusta*), black mustard (*Brassica nigra*), tree of heaven (*Ailanthus altissima*), and eucalyptus (*Eucalyptus spp.)*.

Spillway Channel

The spillway channel is located north of the low-flow channel and flows from northeast to southwest across the site. It converges with the low-flow channel approximately in the center of the site. The channel originates at the northeast end of the site from a culvert that carries Spring Brook Wash flows. In addition, flows come from Lake Evans over a spillway across Dexter Drive, which generally spills into the channel several times per year during large rain events (McDaniel pers. comm.). Water was present at the upstream end of the channel during the August 2018 site visit but was not present in the middle or downstream portion due to nuisance flows that feed the channel percolating and going subsurface. The entire channel is non-wetland waters of the U.S. Although the majority meets all three parameters of a wetland, because it is located below the OHWM it was mapped as non-wetlands. CDFW jurisdiction consisted of the channel and adjacent riparian habitat, which consisted primarily of Fremont cottonwood (*Populus fremontii*) and wild grape (*Vitis girdiana*), Mexican fan palm (*Washingtonia robusta*), black mustard (*Brassica nigra*), tree of heaven (*Ailanthus altissima*), arrow weed (*Pluchea sericea*) and eucalyptus (*Eucalyptus spp.)*.

Concrete Drainage

The concrete drainage channel is located at the northern end of the site just north of the start of the spillway channel. The channel collects runoff from the neighboring residential development to the north and delivers it into the site. Beyond the terminus of the channel there is no discernable channel or flow path. Water likely spreads out into sheetflow.

3.5 CRAM Conditional Assessment

Three CRAM AAs were surveyed within the site—one in the low-flow channel, one in the spillway channel, and one in the low-flow channel after its confluence with the spillway channel. Wetland condition throughout the site ranged from 58 to 77 in total CRAM score. All AAs scored relatively high for buffer and landscape attributes, scoring between 80 and 93, with the lower scores occurring within the buffer condition submetric. All AAs scored an A for percent of AA with buffer and scored an A or B for buffer width.

The hydrology attribute scores for the AAs ranged from 42–75. Water source scored low as a result of the developed watershed and the assumed high contribution of urban runoff to the site. AA2 and AA3 scored an A or B for channel stability and hydrologic connectivity as the channels were relatively stable with only minor signs of degradation and entrenchment. AA1 scored lower as there were moderate to severe signs of channel degradation and entrenchment.

The physical structure attribute scores ranged from 50–63, with AA1 scoring the lowest. AA1 scored a C for both structural patch richness and topographic complexity due to minimal patches and having no benches; AA2 and AA3 scored the same as AA1 for structural patch richness but scored slightly higher (B) for topographic complexity due to the presence of some benching and micro topography.

The biotic structure attribute ranged from 56–75, with AA1 and AA3 scoring a 56 and AA2 scoring a 75. AA1 and AA3 scored the same for all metrics and submetrics, with the number of co-dominant species scoring the lowest and percent invasion scoring the highest. AA2 scored relatively higher throughout with the lowest score in number of co-dominant species and the highest in number of plant layers.

A summary of the results for each AA is provided in Table 8, and a depiction of the AAs is provided in Figures 15, 16 and 17. The CRAM memorandum is provided as Appendix B.

Table 8. CRAM Metric, Submetric, Attribute, and Overall Scores for Evan's Creek Assessment Areas

Attributes	**CRAM Metric and Submetrics**	**AA1**	**AA2**	**AA3**
Buffer and Landscape Context	Stream Corridor Continuity	A (12)	A (12)	A (12)
	Buffer Submetric A: Percent of Assessment Area with Buffer	A (12)	A (12)	A (12)
	Buffer Submetric D: Average Buffer Width	A (12)	A (12)	C (6)
	Buffer Submetric C: Buffer Condition	C (6)	B (9)	C (6)
	Final Attribute Score	**85%**	**93.3%**	**79.6%**
Hydrology	Water Source	C (6)	C (6)	C (6)
	Channel Stability	C (6)	B (9)	B (9)
	Hydrologic Connectivity	D (3)	A (12)	A (12)
	Final Attribute Score	**41.7%**	**75%**	**75%**
Physical Structure	Structural Patch Richness	C (6)	C (6)	C (6)
	Topographic Complexity	C (6)	B (9)	B (9)
	Final Attribute Score	**50%**	**62.5%**	**62.5%**
Biotic Structure	*Plant Community (PC) Submetric A: Number of Plant Layers*	B (9)	A (12)	B (9)
	PC Submetric B: Number of Co-dominant Species	D (3)	C (6)	D (3)
	PC Submetric C: Percent Invasion	A (12)	B (9)	A (12)
	Horizontal Interspersion	C (6)	B (9)	C (6)
	Vertical Biotic Structure	C (6)	B (9)	C (6)
	Final Attribute Score	**55.6%**	**75%**	**55.6%**
Overall AA Score		58%	76.5%	68%

Source: ICF 2017

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Figure 15
CRAM Results-AA1
Evans Creek Opportunities and Constraints Memo

Source: ICF 2017

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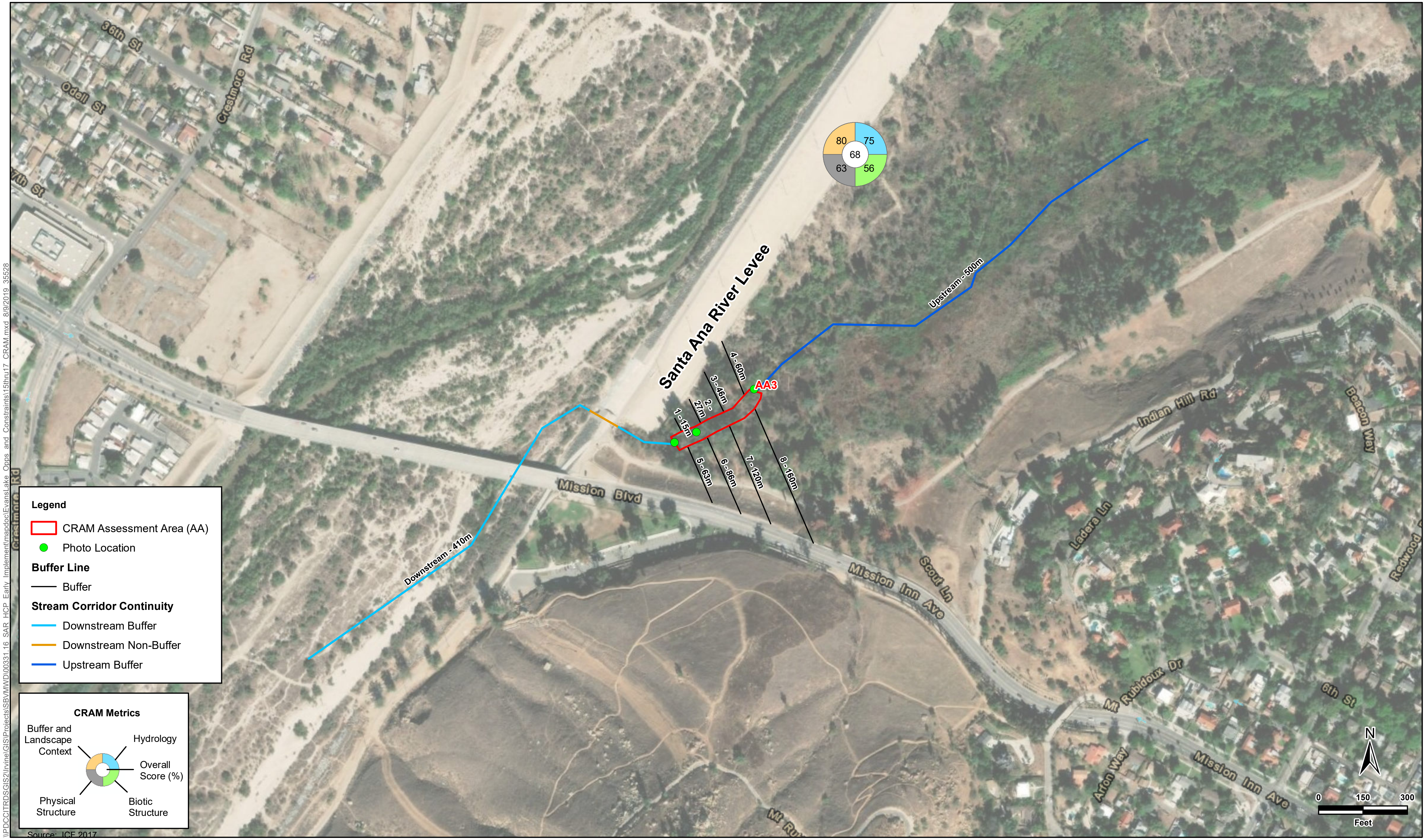
Figure 16
CRAM Results-AA2
Evans Creek Opportunities and Constraints Memo



Source: ICF 2017

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Figure 17
CRAM Results-AA3
Evans Creek Opportunities and Constraints Memo

Chapter 4
Restoration Opportunities and Constraints

This chapter discusses the objectives of the restoration activities and restoration opportunities and constraints in addition to benefits of the restoration activities to Cover Species and Aquatic Resources. It also briefly discusses the potential recreational facilities that would be constructed at the site by the City of Riverside as part of the Fairmount Park Wilderness Camp Plan (Figure 19).

4.1 Objectives

There are several objectives associated with the restoration project, including creation of habitat for the Santa Ana sucker and other Covered Species associated with the Upper SAR HCP, increasing the functions and services of the Aquatic Resources and upland resources on site to provide mitigation for impacts associated with Covered Activities, and incorporation of park and recreational facilities (e.g., nature center, education center, trails). The specific objectives are listed below.

1. Restore/enhance/establish habitat for Santa Ana sucker and other aquatic fish species by implementing channel improvements and providing supplemental flow.
2. Increase habitat functions and services of aquatic, transitional, and upland resources and reduce risk of fire through removal of invasives species, removal of anthropogenic trash and debris, reclaiming unauthorized trails, and removal of homeless encampments.
3. Increase habitat functions and services of aquatic, transitional, and upland resources through replanting of the areas of invasive species removal with native riparian, marsh, transitional, and upland habitat.
4. Re-establish and establish additional Aquatic Resources (floodplain, secondary channels) adjacent to the existing stream channels.
5. Create fish passage (roughened channel, orifice, vertical slot) for Santa Ana sucker to access the site.
6. Enhance public use of Fairmont Park by constructing several community amenities.

4.2 Restoration Opportunities and Benefits

4.2.1 Description of Restoration Opportunities

Several restoration opportunities have been identified within the site. Each restoration opportunity is described in detail below, and the benefits to Covered Species and Aquatic Resources are discussed in Section 4.2.2. The restoration opportunities are depicted on Figure 18.

4.2.1.1 Santa Ana Sucker Restoration Opportunities

1. **Supplement Existing Flows:** The existing low-flow channel does not provide enough water necessary to provide habitat for Santa Ana sucker. If the lake elevation drops below the elevation of the sluice box at Dexter Drive, or the sluice box is not functioning correctly, little to no water spills from the lake to the low-flow channel. Water from the Regional Recycled Water Project (Purple Pipe) or a new groundwater well and pump are proposed to be constructed at the upstream extent of the low-flow channel near Dexter Drive to provide sufficient water for Santa Ana sucker. The exact capacity of the supplemental flows has not yet been determined. Minimum flows of 2 cubic feet per second (cfs) may be required for limited durations to provide the flow depths necessary for sucker passage based on preliminary fish passage designs (Appendix A in ICF 2015) for the culvert under the Santa Ana River levee. Future studies will need to be conducted to determine the achievable flow rate. Ideally the supplemental flows will be able to be varied so that pulses of higher flows can be periodically routed down the channel to flush fine sediment accumulations on gravel substrate.
2. **Construct Bank to Define Channel**: The 3,400-foot-long low-flow channel is relatively low gradient, particularly in the downstream reaches. Over 1,000 feet of new bank would be constructed on the channel's left bank to create a more defined channel and floodplain benches. This would confine low flows to a more defined channel instead of allowing water to spread out to adjacent flow depressional areas, and create more topographic heterogeneity.
3. **Create Riffle and Pools and Habitat Structure**: Earthwork grading would be performed in select reaches to create channel bed complexity by adding pools and riffles in channel reaches that are currently relatively uniform without much topographic or flow diversity. Gravel would be added to new riffle sections that would have sufficient flow velocities to maintain suitable coarse substrate for sucker habitat. Approximately one instream wood and rock material structure would be constructed for every 200 feet of channel to aid in diversifying hydraulic conditions that would create and sustain habitat complexity.
4. **Construct Connector Channel**: The existing channel in the mainstem Santa Ana River that heads south along the levee and under the Mission Boulevard bridge would be plugged with rock and wood, and a new 280-foot-long channel would be excavated through a sediment berm in order to make a continuous channel connection between the site and the Santa Ana River.
5. **Create Fish Passage**: The site currently does not support Santa Ana sucker partially due to the presence of the Santa River levee and culverts located between the site and the Santa Ana River. Sucker passage would be created by creating a pathway for them to access the site. Creation of fish passage would allow suckers to migrate from the Santa Ana River into the site's channels to access additional habitat and adjust to changing hydrologic conditions. Full details of the preliminary fish passage designs are contained in a separate design report (Appendix A in ICF 2015). In summary, two concept designs were developed to provide upstream passage for adults (and potentially juveniles):

   Option 1: A vertical slot or orifice fishway downstream of the culvert outlet apron that would provide sufficient backwater to allow passage through the north culvert barrel.

   Option 2: A roughened channel (rock ramp) fishway downstream of the culvert outlet that would create backwater to the pipe outlet with baffles in the south culvert barrel to provide passage.

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* Recreation facilities (e.g. trails, camp site, picnic area, nature center, etc.) will be incorporated into the site plan which will reduce restoration opportunities shown in this figure.

Figure 18
Restoration Concept
Evans Creek Opportunities and Constraints Memo

Completely replacing the existing culverts was also considered but is less feasible due to the logistics of cutting or tunneling through the flood control levee and the potential for blockage with changes in the Santa Ana River bed elevations (Appendix A in ICF 2015). Conceptually, this option would replace the existing culverts at a lower elevation, such that they would connect with the invert elevation of the channel in the Santa Ana River bed. The culverts could have a natural bottom by countersinking oversized barrels, and a roughened channel fish passage could be constructed upstream of the culvert inlet to connect to the invert elevation of the channel upstream. Alternatively (depending on channel morphology and slope upstream), the upstream channel might be allowed to degrade 2 to 3 feet to match the new culvert elevation (Appendix A in ICF 2015). Improvements for Santa Ana sucker passage at the channel outlet are feasible from an engineering standpoint, although several design challenges are present that may limit the duration of the passage window. Several uncertainties are identified in this assessment that need to be addressed in order to advance a passage design. Chief among these is the availability, magnitude, and timing of flows so that the design flow range and most appropriate fish passage type can be selected (Appendix A in ICF 2015).

4.2.1.2 Channel Restoration Opportunities

6. **Floodplain Bench Establishment**: Sections of the spillway channel, primarily in the upstream reaches, are highly incised with vertical banks 5–6 feet or more tall. Bank incision of this magnitude has virtually eliminated any overbank flooding and abandoned the floodplain. The channel banks would be laid back and benching created to allow the channel to re-engage the floodplain and create several topographic habitats with varying hydrologic regimes.

7. **Secondary Channel Establishment**: The spillway channel currently consists of a single-thread channel. In order to create additional channel complexity that was likely similar to historic conditions a secondary/high-flow channel would be created on the north side of the spillway channel. The channel would likely only be engaged during winter rain events. The channel would also bring some additional flows closer to the black willow woodland that is located in the north end of the project site. The area was previously used to dispose of material that was dredged from Lake Evans (McDaniel pers. comm.) and has become dominated by black willow.

8. **Spillway and Low-flow Channel Rehabilitation**: The low-flow channel and spillway channel are vegetated with a mixture of native and nonnative and invasive species (e.g., palm, tree of heaven, bull thistle, fennel, ficus). Nonnative and invasive species would be treated and/or removed. Palms and nonnative trees close to the channel would be drilled and killed in place using Garlon (Triclopyr) herbicide. These trees are far away from roads or designated trails and will not represent a danger by slowly dying in place.

9. **Spillway and Low-flow Channel Rehabilitation**: Native riparian species (willow, cottonwood, sycamore, etc.) would be planted in areas of invasive removal. In addition, wild grape (*Vitis girdiana*) is dominant in many areas and is growing throughout and on top of native species, potentially limiting growth and light availability. Therefore, grape would be removed and controlled to limit its distribution.

10. **Spillway and Low-flow Channel Rehabilitation**: There is a large presence of transients and homeless encampments in the channels, which has led to anthropogenic trash, debris, and unauthorized trails. Trash and anthropogenic debris would be removed and unauthorized trails

reclaimed. Additional funding may also be sought to patrol the site in order to limit transients and homeless encampments.

4.2.1.3 Riparian Restoration Opportunities

11. **Riparian Rehabilitation**: The riparian areas of the site are vegetated with a mixture of native and nonnative and invasive species (e.g., palm, eucalyptus*,* tree of heaven, bull thistle, tree tobacco, fennel, ficus, castor bean, mustard). Nonnative and invasive species would be treated with herbicide and/or removed. Palms and nonnative trees close to existing or planned trails would need to be removed from the site as they are a falling hazard.

12. **Riparian Rehabilitation**: The riparian restoration approach would focus on establishing large trees and low growing vegetation in order to maintain a clear line of sight within the site and not create pockets of thick brush where transients could hide. Native riparian tree species (sycamore, black willow, and cottonwood) would be planted along with low growing alkali marsh species (*Juncus* spp., *Eleocaris* spp., *Pluchea* spp., etc.). Shrub, small tree, and vine species would not be planted, or would be planted strategically to minimize pockets of thick brush. A small native walnut woodland is also present within the southwest portion of the site, and additional walnut trees may be planted in order to expand on this existing habitat.

    After the riparian plantings become established, a vegetation management program would be implemented to maintain a clear line of sight. This program would include cutting tree branches from ground level up to 6–7 feet off the ground and removing nonnative shrubs and vines that obstruct line of sight. In addition, wild grape is dominant in many areas and is growing throughout and on top of native species, potentially limiting growth and light availability. Therefore, wild grape would be removed and controlled to limit its distribution.

13. **Riparian Rehabilitation**: There is a large presence of transients and homeless encampments in the riparian restoration area, which has led to anthropogenic trash, debris, and unauthorized trails. Trash and anthropogenic debris would be removed and unauthorized trails reclaimed. Additional funding may also be sought to patrol the site in order to limit transients and homeless encampments.

4.2.1.4 Upland Restoration Opportunities

14. **Upland Rehabilitation**: The existing uplands are vegetated with a mixture of native and nonnative and invasive species (e.g., palm, eucalyptus*,* Tamarix, pepper, nonnative grasses, tree tobacco, bull thistle, fennel, mustard). Nonnative and invasive species would be treated with herbicide and/or removed.

15. **Upland Rehabilitation**: Native upland vegetation would be planted in areas of invasive removal. Plant communities to be planted may include grassland, sage scrub, and/or oak woodland.

16. **Upland Rehabilitation**: There is a large presence of transients and homeless encampments in the upland restoration area, which has led to anthropogenic trash, debris, and unauthorized trails. Trash and anthropogenic debris would be removed and unauthorized trails reclaimed. Additional funding may also be sought to patrol the site in order to limit transients and homeless encampments.

17. **Oak Woodland Establishment**: Oak woodland establishment would occur in the southern end of the site south of the bike/walking trail. This area is currently dominated by nonnative grasses, with scattered invasive woody plant species and several large native oak trees (*Quercus* spp.). Additional oak trees would be planted and any invasive woody plant species removed and controlled.

4.2.1.5 Park Recreation Opportunities

18. **Community Facilities:** The City of Riverside Parks, Recreation and Community Services Department proposes to add community facilities within the project site, including, but not limited to, a nature trail, amphitheater, archery/BB gun range, community garden, and a camping and day use area. These facilities would be constructed outside of the most sensitive areas of the project, and many would incorporate community outreach and education about the natural resources of the site. The specific facilities and their location are not known at this time; however, the City of Riverside Parks, Recreation and Community Services Department has prepared a preliminary design of possible facility locations (Figure 19). Some of the facilities would overlap with potential restoration areas shown in Figure 18, and therefore mitigation/covered species credit would not be sought for these areas of overlap. A more refined design will be prepared in the future.

4.2.2 Benefits to Covered Species

Restoration activities identified would generally benefit all Covered Species that have a potential to occur on site. However, certain activities would benefit specific species more. The following section outlines the Covered Species that have the potential to occur on site and the benefit to those species.

4.2.2.1 Covered Fish Species

Santa Ana Sucker, Arroyo Chub, and Santa Ana Speckled Dace

Santa Ana Sucker, Arroyo Chub, and Santa Ana Speckled Dace have the potential to inhabit the site post-restoration; however, existing fish habitat is severely limited on site. The primary constraints on habitat restoration for these species are unsuitable surface hydrology, limited channel structure, the barrier to fish passage from the Santa Ana River into the Evans Creek site. and limited function of the low-flow channel and the spillway channel.

Altering site hydrology to benefit covered fish species would include augmenting surface flows in the low-flow channel through installation of a Purple Pipe or groundwater well and pump. Creating new channel or enhancing existing channel with appropriate substrates and structure, and rehabilitating riparian vegetation would also benefit the species. However, without creating fish passage at the Santa Ana River levee, these restoration actions would not benefit any of these species unless a resident population within the project site is established.

Overall, these actions would enhance approximately 3,400 feet of new native fish habitat within the existing low-flow channel. Long-term management to retain this habitat will need to address channel maintenance, invasive aquatic and terrestrial plant species, and limiting human disturbance.

4.2.2.2 Covered Reptile Species

Western Pond Turtle and South Coast Garter Snake

The low-flow channel and spillway channel currently support marginal aquatic habitat for western pond turtle. The flows are minimal, and there are no pools that are of suitable depth for western pond turtles. Upland habitat for western pond turtle is of poor quality around the low-flow and spillway channel due to dense vegetation or human disturbance. Areas of higher quality upland habitat does occur in areas where the vegetation is more open and exposed sandy soils occur. Turtles were observed within Lake Evans during field surveys. Some of these were identified as nonnative red-eared sliders; though others were not positively identified and could be native western pond turtles. If native pond turtles do occur in Lake Evans, they can serve as a population source to colonize areas on the site that are restored.

Aquatic and upland habitat conditions for south coast garter snake are similar to that for western pond turtle habitat.

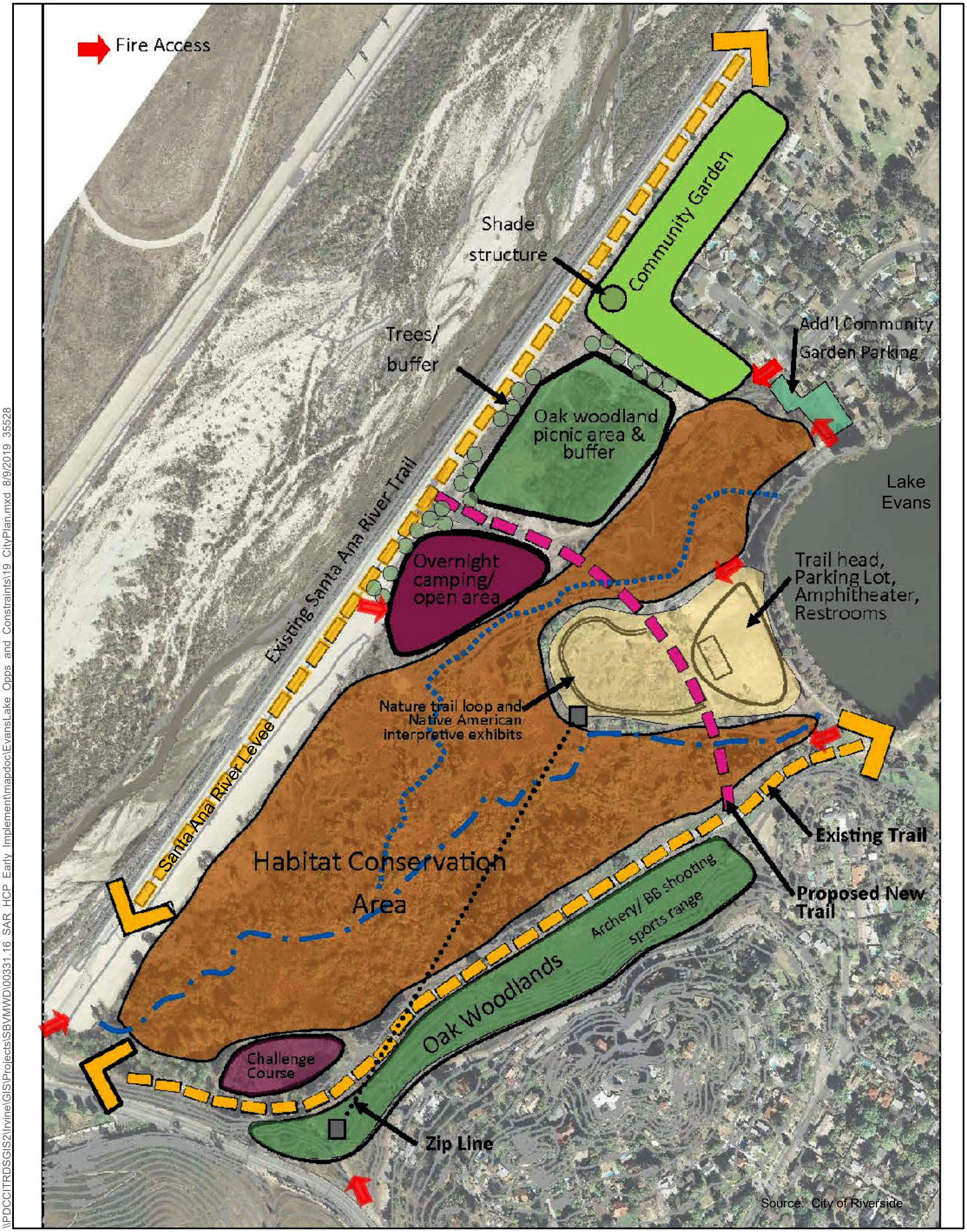
Providing a consistent flow and areas where the channels can pond, as well as clearing the dense understory vegetation along the channels, would benefit western pond turtle and south coast garter snake by restoring suitable aquatic habitat and increasing access to upland habitat. However, providing areas of pooled water could increase habitat for nonnative predator species. Other restoration opportunities that would increase upland habitat quality include removing nonnative vegetation and replanting with natives along the riparian and floodplain habitat areas and expanding the active floodplain and riparian habitat adjacent to the low-flow and spillway channels. These restoration opportunities could create additional aquatic habitat for these species or at least more scouring floods to reduce vegetation. Long-term management to limit human disturbance at the site, maintain the channel, and control nonnative invasive aquatic species (including red-eared slider) is also critical for maintaining high-quality pond turtle habitat at the site.

4.2.2.3 Covered Riparian Bird Species

Southwestern Willow Flycatcher, Least Bell’s Vireo, Yellow Breasted Chat

Existing covered riparian bird species habitat at the site is of marginal to good overall quality, varying primarily based on the proportion of nonnative species, proximity to surface water, and degree of human disturbance. Least Bell’s vireo were detected along the Santa Ana River, and yellow-breasted chat and yellow warbler were detected within the main project site.

Restoration activities that enhance or rehabilitate riparian conditions at the site would increase the amount of suitable habitat for riparian bird species, including least Bell’s vireo, southwestern willow flycatcher, and yellow-breasted chat. However, vegetation management activities to increase the line of sight through the project (cutting tree branches within 6 feet of the ground and removing dense stands of shrubs) would reduce habitat quantity and quality. Removing nonnative eucalyptus trees and replacing with native vegetation would increase habitat suitability throughout the site. Other restoration opportunities that would improve habitat quality for bird species on the site include controlling invasive species and limiting human disturbance.



Source: City of Riverside

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Figure 19
City of Riverside Fairmount Park Wilderness Camp Plan
Evans Creek Opportunities and Constraints Memo

Field surveys did not identify brown-headed cowbirds, a significant nest parasite on least Bell's vireo, as occurring at the site nor did they identify feral pet predators at the site. However, it is possible that these may be present and may be negatively affecting native wildlife at the site. Periodic surveys for brown-headed cowbirds and domestic and feral cats and control of these predators would benefit riparian birds.

Given the size of the site (~115 acres), increasing riparian vegetation and limiting human disturbance would not likely increase the suitability of the site for yellow-billed cuckoo, which generally requires large (at least 200 acres) patches of riparian habitat dominated by willow and cottonwood trees. In addition, reducing vegetation to increase line of sight would reduce potential habitat for yellow-billed cuckoo.

In order to avoid short-term impacts on all nesting bird species, restoration activities would need to be conducted during non-breeding periods.

4.2.2.4 Covered Mammal Species

Black-tailed Jackrabbit and Los Angeles Pocket Mouse

Black-tailed jackrabbit and Los Angeles pocket mouse require open areas of herbaceous dominated habitat such as California annual grassland or salt grass flats. Although the site currently provides potential habitat for these species, that habitat is limited due to the extensive dense riparian understory vegetation cover throughout the site as well as the presence of nonnative annuals in the uplands. Furthermore, connectivity to nearby upland habitats is currently limited to an area at the northwest end of the site that connects to the Santa Ana River Trail.

Adoption of the upland restoration opportunities identified above may slightly increase habitat for black-tailed jackrabbit or Los Angeles pocket mouse. However, overall the site is not well suited for enhancement to benefit these species.

4.2.2.5 Covered Plant Species

Santa Ana River Woolly-star

Suitable habitat for Santa Ana River woolly-star is composed of alluvial terraces within open washes and early-successional alluvial fan scrub on open slopes above main watercourses where flooding and scouring occur periodically to maintain open shrublands. Suitable habitat for the species currently occurs within the Santa Ana floodplain north of Mission Inn Avenue. Restoration opportunity exists in the form of habitat enhancement within this area such as the removal of tamarisk scrub, arundo, and other nonnatives.

The low-flow channel and spillway channel and adjacent areas within the main portion of the site do not provide suitable habitat for Santa Ana woolly-star. This area, if restored, would consist of riparian forest and woodland habitats that would not provide suitable open, sage dominated vegetation on floodplain terraces, as the flow regimes are not sufficient to create the type of habitat that is preferred by this species.

4.2.3 Benefits to Aquatic Resources

The project area supports a variety of wetland and non-wetland conditions ranging in quality from low to moderate. The primary factors affecting existing wetlands/non-wetlands are associated with invasive species, adjacent land uses, modified hydrology, and human visitation. Although the site has a diversity of native vegetation communities, including cottonwood, willow, walnut, and arrow weed, it also supports several expansive nonnative plant species, including tamarisk, eucalyptus, pepper, tree of heaven and palm.

The primary invasive species in the riparian habitat are palms, eucalyptus, bull thistle, mustard, and fennel, while the upland habitat is threatened by nonnative grasses, mustard, and pepper tree. The removal and control of invasive species and ongoing management of the site would allow for native species establishment and recovery. In addition, human activity in the buffer, floodplain, and channel degrades conditions as a result of trail creation, trash disposal, vegetation clearing, illegal campsites, and human waste. All of the restoration activities described above will facilitate improvements to overall wetland conditions. In addition, channel and floodplain grading and installation of natural material (rock and wood) in the channel will lead to increased functions and services.

4.2.3.1 USACE and RWQCB Jurisdiction

There are various opportunities within the site to benefit and increase USACE and RWQCB jurisdictional wetlands and non-wetlands. The establishment and restoration of jurisdictional habitats will provide mitigation credits for impacts associated with restoration implementation and the potential opportunity for onsite mitigation credits that could be used on future projects.

Laying back of the bank slopes and creation of floodplain benches in the spillway channel and creation of a secondary/high flow channel would result in re-establishment credits. The removal of invasive and nonnative species, removal of trash and debris, and closing of illegal trails within the channels would result in rehabilitation credits and would result in buffer rehabilitation credits. The placement of woody debris and creation of riffle-pools would result in enhancement credits.

Within the existing channels, construction methods will need to be sensitive to the presence of existing vegetation communities, jurisdiction resources, and biological resources to limit impacts. For example, the placement of fill material adjacent to the low-flow channel to create a more defined channel and floodplain benching may result in impacts on USACE and RWQCB jurisdictional resources. If impacts are unavoidable, mitigation may be required. All attempts will be made to design a project that is self-mitigating.

4.2.3.2 CDFW Jurisdiction

The CDFW jurisdictional streambed and riparian habitat will benefit and generate mitigation credits in the same manner as the USACE/RWQCB resources. In addition, the CDFW riparian habitat that extends outside USACE/RWQCB jurisdiction will benefit and generate mitigation credits from restoration activities, in particular removal of invasive species, revegetation of native species, removal of trash and debris, and control of human use. Because CDFW jurisdiction extends beyond USACE/RWQCB jurisdiction there may be some areas towards the outer limits of the project area, such as the eucalyptus woodland at the southern end and the ruderal habitat at the northern end, that generate buffer rehabilitation credits. Unlike USACE, CDFW more broadly categorizes restoration; however, credits may still fluctuate based on the intensity of the restoration activity. For example, activities such as earthwork and channel improvements may yield higher credits than the invasive species removal and revegetation of the riparian and upland areas.

4.3 Summary of Site Constraints

4.3.1 Hydrology

Flows in the low-flow channel are neither consistent nor predictable throughout the year. If the water elevation in Lake Evans is high enough and the outflow box is functioning properly, water may spill into the low-flow channel. Depending on the rate of spill, the water may or may not make it all the way downstream to the culvert under the levee. If the lake level drops below the elevation of the outflow box or the box is not functioning properly, the channel may be entirely dry. Water was observed flowing in both the low-flow and spillway channels during both August and October 2018 site visits. In previous site visits, no water was observed in either channel.

Inconsistent flows creates challenges when trying to create habitat for the Santa Ana sucker. Therefore, as discussed previously, Purple Pipe or a groundwater pump and well is proposed to provide additional flows. However, there may be some potential issues with providing a source of water that is controlled via machinery or a structure. Using equipment/structures to provide water to a mitigation site will require approval by the regulatory agencies as there is potential for equipment failure, and mitigation sites are required to be as self-sustaining as possible. A backup water source may also need to be constructed. In addition, constructing a fish passage at the SAR levee that works properly to allow sucker and other fish to access the site has some design constraints that will need to be worked out in further design.

4.3.2 Topography

The site is within the historic SAR floodplain and is low gradient with undulating surface topography as a result of historic flood flows as well as human activities including floodplain and stream management. Any restoration efforts and introduction of hydrology will need to account for the minimal gradient change from upstream to downstream. In addition, any soil that is removed due to grading activities will need to be placed strategically on site where it does not negatively impact resources or hauled off site.

4.3.3 Connection with the Santa Ana River

The SAR low-flow channel is presently located on the north side of the floodplain, and the culvert outfall at the SAR levee does not connect directly with the SAR low-flow channel. Instead, it flows down a former active channel of the Santa Ana River in a southwesterly direction paralleling the levee and under the Mission Boulevard bridge. Depending on the volume of flow delivered through the SAR levee culvert, the flow may percolate into the SAR riverbed before connecting with the low-flow channel.

A small connector channel, approximately 280 feet long, may need to be excavated through the SAR floodway in order to make a continuous channel connection between the Evans Creek low-flow channel and the SAR low-flow channel. The secondary flood channel paralleling the levee may also have to be plugged with rock to force the Evans Creek low-flow channel into the newly excavated connector channel. The connector channel will likely require ongoing maintenance to reestablish if washed out or damaged during SAR flood events.

4.3.4 Human Disturbance

The site is heavily used by humans, including recreational day-users and the homeless. The site is currently fenced on the western side along the SAR bike trail; however, sections of the chain link fence have been vandalized to provide access points. An asphalt foot/bike path exists on the southeast side of the site, and Lake Evans, a popular park and fishing location, is located to the west. Both of these areas are unfenced and allow easy access for humans. Homeless encampments were observed throughout the site, with a heavier concentration in the central and southern areas. As evidenced by burn scars on the palm trees, the site has burned several times in the last few years due to human activities. This poses a substantial risk to restoration performed on site because human use is difficult to control without continued support from the local community and law enforcement, whereas the lack of such control imperils the integrity of restoration improvements and reduces the value of the site as habitat. Management of human use on the site will likely be a substantial long-term cost, and careful site planning and design will be needed to minimize that expense.

4.3.5 Invasive Wildlife Species

Several invasive wildlife species are known to occur or have the potential to occur at the project site. Brown-headed cowbird (*Molothrus ater*), a significant nest parasite on least Bell's vireo and other songbirds, has the potential to occur on site, though they were not observed during 2018 field surveys. Cowbird control may be needed to optimize site suitability for the vireo and other desirable riparian birds. Red-eared sliders are known to occur in Lake Evans. Once suitable habitat for western pond turtle has been restored on site, monitoring for red-eared sliders will be necessary to control the spread of the species on site. Field surveys did not identify feral pet predators at the site; however, feral cats are likely to occur on or adjacent to the project site. Feral or pet dogs or cats may have an adverse effect on native wildlife at the site. Control of these predators may prove to be appropriate. The SAR supports a population of wild boar (*Sus scrofa*), which can create damage to freshly graded sites and young vegetation (planted or recruited). Although population control of this species has not been feasible to date, site-specific management actions may be warranted to protect revegetated areas.

4.3.6 Nonnative Fish Species

The site is directly connected to Lake Evans, which receives flow from the upstream watershed and is seasonally stocked for fishing; as such, it supports a variety of nonnative fish including bass (*Micropterus* spp.) and sunfish. It is also likely mosquitofish are located within the lake. In addition, if a connection to the Santa Ana River low-flow channel is made, it could create a pathway for nonnative fish to migrate upstream into the low-flow and spillway channel. Control of these species and not creating habitat that is hospitable for these species will be critical to the success of any restoration targeting native fish. One possible solution would be seasonal flow management to induce stressful conditions to which native fish species are adapted, but that are lethal to invasive species.

4.3.7 Invasive Plant Species

Exotic tree and shrub species (eucalyptus, tree of heaven, edible fig, arundo, tamarisk, Brazilian pepper tree, and palms) are prevalent throughout the site and may form monotypic stands with little to no understory. These invasive plant communities invade and exclude native vegetation cover in riparian systems, and have much lower ecological functions and values compared to native riparian vegetation. The rapid growth and prolonged seed dispersal periods for many invasive species can quickly result in the displacement of native plant communities, and the dry, dead biomass produced by some species such as arundo, tamarisk, and palm frond litter increases the fuel load of riparian habitats, resulting in an elevated fire risk. Eucalyptus and Brazilian pepper tree stands can inhibit growth of native plants by the accumulation of leaf litter with allelopathic properties. Repeated removal treatments will likely be needed to initially control infestations for many of these species, and cleared areas may potentially be colonized by other exotic annual or perennial, nonnative species such as mustard, castor bean, poison hemlock, fennel, and/or nonnative grasses if seasonal weed abatement and maintenance is not implemented after removal. A long-term, ongoing invasive plant management program would be required to ensure that invasive species do not recolonize the site.

4.3.8 Sensitive Species

Suitable aquatic habitat for covered fish species, western pond turtle, and south coast garter snake is lacking throughout the site. Restoration of the creek, including opening the low-flow and spillway channels and creating slow-moving or ponded areas would enhance the aquatic habitat on site. Removal of much of the thick nonnative understory vegetation adjacent to the channels will improve upland habitat for western pond turtle and south coast garter snake. Yellow-breasted chat and yellow warbler occur on site, and least Bell's vireo have been recorded just off site along the Santa Ana River. Riparian habitat occupies much of the site, though it is dominated by invasive plant species. Removal of invasive species and enhancement of the riparian habitat will benefit these species; however, the benefit may be negated by clearing vegetation to keep an open line of sight in the project site. Also, restoration may require measures to minimize adverse impacts on riparian birds, such as phased removal of vegetation and work outside of the breeding season.

4.3.9 Aquatic Resources

The site supports jurisdictional Aquatic Resources regulated by the USACE, RWQCB, and CDFW. Although much of the restoration work proposed would be expected to improve functions and services of the Aquatic Resources, there is a potential for conflicts with restoration targeting native fish in the form of temporary and/or permanent impacts on jurisdictional Aquatic Resources (wetlands and waters), resource conversion (wetlands to non-wetlands), or installation of non-self-sustaining engineered structures (pumps, water-discharge devices). As restoration opportunities are considered, it will be critical to evaluate the various goals of the project to maximize credit opportunity while minimizing impacts.

4.3.10 Land Uses

Fairmount Park and Lake Evans lie to the northeast of the site, which supports fishing, small non-motorized boating, and general recreation. To the south of the site lies an asphalt walking/bike trail, and to the west of the site lies the Santa Ana River levee and bike bath. All land uses need to be formally surveyed and accounted for when designing the project. In addition, the Santa Ana River levee and bike trail along with the culverts beneath are currently located at the downstream end of the site. These structures have created a significant barrier to native fish and invertebrates moving between the site and the SAR. In order to reintroduce these species to the site, and in particular the Santa Ana sucker, a fish passage would need to be created at this location.

In addition, the City of Riverside Parks, Recreation and Community Services Department proposes to add community facilities within the project site (e.g., a nature trail, amphitheater, archery/BB gun range, community garden, camping and day use area). Depending on the facilities that are constructed, their use, and their location, they could negatively impacted Covered Species and Aquatic Resources. These facilities should be located away from sensitive areas, and mitigation credits will not likely be obtainable in these areas. Therefore, mitigation and recreational needs and compatibility should be considered in the final site design.

4.3.11 Ownership and Access

The site is owned by the City of Riverside, which is considered a willing partner to this program, and the Riverside Land Conservancy; and a few private parcels are located on the edges of the site that may fall within the boundaries of the site. For all properties there are logistical hurdles that will need to be overcome to secure use or purchase of the land. In addition, a thorough evaluation of the title report and any deed restrictions will be critical to use of the property. There is an existing asphalt walking/bike path along the south end of the site, Dexter Drive is on the east side, and the SAR levee/bike path is on the west side. Only the east side of the site is currently fenced. Access to the site should be relatively easy and straightforward if permission to use the walking/bike path and adjacent areas for access and staging is given.

4.4 Summary of Restoration Opportunities and Constraints

Several restoration opportunities have been identified within the site. Each restoration opportunity is described in detail above along with the benefits to Covered Species and Aquatic Resources associated with these restoration opportunities.

Restoration opportunities and constraints are summarized in Table 9 along with overlapping opportunities and potential tradeoffs. Many of the opportunities provide potential for both species and Aquatic Resource benefits and mitigation credit. Some opportunities will be more costly as a result of earthwork (e.g., floodplain expansion and creating more defined channels), whereas other opportunities may be less expensive (e.g., invasive species removal and supplemental planting, trash and debris removal, and homeless encampment removal); however, the activities would yield different types of mitigation credits that may have different values, from a financial or project needs perspective.

For the Santa Ana sucker specific restoration activities, which target the creation of perennial drainages that support Santa Ana sucker and creation of fish passage from the SAR to the project site; the water source; and presence of the levee and culvert system are the largest constraints. The site currently does not have a reliable perennial flow. Gaining more certainty with regard to the amount of water available to augment existing flows will be important to determine site design and potential management implications (e.g., methods to flush sediment from the channel to maintain substrate suitability for Santa Ana sucker). The cost of water-related infrastructure and pumping costs could also be a constraint.

Recreational uses will be incorporated into the site, with an opportunity for education. The siting and design of these facilities will need to be further refined and compatibility with restoration and mitigation credits determined.

Table 9. Summary of Restoration Opportunities and Benefits at the Evans Creek Site

		Benefits to Covered Species											Jurisdictional Aquatic Resources						
Restoration Opportunities	**Type and Amount of Habitat**	**Santa Ana Sucker**	**Santa Ana Speckled Dace**	**Arroyo Chub**	**Western Pond Turtle**	**South Coast Garter Snake**	**Least Bell's Vireo**	**Southwestern Willow Flycatcher**	**Yellow-breasted Chat**	**Black-tailed Jackrabbit**	**Los Angeles Pocket Mouse**	**Santa Ana River Woolly-Star**	**Re-establishment**	**Establishment**	**Rehabilitation**	**Enhancement**	**Buffer**	**CDFW (outside USACE)**	**Uncertainties/ Management Considerations**
1. Supplement Existing Flows: Installation of Purple Pipe or groundwater well and pump to provide sufficient flows in low-flow channel for Santa Ana sucker	Enhance 3,400 feet of stream channel habitat	✓	✓	✓	✓	✓										✓			Flow rate capacity of the Purple Pipe or new pump has not yet been determined. Minimum flows of 2 cfs may be required for limited durations to provide the flow depths necessary for sucker passage through culvert levee. Ideally the supplemental flows will be able to be varied so that pulses of higher flows can be periodically routed down the channel to flush fine sediment accumulations on gravel substrate.
2. Construct Bank to Define Channel: Construct 1,000 feet of new channel bank in the low-flow channel		✓	✓	✓	✓	✓										✓			
3. Construct Riffles and Pools and Habitat Structure: Construct riffles		✓	✓	✓	✓	✓										✓			

Restoration Opportunities	Type and Amount of Habitat	Benefits to Covered Species											Jurisdictional Aquatic Resources						Uncertainties/ Management Considerations
		Santa Ana Sucker	Santa Ana Speckled Dace	Arroyo Chub	Western Pond Turtle	South Coast Garter Snake	Least Bell's Vireo	Southwestern Willow Flycatcher	Yellow-breasted Chat	Black-tailed Jackrabbit	Los Angeles Pocket Mouse	Santa Ana River Woolly-Star	Re-establishment	Establishment	Rehabilitation	Enhancement	Buffer	CDFW (outside USACE)	
and pools and add instream woody and rocky habitat in low-flow channel to increase topographic and flow diversity																			In-stream channel work may impact CDFW/USACE/RWQCB jurisdiction and may require mitigation.
4. Construct Connector Channel: Excavate connector channel to connect Evans Creek low-flow channel with the SAR low-flow channel	Establishment of 280-foot-long channel (0.09 acre)	✓	✓	✓	✓	✓								✓					Periodic maintenance in channel may be needed to maintain habitat. Creation of additional sucker habitat may increase suitable habitat for nonnative fish species.
5. Create Fish Passage: Create fish passage structure at the SAR levee	Fish passage	✓	✓	✓															Improvements for Santa Ana sucker passage at the Evans Creek outlet are feasible from an engineering standpoint, although several design

		Benefits to Covered Species											Jurisdictional Aquatic Resources						
Restoration Opportunities	**Type and Amount of Habitat**	**Santa Ana Sucker**	**Santa Ana Speckled Dace**	**Arroyo Chub**	**Western Pond Turtle**	**South Coast Garter Snake**	**Least Bell's Vireo**	**Southwestern Willow Flycatcher**	**Yellow-breasted Chat**	**Black-tailed Jackrabbit**	**Los Angeles Pocket Mouse**	**Santa Ana River Woolly-Star**	**Re-establishment**	**Establishment**	**Rehabilitation**	**Enhancement**	**Buffer**	**CDFW (outside USACE)**	**Uncertainties/ Management Considerations**
																			challenges are present that may limit the duration of the passage window. Several uncertainties are identified in this assessment that need to be addressed in order to advance a passage design. Chief among these is the availability, magnitude, and timing of flows so that the design flow range and most appropriate fish passage type can be selected.
6. Floodplain Bench Establishment: Layback banks of spillway channel, create floodplain benches	Re-establish 0.29 acres of floodplain bench	✓	✓	✓	✓	✓								✓					Need to determine exact locations and amount of cut/fill and location for placement of cut material.

		Benefits to Covered Species											**Jurisdictional Aquatic Resources**						
Restoration Opportunities	**Type and Amount of Habitat**	**Santa Ana Sucker**	**Santa Ana Speckled Dace**	**Arroyo Chub**	**Western Pond Turtle**	**South Coast Garter Snake**	**Least Bell's Vireo**	**Southwestern Willow Flycatcher**	**Yellow-breasted Chat**	**Black-tailed Jackrabbit**	**Los Angeles Pocket Mouse**	**Santa Ana River Woolly-Star**	**Re-establishment**	**Establishment**	**Rehabilitation**	**Enhancement**	**Buffer**	**CDFW (outside USACE)**	**Uncertainties/ Management Considerations**
																			CDFW jurisdiction will be impacted (but improved overall).
7. Secondary Channel Establishment: Establish secondary/high flow channel	Establish 0.18 acres of secondary stream channel	✓	✓	✓	✓	✓								✓					Need to determine proper elevation to ensure channel is engaged during appropriate storm events. CDFW jurisdiction will be impacted (but improved overall).
8. Spillway and Low-flow Channel Rehabilitation: Remove and/or treat invasive species	Rehabilitate 2.99 acres of stream channel habitat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓			✓	Vegetation removal should be conducted outside the nesting season or monitors should be in place to limit impacts on nesting activities.
9. Spillway and Low-flow Channel Rehabilitation: Revegetate channel with																			

		Benefits to Covered Species											Jurisdictional Aquatic Resources						
Restoration Opportunities	**Type and Amount of Habitat**	**Santa Ana Sucker**	**Santa Ana Speckled Dace**	**Arroyo Chub**	**Western Pond Turtle**	**South Coast Garter Snake**	**Least Bell's Vireo**	**Southwestern Willow Flycatcher**	**Yellow-breasted Chat**	**Black-tailed Jackrabbit**	**Los Angeles Pocket Mouse**	**Santa Ana River Woolly-Star**	**Re-establishment**	**Establishment**	**Rehabilitation**	**Enhancement**	**Buffer**	**CDFW (outside USACE)**	**Uncertainties/ Management Considerations**
native riparian species and limit distribution of wild grape																			
10. Spillway and Low-flow Channel Rehabilitation: Remove trash and debris and reclaim unauthorized trails																			
11. Riparian Rehabilitation: Remove and/or treat invasive species	Rehabilitate 61.75 acres of riparian habitat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓			✓	Vegetation removal should be conducted outside the nesting season or monitors should be in place to limit impacts to nesting activities.
12. Riparian Rehabilitation: Revegetate riparian areas with native riparian species and limit distribution of wild grape																			

Restoration Opportunities	Type and Amount of Habitat	Benefits to Covered Species											Jurisdictional Aquatic Resources						Uncertainties/ Management Considerations
		Santa Ana Sucker	Santa Ana Speckled Dace	Arroyo Chub	Western Pond Turtle	South Coast Garter Snake	Least Bell's Vireo	Southwestern Willow Flycatcher	Yellow-breasted Chat	Black-tailed Jackrabbit	Los Angeles Pocket Mouse	Santa Ana River Woolly-Star	Re-establishment	Establishment	Rehabilitation	Enhancement	Buffer	CDFW (outside USACE)	
13. Riparian Rehabilitation: Remove trash and debris and reclaim unauthorized trails																			
14. Upland Rehabilitation: Remove and/or treat invasive species	Rehabilitate 31.31 acres of upland habitat				✓	✓	✓	✓	✓	✓	✓						✓		Vegetation removal should be conducted outside the nesting season or monitors should be in place to limit impacts to nesting activities.
15. Upland Rehabilitation: Revegetate upland areas with native upland species and limit distribution of wild grape																			
16. Upland Rehabilitation: Remove trash and debris and reclaim unauthorized trails																			

		Benefits to Covered Species											Jurisdictional Aquatic Resources						
Restoration Opportunities	**Type and Amount of Habitat**	**Santa Ana Sucker**	**Santa Ana Speckled Dace**	**Arroyo Chub**	**Western Pond Turtle**	**South Coast Garter Snake**	**Least Bell's Vireo**	**Southwestern Willow Flycatcher**	**Yellow-breasted Chat**	**Black-tailed Jackrabbit**	**Los Angeles Pocket Mouse**	**Santa Ana River Woolly-Star**	**Re-establishment**	**Establishment**	**Rehabilitation**	**Enhancement**	**Buffer**	**CDFW (outside USACE)**	**Uncertainties/ Management Considerations**
17. Oak Woodland Establishment: Plant additional oak trees in southern end of site	Establish 4.63 acres of oak woodland south of existing asphalt trail/path						✓	✓	✓								✓		If machinery is needed for planting it should be conducted outside the nesting season or monitors should be in place to limit impacts to nesting activities.
18. Construct community park facilities	NA																		Facilities should be constructed outside the most sensitive habitats. Mitigation credits will not likely be given in areas of public use. Public use could increase with implementation of park amenities and result in habitat disturbance.

Chapter 5
Recommendations

The recommendations included in this chapter are meant as guidance for completing the next phase of the restoration effort. Recommendations are divided into two categories: (1) *Coordination and Integration* with the HCP and other regulatory compliance efforts and (2) *Addressing Key Uncertainties*.

5.1 Coordination and Integration

Coordination and integration with the HCP development process as well as regulatory compliance processes is critical to the success of the restoration process. Coordinating the screening of opportunities and constraints with the resource agencies and project partners is intended to identify fatal flaws and establish restoration activity priorities. Uncertainties that may require longer timelines to resolve, such as funding, final opportunities to advance, and exact mitigation, will likely remain unresolved until later in the process but will be accounted for in the approach. Future designs will account for any additional opportunities identified in the Covered Species and Aquatic Resource site assessments described in this report that are included in the immediate design work.

This report is meant to provide an opportunity for consultation and collaboration with resource agencies and HCP permittees on which of the identified restoration opportunities should be included in the next phase of the restoration site effort. It is critical that consensus be obtained on which opportunities to include prior to beginning plan sheets and cost estimate development work of the future designs because some restoration opportunities may be dependent on joint implementation with other opportunities or, conversely, may preclude implementing other opportunities. This approach will create efficiency by working through any potential substantial design changes early in the design process and prior to development of more detailed designs. Addition or removal of restoration opportunities after design work has begun may create additional work and schedule delays. Obtaining early consensus will also be invaluable in allowing work to begin sooner in the design process on developing the required CEQA and related permitting documents.

5.2 Addressing Key Uncertainties

Principal uncertainties and refinements to the preliminary design (including those discussed in ICF 2015) that need to be better understood, at least within a reasonable range of possibilities, in order to complete future designs are described in the following subsections. Future designs will build upon the preliminary designs previously developed by ICF (2015) for the Proposition 84 grant application and any additional opportunities identified in the Covered Species and Aquatic Resource site assessments described in this report. Key design uncertainties and preliminary design refinements to be addressed as part of the design development include the following.

- Source, volume, and seasonal distribution of water supply for the low-flow channel.
- Location, type, and design specification of Santa Ana sucker habitat creation or enhancement.

- Location, type, and design specification of other Covered Species habitat and Aquatic Resource features.
- Field topographic surveys to supplement available LiDAR elevations.
- Surface and groundwater hydrologic monitoring.
- Extent and boundaries of revegetation areas.
- Approach for Aquatic Resource credit for mitigation.
- Design and/or management measures to address human disturbance.

5.2.1 Source, Volume, and Seasonal Distribution of Water Supply

Providing additional water to the site is essential for successful restoration of Santa Ana sucker and other fish species habitat. As of this writing, the most likely future source for water supply is the Regional Recycled Water Project (the Purple Pipe); however, much remains to be determined with regard to the volume available and the need to dechlorinate the water prior to discharging at the site. Current estimates are 1–3 cfs base perennial flows, with 5–6 cfs for flushing flows, but the volume available for baseline and flushing will not be determined until more project design is completed. A preliminary feasibility study of the Regional Recycled Water Project is in progress. This study should help determine if the Purple Pipe project remains a viable option, or if using groundwater pumps to supply water to the sites will need to be further evaluated. Complete design for the Regional Recycled Water Project is not anticipated until late 2019 or 2020, at the earliest. Future designs can maintain some flexibility to accommodate a range of anticipated flows, but precise flow amounts and timing will be important for final restoration project design and will also need to be taken into account for monitoring and adaptive management of the site. As such, it will be important that the water agencies continue to closely coordinate to ensure that the source, volume, and seasonal distribution of water available from the Regional Recycled Water Project informs integrated site plans.

5.2.2 Location, Type, and Design Specification of Santa Ana Sucker Habitat Creation or Enhancement

Close coordination with the Upper SAR HCP Biological Technical Advisory Committee is needed throughout the restoration design process to continue to define habitat requirements for the Santa Ana sucker and ensure the restoration design features developed provide habitat needs for the fish and will be sustainable. This effort will be informed by the reference reach assessment efforts completed at Haines Creek and the East Fork San Gabriel River to study the geomorphic and aquatic characteristics of streams with healthy sucker populations. To complete future design plans, additional studies on geomorphic and hydraulic conditions will be undertaken to determine important design characteristics such as channel dimensions, substrate texture and percentage fine sediment composition, flow velocities and depths in different geomorphic units (e.g., pools, riffles, planar bed), and sediment transport conditions. Habitat units used by different life stages of suckers and sucker preferences for flow conditions and structure, such as large wood or overhanging banks, will need to be incorporated into the design of appropriate habitat features that are compatible with the physical processes and scale of the site. This work will include locations for large wood and rock habitat structures and streambank riparian habitat conditions best suited for each restoration reach.

5.2.3 Location, Type, and Design Specification of Other Covered Species Habitat and Aquatic Resource Features

The restoration opportunities identified in Chapter 4 for other Covered Species habitat and Aquatic Resource features and that are determined through consensus should be included in future designs and will need to be further specified to include the location, type, and other necessary design specifications. ICF staff will coordinate with the Upper SAR HCP Biological Technical Advisory Committee, Upper SAR Hydrology Technical Advisory Committee, and other technical experts to determine this information. Ultimately, this will result in more precise estimates of the quantity of Covered Species habitat and compensatory Aquatic Resources to result from restoration actions, provide input in the development of design features, and assess the potential for temporary impacts on Covered Species associated with construction activities to inform the CEQA analysis.

5.2.4 Field Topographic and Soils Surveys

Existing topographic data for the Evans Creek site is based on 2014 LiDAR flown specifically for development of the preliminary designs (and 2015 LiDAR flown not specifically for this project but subsequently obtained and available for design). Because the accuracy of the LiDAR is reduced in areas due to dense vegetation cover and presence of water, additional field topographic surveying needs to be performed at the site in areas critical for design work, including engineering design of channel and floodplain habitat features important for sucker habitat and potential grading of riparian floodplain areas. Additionally, field soil sampling is recommended to evaluate soil conditions and their suitability for different plant communities or wetland habitats. The approach used for field topographic surveys and soil analysis at the other tributary restoration sites is recommended.

5.2.5 Surface and Groundwater Hydrologic Monitoring and, if Needed, Modeling

Characterizing the shallow groundwater conditions where restoration activities would occur will help determine the likely surface water and groundwater interaction. Groundwater characterization will also aid in the design of groundwater-dependent plant and wetland features. Installation of shallow groundwater wells with monthly readings similar to what was done at the other tributary restoration sites is recommended.

5.2.6 Extent and Boundaries of Revegetation Areas

Revegetation areas will need to be determined as part of future designs. Planting native vegetation to rehabilitate certain types of habitat (e.g., riparian or alkali meadow) and to restore areas where vegetation is removed for grading associated with channel restoration or floodplain expansion is proposed. Therefore, the extent of revegetation areas will be considered in concert with determining the location, type, and design of restoration activities.

5.2.7 Design and/or Management Measures to Address Level of Human Disturbance

Human disturbance was identified as a major constraint at the site. As such, the potential effect of human disturbance, and measures to limit that affect, will be an important consideration in selecting and designing restoration actions. In order to assess the practicality of certain management approaches to human visitation and disturbance, it may be necessary to engage local government and other potential stakeholders to discuss whether any agreements might be needed to help manage human use of the site, both authorized and unauthorized. For example, is local law enforcement to play a role? Are any additional studies needed to develop sustainable solutions? These could be potentially controversial topics and will need to be considered thoroughly during the CEQA review of the project.

Chapter 6
References

6.1 References

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Appendix A

Jurisdictional Delineation Memorandum

1.0 Summary

This report discusses regulatory methods and provides the results of a formal jurisdictional delineation completed for the Evan's Lake Drain project site (Project), a mitigation site that is part of the San Bernardino Valley Municipal Water District (SBVMWD) Early Implementation of the Upper Santa Ana River Habitat Conservation Plan. The purpose of this delineation is to assess the limits of potential federal jurisdiction (i.e., Waters of the U.S. subject to U.S. Army Corps of Engineers [USACE] regulation) and state jurisdiction (i.e., Waters of the State subject to Regional Water Quality Control Board [RWQCB] regulation and California Department of Fish and Wildlife [CDFW] jurisdictional waters subject to CDFW regulation) within the Project.

2.0 Project Description

SBVMWD proposes restoration of the Project as early implementation of the Upper Santa Ana River Habitat Conservation Plan as well as part of a mitigation bank. Restoration activities will focus on improving channel conditions for the state and federally listed Santa Ana sucker (*Catostomus santaanae*) and improving overall aquatic functions and services of the site through removal of invasive species, replanting native species, removing trash and debris, reconfiguring sections of the existing channels and keeping transients from disturbing the site. Restoration activities have not been finalized and therefore could change in the future.

3.0 Project Location

The project site is located within the City of Riverside, Riverside County, California, north of Mission Inn Avenue, east of the Santa Ana River and west of Lake Evans. The center of the Project is located at approximately 33.993997°, -117.385669°. (Figures 1 and 2; all figures are included as Attachment 1).

4.0 Methodology

Prior to beginning the field delineation, aerial photography, U.S. Geological Survey topographic maps, the National Hydrography Dataset, soil maps, and the National Wetlands Inventory were analyzed to determine the locations of potential areas of USACE, RWQCB, and CDFW jurisdiction. Based on the pre-field analysis it was determined that there was a potential for both wetland and non-wetland features, as defined below, to occur within the Project.

ICF biologists R.J. Van Sant, Kristen Klinefelter, and Marissa Maggio conducted the jurisdictional delineation on July 31, August 1 and August 3, 2018.

Potential wetlands were delineated using the methodology set forth in the 1987 USACE *Wetland Delineation Manual* (Environmental Laboratory 1987) and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008a). To meet the definition of a potential wetland, the area must meet the following criteria: (1) a predominance of hydrophytic vegetation, (2) the presence of hydric soils, and (3) the presence of wetland hydrology. In addition, waters of the U.S. that were located at or below the OHWM and that met all 3 wetland criteria were mapped as non-wetland waters[1]. Details of the application of these techniques are described below.

- **Hydrophytic Vegetation:** The hydrophytic vegetation criterion is satisfied at a location if greater than 50% of all the dominant species present within the vegetation unit have a wetland indicator status of obligate (OBL), facultative wetland (FACW), or facultative (FAC) (Environmental Laboratory 1987). An OBL indicator status refers to plants that almost always occur in wetlands under natural conditions. A FACW indicator status refers to plants that usually occur in wetlands but are occasionally found elsewhere. A FAC indicator status refers to plants that are equally likely to occur in wetlands or elsewhere. An NI (no indicator) status designates that insufficient information was available to determine an indicator status. An NO (no occurrence) status indicates that the species does not occur in the region; when a plant with an NO status is found within a region, it usually indicates that the plant is ornamental. Plants with no indicator status are generally upland species(UPL). The wetland indicator status used for this report follows the *National Wetland Plant List* (Lichvar et al. 2016).
- **Hydric Soils:** The definition of a hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA/NRCS 1994). This determination is made based on various field indicators detailed in the *Arid West Supplement* and the *Field Indicators of Hydric Soils in the United States (Version 7.0)* (USDA/NRCS 2010). The soil map for the Project is included as Figure 3.
- **Wetland Hydrology:** Wetland hydrology is determined using indicators of inundation or saturation (flooding, ponding, or tidally influenced) detailed in the *Wetland Delineation Manual* and the *Arid West Supplement*.

Within areas that could potentially support wetlands, soil pits were dug to examine soil color and texture and determine the wetland boundary. A paired-pit technique was used (one sample point with wetland results paired with one sample point with non-wetland results, used to identify a wetland boundary).

Potential non-wetland waters were identified using field indicators for ordinary high water mark (OHWM) using the methodology set forth in *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (USACE 2008b). Non-wetland waters are features that support indicators of flow (i.e., OHWM) but do not support a three-parameter wetland.

The jurisdictional features were recorded in the field on iPads using Arc Collector (ESRI software) and a Trimble R1 Global Navigation Satellite Systems Receiver unit, which provided sub-meter accuracy.

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[1] Per direction from Michael LaDouceur, Senior Project Manager, of the U.S. Army Corps of Engineers - Carlsbad Field Office at the October 30, 2018 Upper Santa Ana River field visit.

5.0 Results

The site contains three channels: a concrete drainage channel, a low-flow channel and a spillway channel which converges with the low-flow channel into a single channel approximately in the middle of the site. In addition, the site contains a portion of the Santa Ana River (SAR). Table 1 below outlines the jurisdictional features within the Project. Reference photographs are included in Attachment 2 and wetland data forms are included in Attachment 3.

The SAR is located at the far western end of the site. A meander bend in the river historically occupied a large portion of the Fairmount Park area and the site, but the river has since been cut off by construction of the SAR levee and bike path. Habitat within the SAR is dominated by Fremont cottonwood, red willow, arroyo willow and mulefat with a few patches of tamarisk. The SAR within the site consists of the main river channel and it’s floodplain and a channel that outflows from a large culvert underneath the SAR levee/bike path and flows south. Primary OHWM indicators consisted of a defined bed and bank and changes in vegetation characteristics. CDFW jurisdiction was mapped as the entire river channel from the levee on the east side of the river to the project boundary on the west side.

The low-flow channel flows from north-east to south-west within the site and eventually flows beneath the SAR levee/bike path through a large culvert and into the SAR. The channel originates at a culvert just west of Dexter Drive and is fed by water overtopping a riser/sluice gate within Evan’s Lake. Water was flowing into the riser and slowly in the channel during field work. The entire low flow channel is non-wetland waters of the U.S., although the majority meets all 3-parameters of a wetland but because it’s located below the OHWM was mapped as non-wetlands1. CDFW jurisdiction consisted of the low flow channel and adjacent riparian habitat, which consisted primarily of Fremont cottonwood (*Populus fremontii*) and wild grape (*Vitis girdinia*), Mexican fan palm (*Washingtonia robusta*), black mustard (*Brassica nigra*), Tree of Heaven (*Ailantus altissima*), and Eucalyptus (*Eucalyptus spp.)*.

The spillway channel is located north of the low-flow channel and flows from north-east to south-west across the Project. It converges with the low-flow channel approximately in the center of the site. The channel originates at the north-east end of the site from a culvert that carries Spring Brook Wash flows. In addition, flows come from Lake Evans over a spillway across Dexter Drive, which generally spills into the channel several times per year during large rain events. Water was present at the upstream end of the channel during the August 2018 site visit but was not present in the middle or downstream portion. The entire channel is non-wetland waters of the U.S., although the majority meets all 3-parameters of a wetland but because it’s located below the OHWM was mapped as non-wetlands. CDFW jurisdiction consisted of the channel and adjacent riparian habitat, which coinsisted primarily of Fremont cottonwood (*Populus fremontii*) and wild grape (*Vitis girdinia*), Mexican fan palm (*Washingtonia robusta*), black mustard (*Brassica nigra*), Tree of Heaven (*Ailantus altissima*), arrowweed (*Pluchea sericiea*) and Eucalyptus (*Eucalyptus spp.)*.

The concrete drainage channel is located at the northern end of the site just north of the start of the spillway channel. The channel collects runoff from the neighboring residential development to the north and delivers it into the Project. Beyond the terminus of the channel there is no discernable channel or flow path. Water likely spreads out into sheetflow.

	Waters of the U.S. (USACE/RWQCB)				CDFW jurisdiction			Linear Feet
	Non-wetland[1] (ac.)	Non-wetland (ac.)	Non-wetland, concrete lined (ac.)	Total (ac.)	Streambed (ac.)	Riparian (ac.)	Total (ac.)	
Low-flow Channel	1.98	-	0.08	2.06	2.05	62.82	65.85	3,489
Spillway Channel	0.83	0.14	-	0.97	0.98			2,624
Santa Ana River	-	1.98	-	1.98	1.99	3.33	5.32	640
Concrete Drainage	-	-	0.02	0.02	0.02	-	0.02	122
Total	**2.81**	**2.12**	**0.10**	**5.03**	**5.04**	**66.15**	**71.19**	**6,875**

[1] Meets 3 parameter wetland but because they are contained within a riverine feature and are located below the OHWM they were mapped as non-wetland WOUS

6.0 Conclusion

The Project is within the Middle Santa Ana River hydrologic unit code 10 watershed (1807020308) (Figure 4). All potential aquatic resources described above ultimately flow into the Santa Ana River, which in turn flows into the Pacific Ocean (a Traditional Navigable Waterway). All potential aquatic resources meet the definition of a three-parameter wetland or showed evidence of an OHWM and/or bed and bank and meet the definition of a non-wetland and/or streambed. All potential aquatic resources may be subject to regulation under Sections 404 and 401 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code.

The information and results presented herein document the investigation, best professional judgment, and conclusions of ICF. It is correct and complete to the best of our knowledge. All jurisdictional delineations should be considered preliminary until reviewed and approved by the regulatory agencies.

Attachments

1. Figures
    1 Project Vicinity
    2 USGS Topography
    3 Soils
    4 Watershed
    5 Waters of the U.S.
    6 CDFW Jurisdictional Waters
2. Photo Log
3. Wetland Data Forms
4. Request for Corps Jurisdictional Determination (JD)

7.0 References

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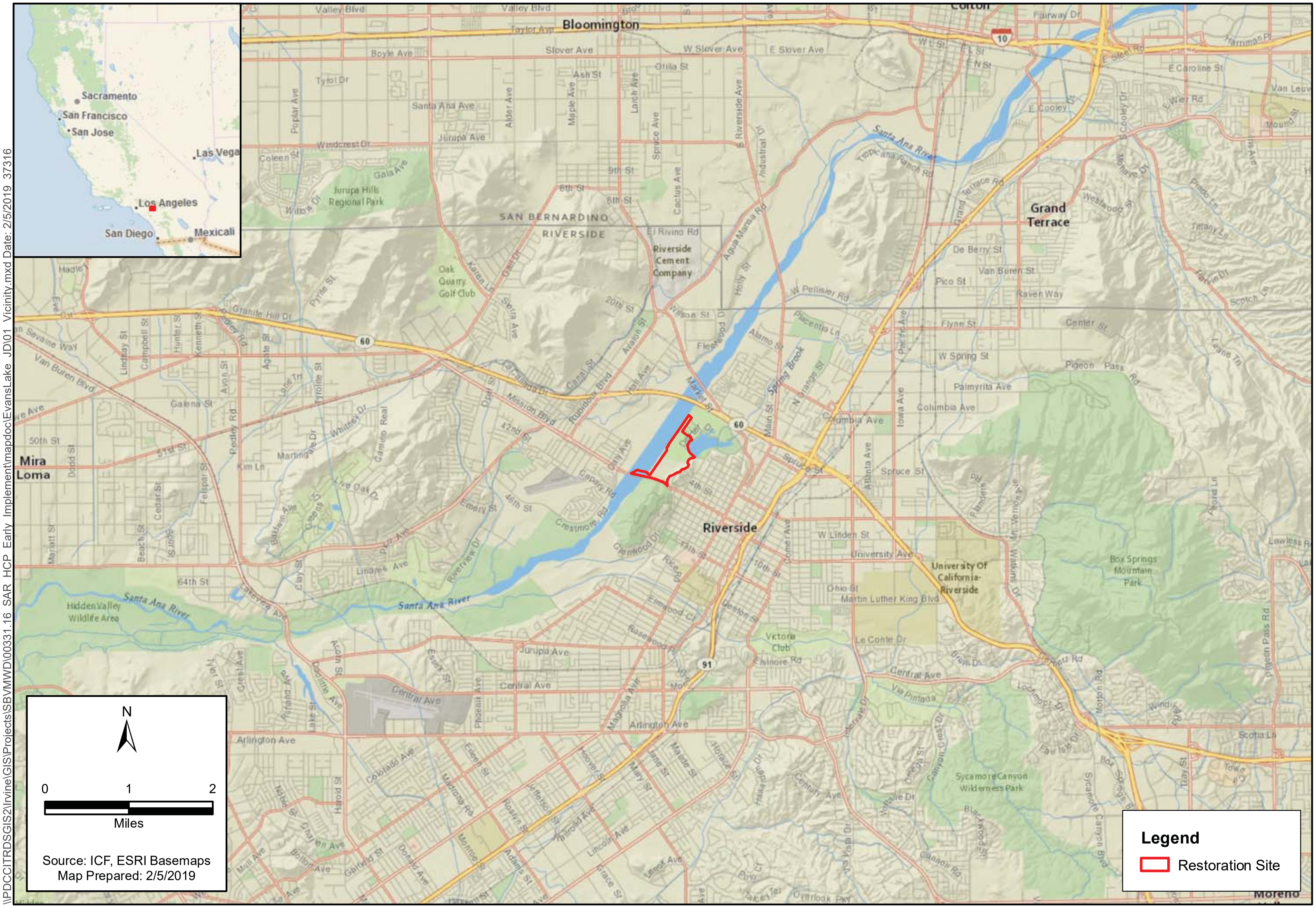
Attachment 1
Figures

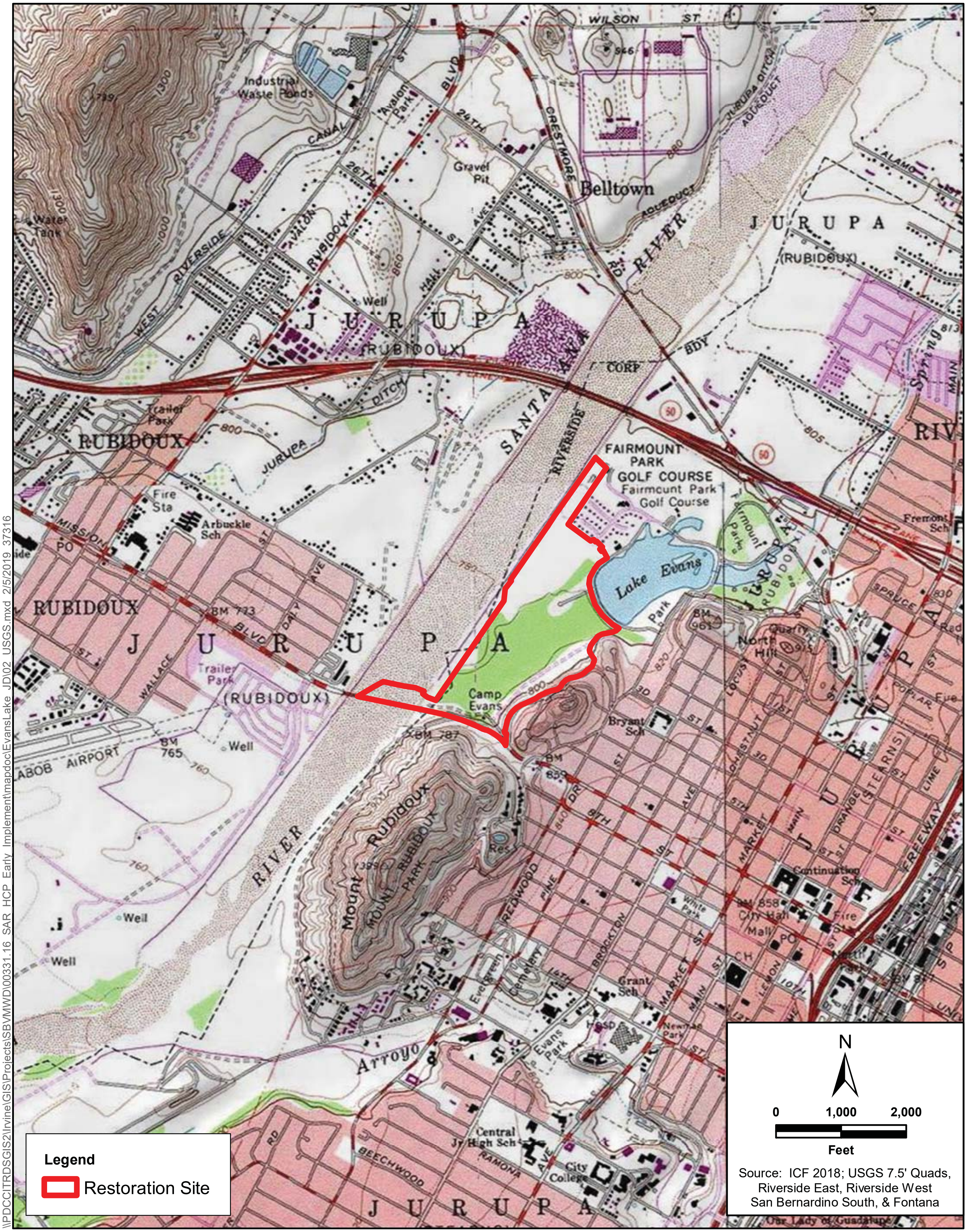
\\PDCCITRDSGIS2\Irvine\GIS\Projects\SBVMWD\00331.16 SAR HCP Early Implement\mapdoc\EvansLake JD\01 Vicinity.mxd Date: 2/5/2019 37316



Source: ICF, ESRI Basemaps
Map Prepared: 2/5/2019

ICF

Figure 1
Project Vicinity
Evan's Lake Drain Restoration Site



Source: ICF 2018; USGS 7.5' Quads, Riverside East, Riverside West San Bernardino South, & Fontana

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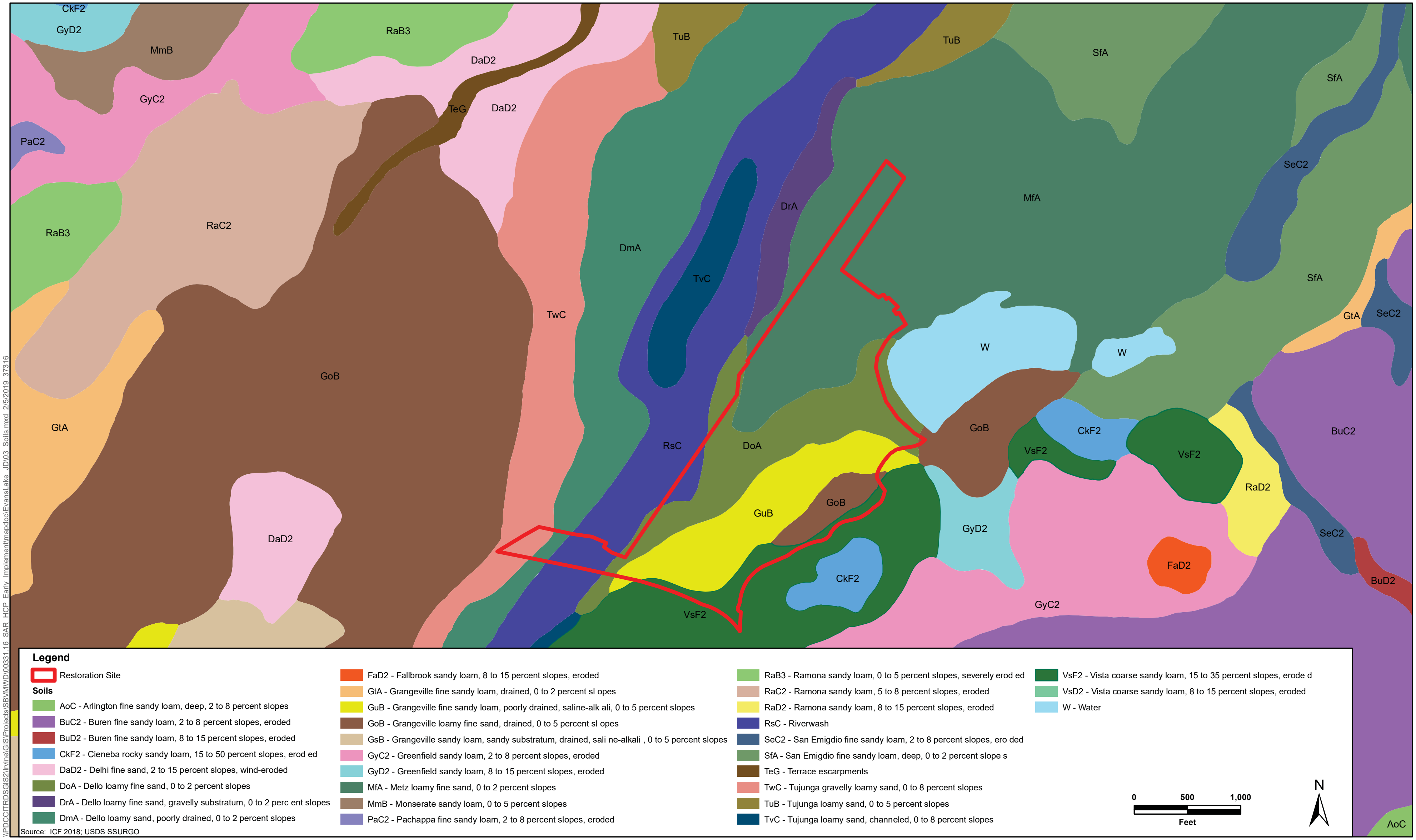
ICF

Figure 2
Topography
Evan's Lake Drain Restoration Site



Source: ICF 2018; USDS SSURGO

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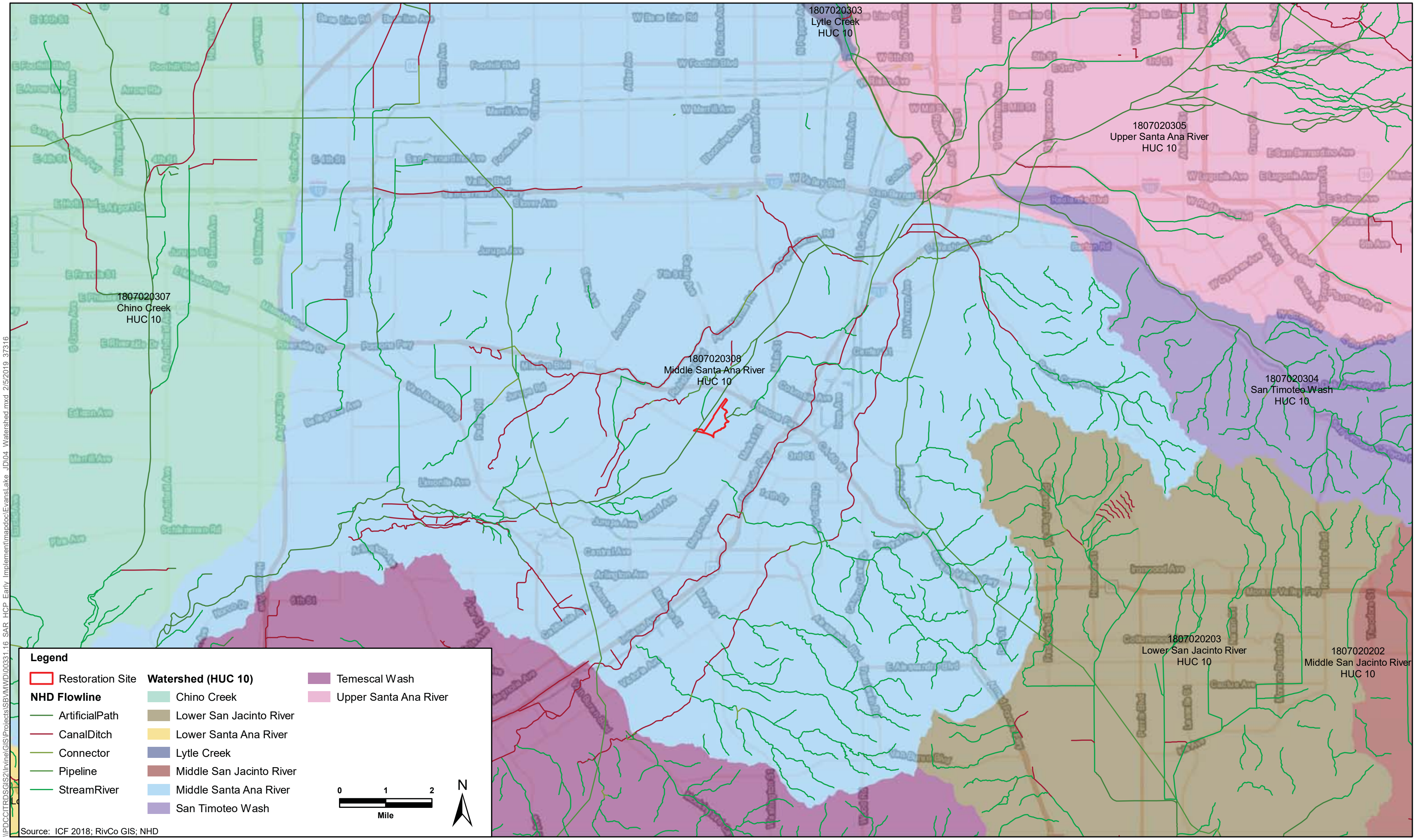
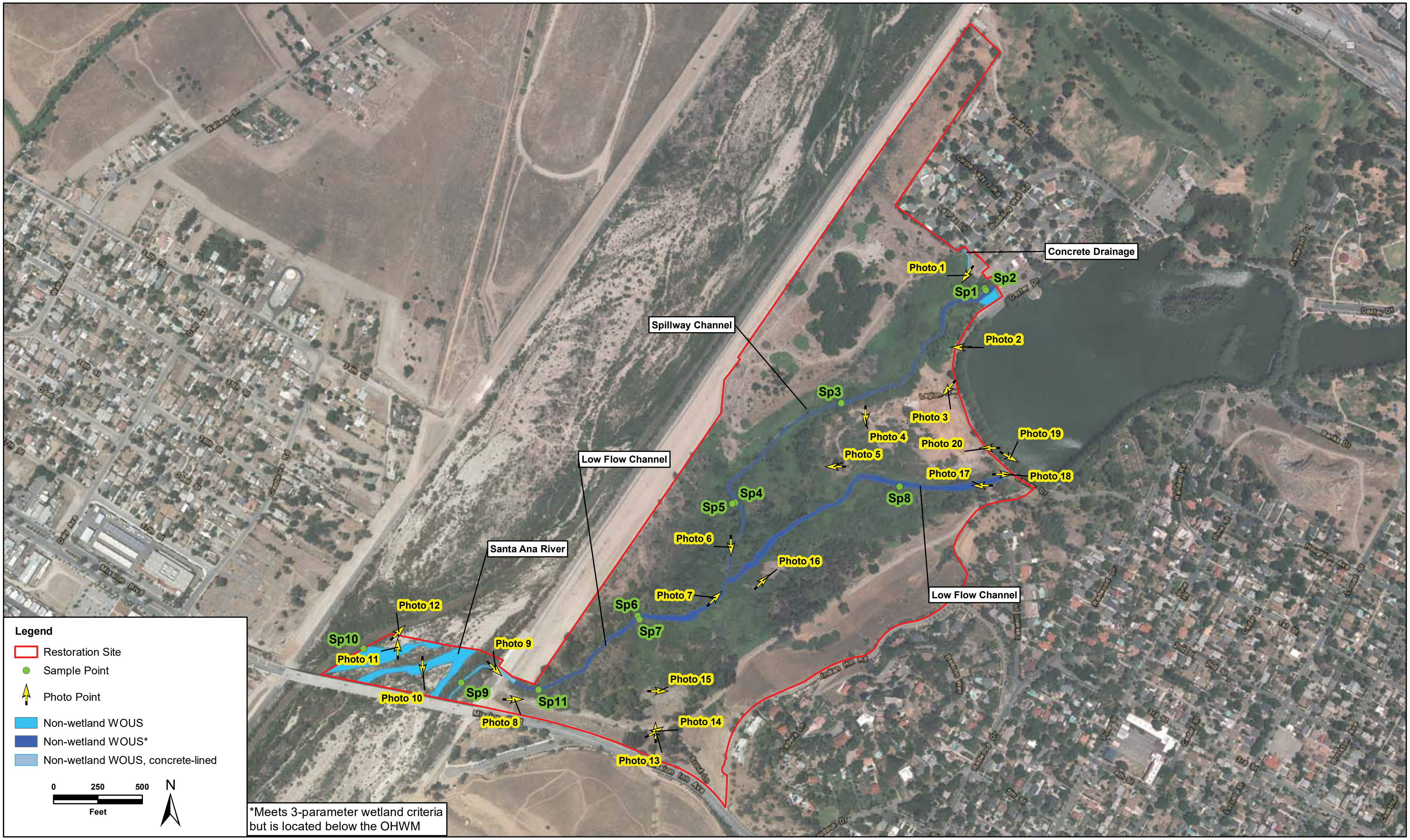
Figure 3
Soils
Evan's Lake Drain Restoration Site



Source: ICF 2018; RivCo GIS; NHD

\PDCC\TRDSGIS2\Irvine\GIS\Projects\SBVMWD\00331.16 SAR HCP Early Implement\mapdoc\EvansLake JD\04 Watershed.mxd 2/5/2019 37316

Figure 4
Watershed
Evan's Lake Drain Restoration Site



*Meets 3-parameter wetland criteria but is located below the OHWM

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ICF

Figure 5
Waters of the U.S.
Evan's Lake Drain Restoration Site

Figure 6
CDFW Jurisdiction
Evan's Lake Drain Restoration Site

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Attachment 2

Photo Log

Photo 1

Date:
July 31, 2018

Direction:
SW

Description:
Looking south-west towards the spillway channel, which is on the left side beneath the grape vines.

Photo 2

Date:
July 31, 2018

Direction:
W

Description:
Looking across site towards spillway channel

Photo 3

Date:
July 31, 2018

Direction:
SW

Description:
Looking across site at disturbed habitat

	**Photo 4** Date: July 31, 2018 Direction: S Description: Looking across site at disturbed habitat and illegal trails
	**Photo 5** Date: July 31, 2018 Direction: W Description: Looking across site from middle of site at wild grape dominated habitat

Photo 6

Date:
July 31, 2018

Direction:
S

Description:
Looking downstream from within spillway channel

Photo 7

Date:
July 31, 2018

Direction:
NE

Description:
Looking upstream just downstream of confluence of spillway channel and low flow channel

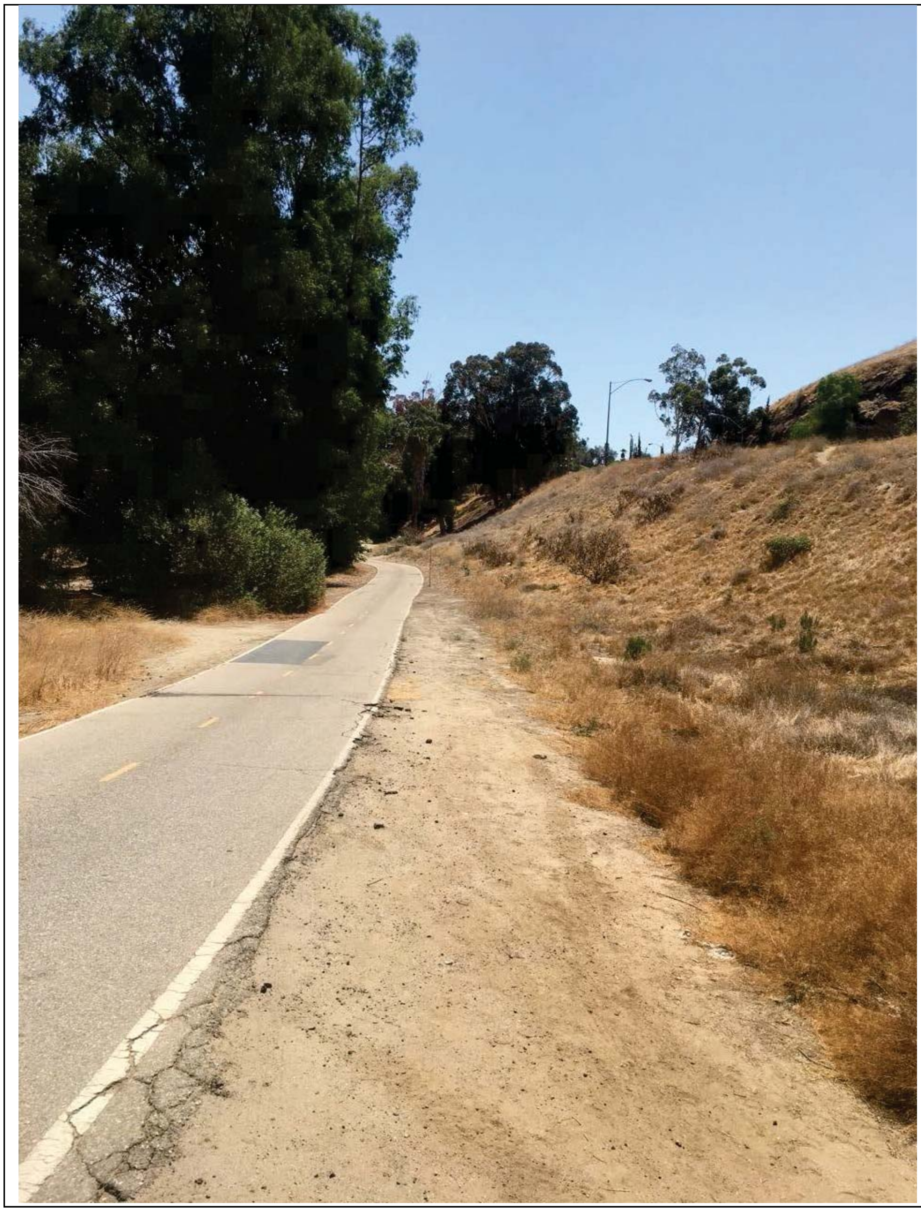


Photo 8

Date:
July 31, 2018

Direction:
E

Description:
Bike path that demarcates the southern end of the project

Photo 9

Date:
July 31, 2018

Direction:
SE

Description:
Looking upstream at culverts that drain into the Santa Ana River

Photo 10

Date:
July 31, 2018

Direction:
S

Description:
Looking downstream within the Santa Ana River

	**Photo 11** Date: August 3, 2018 Direction: N Description: Looking upstream within the Santa Ana River at bank that defines the OHWM
	**Photo 12** Date: August 3, 2018 Direction: NE Description: Looking upstream within the main channel of the Santa Ana River (just outside project limits)

	**Photo 13** Date: July 31, 2018 Direction: N Description: Disturbed habitat at south end of project
	**Photo 14** Date: July 31, 2018 Direction: NE Description: Disturbed habitat just south of project site

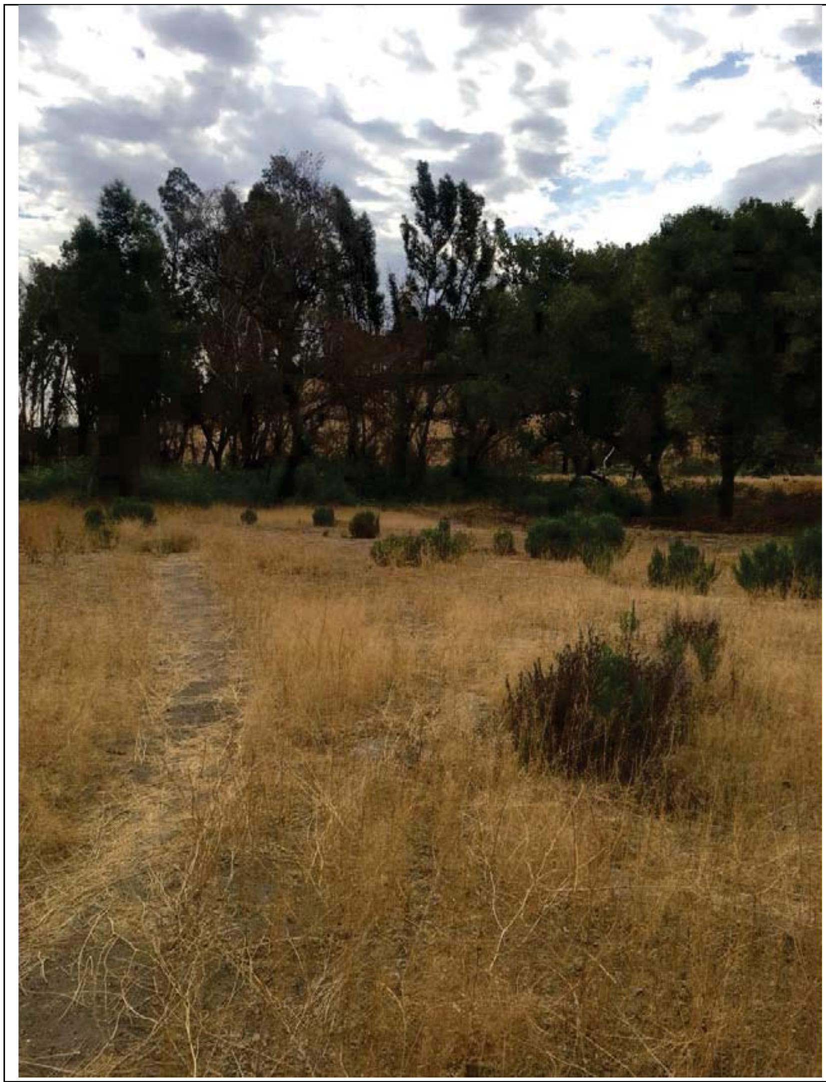


Photo 15

Date:
July 31, 2018

Direction:
E

Description:
Disturbed habitat at south end of project site

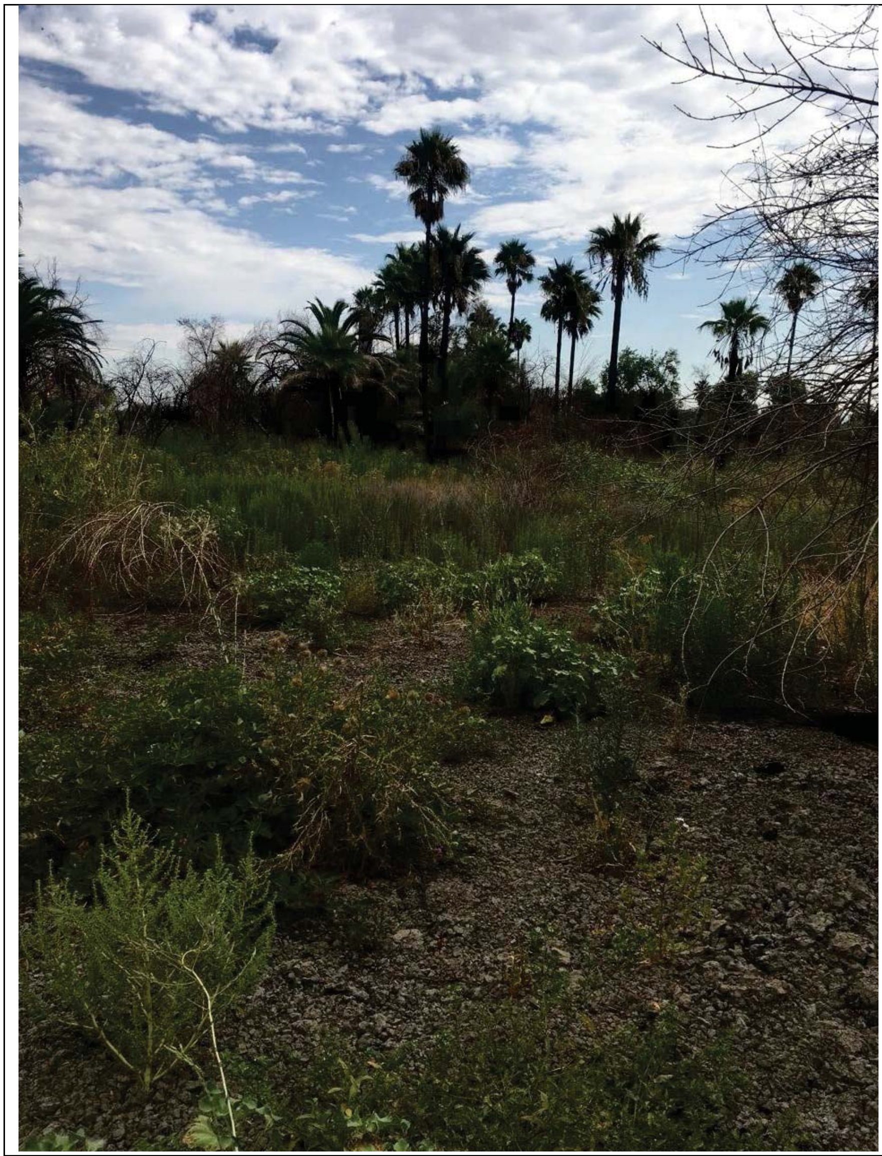


Photo 16

Date:
July 31, 2018

Direction:
NE

Description:
Semi-disturbed lands

Photo 17

Date:
July 31, 2018

Direction:
W

Description:
Looking downstream at low-flow channel

Photo 18

Date:
July 31, 2018

Direction:
E

Description:
Looking upstream at culvert from Evan's Lake at it enters the project site

Photo 19

Date:
July 31, 2018

Direction:
SE

Description:
Riser in Evan’s Lake that feeds low-flow channel

Photo 20

Date:
July 31, 2018

Direction:
W

Description:
Disturbed habitat at east end of site

Photo 21

Date:
July 31, 2018

Direction:
W

Description:
SP1

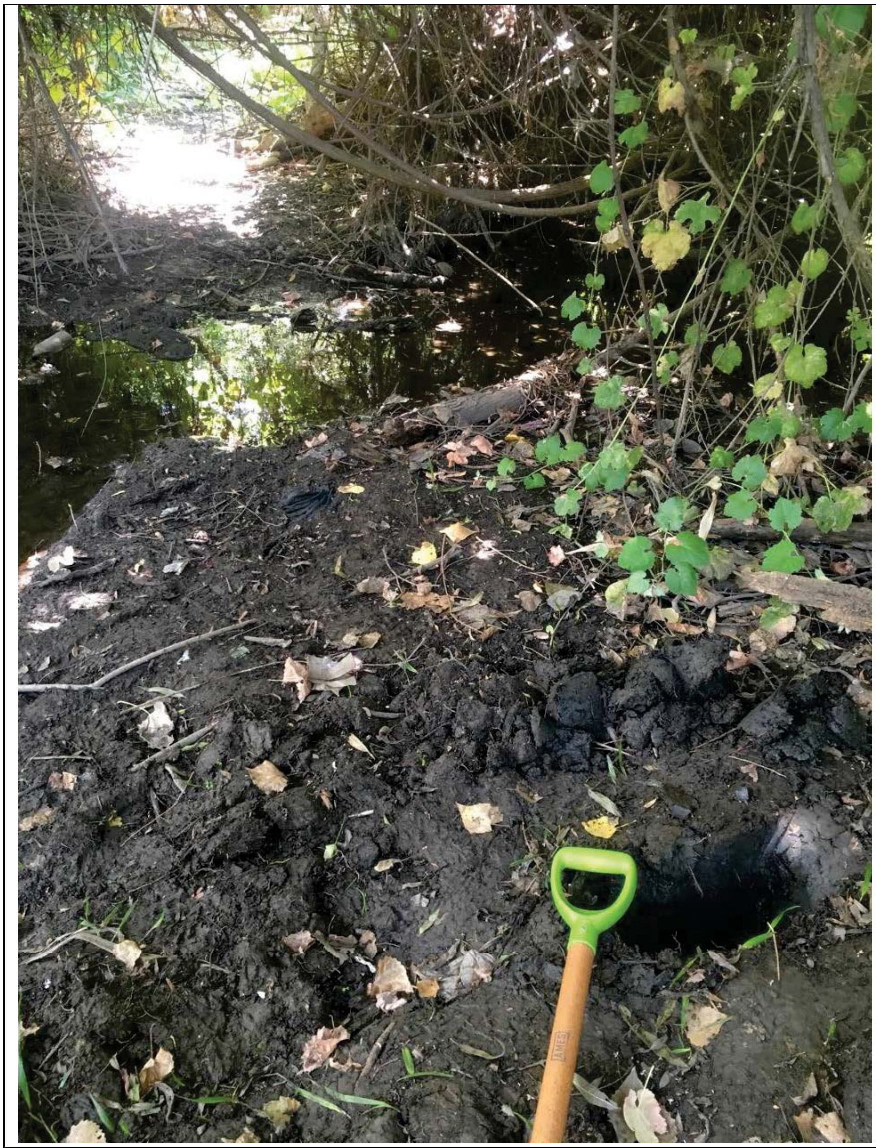


Photo 22

Date:
July 31, 2018

Direction:
S

Description:
SP2 with spillway channel in background

Photos 23 and 24

Date:
July 31, 2018

Direction:
NA

Description:
SP3. Sandy redox in top layers with gray/depleted lower layer

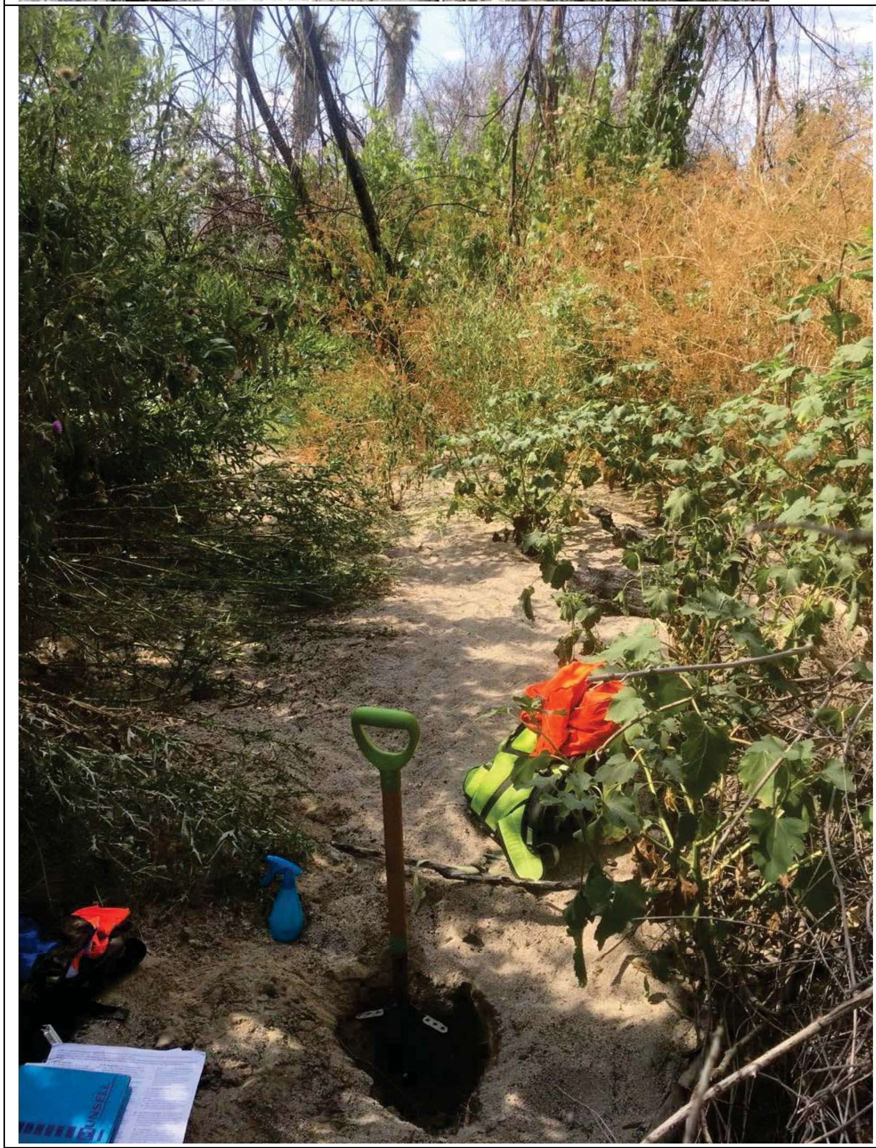
	
	**Photo 25** Date: August 1, 2018 Direction: N Description: SP4 within spillway channel

	**Photo 26** Date: August 1, 2018 Direction: NA Description: SP4 within spillway channel, showing sandy redox soils
	**Photo 27** Date: August 1, 2018 Direction: NA Description: SP5 within uplands adjacent to SP4

Photo 28

Date:
August 1, 2018

Direction:
NE

Description:
SP6 within channel after confluence of low-flow and spillway channel

Photo 29

Date:
August 1, 2018

Direction:
NA

Description:
SP6 showing sandy redox soils

Photo 30

Date:
August 1, 2018

Direction:
NE

Description:
SP7 in uplands adjacent to SP6

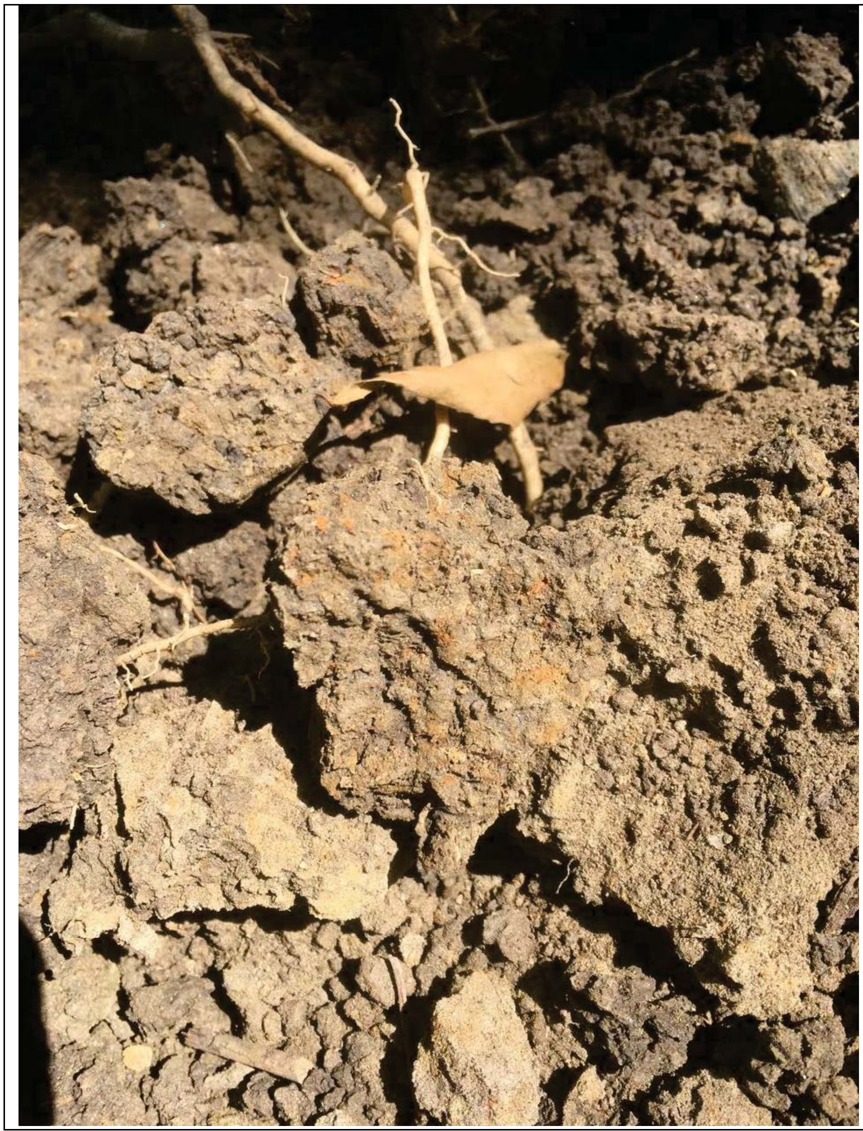


Photo 31

Date:
August 1, 2018

Direction:
NA

Description:
SP7 in uplands adjacent to SP6

Photo 32

Date:
August 3, 2018

Direction:
NE

Description:
SP11 in channel

Photo 33

Date:
August 3, 2018

Direction:
NA

Description:
SP11 showing sandy redox

Photo 34

Date:
August 3, 2018

Direction:
N

Description:
SP9 within side channel of Santa Ana River

Photo 35

Date:
August 3, 2018

Direction:
W

Description:
SP10 adjacent to low flow of Santa Ava River

Photo 36

Date:
August 3, 2018

Direction:
N

Description:
SP8 adjacent to low flow channel

Attachment 3

Wetland Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVAN'S LAKE City/County: RIVERSIDE/RIVERSIDE Sampling Date: JULY 31, 2018
Applicant/Owner: SBVMWD State: CA Sampling Point: SP1
Investigator(s): R. VANSANT, KRISTEN KLEINFELTER Section, Township, Range: ______
Landform (hillslope, terrace, etc.): FLOODPLAIN Local relief (concave, convex, none): NONE Slope (%): 1
Subregion (LRR): C Lat: 33.9969 Long: -117.3820 Datum: ______
Soil Map Unit Name: METZ LOAMY FINE SAND NWI classification: FRESH H_2O FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes ______ No X
Wetland Hydrology Present? Yes ______ No X

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks: SP LOCATED ~ 1-2 FT ABOVE SP 2 OUTSIDE MAIN CHANNEL.
AREA BURNED SEVERAL YRS AGO BUT VEG IS GROWING BACK.

VEGETATION – Use scientific names of plants.

50% = 57.5
20% = 23

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 FT)			
1. SALIX GOODDINGII	60	Y	FACW
2. WASHINGTONIA ROBUSTA	20	N	FACW
3. POPULUS FREMONTII	35	Y	FACW?
4.			
	115	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 FT)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5 FT)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		= Total Cover	
Woody Vine Stratum (Plot size: 5 FT)			
1. VITIS GIRDIANA	100	Y	FAC
2.			
	100	= Total Cover	

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks:

US Army Corps of Engineers Arid West – Version 2.0

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 3/2	100	———	———	———	———	LC	No Redox

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

Roots Below B[illegible], could not dig lower

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No Hydro

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVANS LAKE City/County: RIVERSIDE/RIVERSIDE Sampling Date: 7/31/2018
Applicant/Owner: SBVMWD State: CA Sampling Point: SP2
Investigator(s): RJ VAN SANT, KRISTEN KLEINFELTER Section, Township, Range: ______
Landform (hillslope, terrace, etc.): FLOODPLAIN/CHANNEL Local relief (concave, convex, none): CONCAVE Slope (%): 2-3
Subregion (LRR): C Lat: 33.9909 Long: -117.3820 Datum: ______
Soil Map Unit Name: METZ LOAMY FINE SAND NWI classification: FRESH H2O FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes X No ______
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? **Yes** X **No** ______

Remarks: SP LOCATED JUST OUTSIDE LOW FLOW CHANNEL ~ 2-3 INCHES HIGHER, STANDING/FLOWING H2O IN MAIN CHANNEL. SP LOCATED 1-2 FT BELOW SP1
AREA BURNED SEVERAL YRS AGO BUT VEG IS GROWING BACK

VEGETATION – Use scientific names of plants.

50% = 55
20% = 22

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30FT)			
1. SALIX GOODINGII	75	Y	FACW
2. WASHINGTONIA ROBUSTA	10	N	FACW
3. FRAXINUS VELUTINA	25	Y	FAC
4.			
	110 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10FT)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5FT)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: 5FT)			
1. VITIS GIRDINIA	75	Y	FAC
2.			
	75 = Total Cover		

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-16	5Y 2.5/1	100					MUCKY LC	DARK SOIL w/ ORGANICS. STRONG H2S ODOR

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☒ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☒ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ______

Remarks:

SATURATED SOIL, LOTS OF ORGANICS

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☒ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☒ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes X No ______ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes X No ______ Depth (inches): 0

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVAN'S LAKE City/County: RIV./RIV. Sampling Date: 7/31/2018
Applicant/Owner: SBVMWD State: CA Sampling Point: SP3
Investigator(s): RJ VAN SANT, KRISTEN KLEINFELTER Section, Township, Range: ______
Landform (hillslope, terrace, etc.): CHANNEL BOTTOM Local relief (concave, convex, none): CONCAVE Slope (%): 2-3
Subregion (LRR): C Lat: 33.9952 Long: -117.3847 Datum: ______
Soil Map Unit Name: METZ LOAMY FINE SAND NWI classification: FRESH H2O FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes X No ______
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? **Yes** X **No** ______

Remarks: SP LOCATED IN MAIN CHANNEL, SIDE SLOPES INCISED ~ 6 FT. DID NOT DIG ANOTHER SOIL PIT IN UPLANDS AS CHANNEL WAS VERY INCISED AND PIT WOULD BE ~ 6 FT HIGHER IN ELEVATION AND WAS OBVIOUSLY NOT WETLANDS.

VEGETATION – Use scientific names of plants.

50% = 25
20% = 10

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Washingtonia robusta	10	Y	FACW
2. Salix laevigata	40	Y	FACW
3.			
4.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 ft)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Cyperus eragrostis	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 5 ft)			
1. Vitis girdiana	45	Y	FAC
2.			
	45	= Total Cover	

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks:

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2.5	10YR 4/1	80	10YR 4/6	20	C	M	LC	
2.5-14	10YR 6/1	75	7.5YR 6/8	25	C	M	S	REDOX IN SAND, STRIPPED REDOX OXC.
16-20	2.5Y 5/1	100					LC	VERY GRAY/DEPLETED

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☒ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☒ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 16

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVAN'S LAKE City/County: RIV./RIV. Sampling Date: 7/31/2018
Applicant/Owner: SBVMWD State: CA Sampling Point: 5/4
Investigator(s): RJ Van Sant, KRISTEN KLEINFELTER Section, Township, Range: ______
Landform (hillslope, terrace, etc.): CHANNEL Local relief (concave, convex, none): CONCAVE Slope (%): 1
Subregion (LRR): C Lat: 33.9937 Long: -117.3867 Datum: ______
Soil Map Unit Name: DELLO LOAMY FINE SAND NWI classification: FRESH H2O FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes X No ______
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? **Yes** X **No** ______

Remarks: SITE BURNED SEVERAL YEARS AGO, SAMPLE POINT LOCATED IN MAIN CHANNEL. SANDY BOTTOM CHANNEL, VEG IS GROWING BACK

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1. Washingtonia robusta	10	Y	FACW
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 ft)			
1. Salix laevigata	15	Y	FACW
2. Salix lasiolepis	15	Y	FACW
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Xanthium strumarium	20	Y	FAC
2. Cirsium vulgare	35	Y	FACU
3. Foeniculum vulgare	10		NI
4.			
5.			
6.			
7.			
8.			
	65	= Total Cover	
Woody Vine Stratum (Plot size: 5 ft)			
1. Vitis girdiana	30	Y	FAC
2.			
	30	= Total Cover	

50% = 32.5
20% = 13

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks:

US Army Corps of Engineers Arid West – Version 2.0

SOIL

Sampling Point: SP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 4/2	95	10YR 4/6	5	C	PL	SANDY	REDOX CONC. PRESENT
13-16	10YR 4/4	90	10YR 4/8	10	C	PL	SANDY	REDOX COATED SAND GRAINS

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5) (**LRR C**)
☐ 1 cm Muck (A9) (**LRR D**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☒ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (**LRR C**)
☐ 2 cm Muck (A10) (**LRR B**)
☐ Reduced Vertic (F18)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1) (**Nonriverine**)
☐ Sediment Deposits (B2) (**Nonriverine**)
☐ Drift Deposits (B3) (**Nonriverine**)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Water-Stained Leaves (B9)
☐ Salt Crust (B11)
☐ Biotic Crust (B12)
☒ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water Marks (B1) (**Riverine**)
☐ Sediment Deposits (B2) (**Riverine**)
☐ Drift Deposits (B3) (**Riverine**)
☒ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______
Water Table Present? Yes ___ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVAN'S LAKE City/County: RIV. /RIV. Sampling Date: 8/1/2018

Applicant/Owner: SBVMWD State: CA Sampling Point: SP5

Investigator(s): RJ Van Sant, KRISTEN KLEINFELTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 4-5

Subregion (LRR): C Lat: 33.9936 Long: -117.3867 Datum: ______

Soil Map Unit Name: DELLO LOAMY FINE SAND NWI classification: FRESH H2O FORESTED/SHRUB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No X

Hydric Soil Present? Yes X No ______

Wetland Hydrology Present? Yes ______ No X

Is the Sampled Area within a Wetland? **Yes** ______ **No** X

Remarks: SITE BURNED SEVERAL YRS AGO. VEG HAS MOSTLY GROWN BACK.
SP LOCATED ON FLOODPLAIN BENCH ~ 2-3 FT ABOVE MAIN CHANNEL AND ABOVE SP 4

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. WASHINGTONI ROBUSTA	5	Y	FACW
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10 FT)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 FT)			
1. CIRSIUM VULGARE	5	Y	FACU
2. ERIGERON CANADENSIS	10	Y	FACU
3. POLYPOGON MONO.	1	N	FACW
4.			
5.			
6.			
7.			
8.			
	16 = Total Cover		
Woody Vine Stratum (Plot size: 5 FT)			
1. VITIS GIRDINIA	70	Y	FAC
2.			
	70 = Total Cover		

50% = 8
20% = 3.2

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	–	x 1 = –
FACW species	6	x 2 = 12
FAC species	70	x 3 = 210
FACU species	15	x 4 = 60
UPL species	–	x 5 = –
Column Totals:	91 (A)	282 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ______ **No** X

Remarks:

SOIL

Sampling Point: SP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-6	10YR 2/1	100	—				LC	
6-14	10YR 3/2	95	7.5YR 5/8	5	C	M/PL	S	VERY FINE SAND

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

NO INDICATORS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVAN'S LAKE City/County: RIV/RIV. Sampling Date: 8/1/2018
Applicant/Owner: SBVMWD State: CA Sampling Point: SP6
Investigator(s): RJ VAN SANT, KRISTEN KLEINFELTER Section, Township, Range: ____
Landform (hillslope, terrace, etc.): CHANNEL BOTTOM Local relief (concave, convex, none): CONCAVE Slope (%): 2-3
Subregion (LRR): C Lat: 33.9919 Long: -117.3885 Datum: ____
Soil Map Unit Name: GUB NWI classification: FRESH H2O FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks: SITE BURNED SEVERAL YEARS AGO. VEG HAS MOSTLY RECOVERED. SP LOCATED IN CHANNEL BOTTOM

VEGETATION – Use scientific names of plants.

50% = 27.5
20% = 11

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 FT)			
1. SALIX GOODDINGII	15	Y	FACW
2. FRAXINUS VELUTINA	40	Y	FAC
3.			
4.			
	55	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 FT)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5 FT)			
1.			
2. - CIRSIUM VULG.	1	N	FACU
3. - CYPERUS ERAGROSTIS	4	Y	FACW
4. - RAPHANUS SATIVUS	3	Y	UPL
5.			
6.			
7.			
8.			
	8	= Total Cover	
Woody Vine Stratum (Plot size: 5 FT)			
1. VITIS GIRDIANA	20	Y	FAC
2.			
	20	= Total Cover	

50% = 4
20% = 1.6

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Remarks:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

SOIL

Sampling Point: SP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
~~1-25~~	~~10YR 4/1~~	~~80~~	~~10YR 4/6~~	~~20~~	~~C~~	~~M~~	~~LC~~	
~~25-[illegible]~~	~~10YR 6/1~~	~~75~~	~~7.5YR 5/8~~	~~25~~	~~C~~	~~M~~	~~S~~	~~REDOX IN SAND, STRIPPED REDOX~~
~~[illegible]30~~	~~2.5Y 5/1~~	~~100~~					~~LC~~	~~VERY GRAY/DEPLETED~~
~~1-6~~	~~10 YR 2/1~~	~~100~~					~~LC~~	
~~6-14~~	~~10 YR 3/2~~	~~95~~	~~7.5YR 5/8~~	~~5~~	~~C~~	~~M/PL~~	~~S~~	~~very fine sand; redox in pore linings and matrix~~
0-5	10YR 2/1	100	—				LC	
5-14	10YR 3/2	95	7.5YR 4/6	5	C	M/PL	S	VERY FINE SAND

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes X No ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Biotic Crust (B12)
X Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
X Sediment Deposits (B2) (**Riverine**)
X Drift Deposits (B3) (**Riverine**)
X Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______________
Water Table Present? Yes ______ No X Depth (inches): ______________
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______________

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVANS LAKE City/County: RIV./RIV. Sampling Date: 8/1/2018

Applicant/Owner: SBV/MWD State: CA Sampling Point: SP7

Investigator(s): RJ Van Sant, KRISTEN KLEINFELTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): CONVEX Slope (%): 3-4

Subregion (LRR): C Lat: 33.9019 Long: -117.3884 Datum: ______

Soil Map Unit Name: GuB NWI classification: FRESH H2O FORESTED/SHRUB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______
Hydric Soil Present?	Yes X	No ______
Wetland Hydrology Present?	Yes ______	No X

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks: S7 LOCATED ~ 2 FT HIGHER THAN SP6 IN FLOODPLAIN AREA

VEGETATION – Use scientific names of plants.

50% = 17.5
20% = 7

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 FT)			
1. SALIX LASIOLEPIS	15	Y	FACW
2. PHOENIX CANARIENSIS	20	Y	UPL
3.			
4.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 FT)			
1. SALIX LASIOLEPIS	20	Y	FACW
2. FICUS CARICA	7	Y	FACU
3. FRAXINUS VELUTINA	5	N	FAC
4.			
5.			
	32	= Total Cover	
Herb Stratum (Plot size: 5 FT)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		= Total Cover	
Woody Vine Stratum (Plot size: 5 FT)			
1. VITIS GIRDIANA	Y		FAC
2.			
		= Total Cover	

50% = 16
20% = 6.4

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks:

US Army Corps of Engineers Arid West – Version 2.0

SOIL

Sampling Point: SP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-10	10YR 3/1	95	7.5YR 4/6	5	C	M/PL	LC	REDOX CONCENTRATIONS
10-16	10YR 3/2	95	7.5YR 4/8	5	C	M/PL	LC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_X_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ______ No ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
_X_ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No _X_ Depth (inches): ______________
Water Table Present? Yes ______ No _X_ Depth (inches): ______________
Saturation Present? (includes capillary fringe) Yes ______ No _X_ Depth (inches): ______________

Wetland Hydrology Present? Yes ______ No _X_

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: NO HYDRO INDICATORS ASIDE FROM 1 2°

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: ELAN'S LAKE City/County: RIV./RIV. Sampling Date: 8/1/2018

Applicant/Owner: SBVMWD State: CA Sampling Point: SP 8

Investigator(s): RJ Van Sant, KRISTEN KLUSINKELTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): FLOODPLAIN Local relief (concave, convex, none): NONE Slope (%): 1-2

Subregion (LRR): C Lat: 33.9939 Long: -117.3836 Datum: ______

Soil Map Unit Name: GuB NWI classification: FRESH H2O FORESTED/SHRUB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______

Hydric Soil Present? Yes X No ______

Wetland Hydrology Present? Yes ______ No X

Is the Sampled Area within a Wetland? **Yes** ______ **No** X

Remarks: SP LOCATED IN DENSE RIPARIAN ~1 FT ABOVE MAIN CHANNEL. MAIN CHANNEL HAD H2O PRESENT. DID NOT DIG SOIL PIT IN MAIN CHANNEL AS HAD STANDING H2O. VEG WAS SAME ∴ HYDROPHYTIC, ASSUMED SOILS, HAD HYDROLOGY ∴ IT WAS WETLAND IN MAIN CHANNEL. NOT WETLAND AT THIS SP

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 FT)			
1. SALIX LASIOLEPIS	60	Y	FACW
2. FICUS CARICA	5	N	FACU
3.			
4.			
	65 = Total Cover		
Sapling/Shrub Stratum (Plot size: 0 FT)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 FT)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: 5 FT)			
1. VITIS GIRDIANA	85	Y	FAC
2.			
	85 = Total Cover		

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

SOIL

Sampling Point: SP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-3.5	10YR 2/2	100					LC	
3.5-10	10YR 3/2	97	10YR 5/8	3	C	M/PL	SAND	
10-11.5	10YR 3/1	96	7.5YR 5/8	5	C	M/PL	LC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes Y No ______

Remarks:

COULD NOT DIG PAST 11.5 in DUE TO ROOTS.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): ___________
Water Table Present? Yes _____ No _____ Depth (inches): ___________
Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): ___________

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

NO INDICATORS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: LAKE EVANS City/County: RIV./RIV Sampling Date: 8/3/2018
Applicant/Owner: SBVMWD State: CA Sampling Point: SP 9
Investigator(s): RJ VAN SANT, MARISSA MAGGIO Section, Township, Range: ______
Landform (hillslope, terrace, etc.): CHANNEL BOTTOM Local relief (concave, convex, none): CONCAVE Slope (%): 3-4
Subregion (LRR): C Lat: 33.99089672 Long: -117.39175419 Datum: ______
Soil Map Unit Name: RSC NWI classification: FRESH H2O FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No X
Hydric Soil Present? Yes ______ No X
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks: SP LOCATED IN SANDY CHANNEL BOTTOM THATS FED FROM H2O LEAVING EVAN'S LAKE/FAIRMONT PARK SITE THROUGH 2 CULVERTS. NO H2O DURING SITE VISIT. CHANNEL IN SA RIVER FLOODPLAIN

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 FT)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10 FT)			
1. SALIX EXIGUA	25	Y	FACW
2.			
3. BACCHARIS SALICIFOLIA	2	N	FAC
4.			
5.			
= Total Cover	27		
Herb Stratum (Plot size: 5 FT)			
1. BRASSICA NIGRA (DEAD)	15	Y	UPL
2. RICINUS COM.	0.5	N	FACU
3. VERBESINA ENCILIOIDES	1	N	FAC
4.			
5.			
6.			
7.			
8.			
= Total Cover	16.5		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

50% = 13.5
20% = 5.4

50% = 8.25
20% = 3.3

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	25	x 2 = 50
FAC species	2	x 3 = 6
FACU species	1.5	x 4 = 6
UPL species	15	x 5 = 75
Column Totals:	43.5 (A)	137 (B)

Prevalence Index = B/A = 3.15

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks:

SOIL

Sampling Point: SP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
~~1-5~~	~~10YR 2/1~~	~~100~~					~~LC~~	
~~5-14~~	~~10YR 3/2~~	~~95~~	~~7.5YR 4/6~~	~~5~~	~~C~~	~~MPL~~	~~S~~	~~very fine sand~~
~~1-10~~	~~10YR 3/1~~	~~100~~					LC	
10-15	10YR 3/2	95	7.5YR 5/8	5	C	MPL	LC	very fine sand
0-6	10YR 5/1	100	—				S	
6-12	10YR 4/1	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? Yes ______ No X

Remarks: COULDN'T DIG BELOW 12in DUE TO ROCKS AND SAND FILLING IN HOLE

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
X Drift Deposits (B3) (**Riverine**)
X Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ____________
Water Table Present? Yes ______ No X Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ____________

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVAN'S LAKE City/County: RIV./RIV. Sampling Date: 8/3/2018
Applicant/Owner: SBVMWD State: CA Sampling Point: SP 10
Investigator(s): RJ VAN SANT, MARISSA MAGGIO Section, Township, Range: ______
Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): CONVEX Slope (%): 5
Subregion (LRR): C Lat: 33.99143879 Long: -117.39354033 Datum: ______
Soil Map Unit Name: TwC NWI classification: FRESH [illegible] FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? N Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes ______ No X
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks: SP LOCATED ~ 20 FT ABOVE MAIN CHANNEL OF SA RIVER ON FLOODPLAIN

VEGETATION – Use scientific names of plants.

50% = 13.5
20% = 5.4

50% = 30.5
20% = 12.2

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 FT)			
1. TAMARIX SP.	5	N	FAC
2. AILANTHUS ALTISSIMA	7	Y	FACU
3. SALIX LAEVIGATA	15	Y	FACW
4.			
	27 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10 FT)			
1. SALIX EXIGUA	40	Y	FACW
2. BACCHARIS SALICIFOLIA	18	Y	FAC
3. TAMARIX SPP.	3	N	FAC
4.			
5.			
	61 = Total Cover		
Herb Stratum (Plot size: 5 FT)			
1. BRASSICA NIGRA	15	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	15 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 10-15 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks:

SOIL

Sampling Point: SP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
~~0-13~~	~~10YR 4/2~~	~~95~~	~~10YR 4/6~~	~~5~~	~~C~~	~~PL~~	~~Sandy~~	
~~13-16~~	~~10YR 4/4~~	~~90~~	~~10YR 6/8~~	~~10~~	~~C~~	~~PL~~	~~Sandy~~	
0-16	7.5YR 4/1	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ~~✓~~ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ______ No X

Remarks: NO REDOX. SP LOCATED ~ 70 FT ABOVE MAIN RIVER CHANNEL, AREA FLOODS BUT ISN'T LIKELY SATURATED LONG ENOUGH FOR HYDRIC SOILS

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☒ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ______ Depth (inches): ____________

Water Table Present? Yes ______ No ______ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ____________

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: MINOR INDICATORS OF FLOW, LIKELY FROM HIGH H_2O EVENTS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: EVANS LAKE City/County: Riverside, Riverside Sampling Date: 8/3/18
Applicant/Owner: SBVMWD State: CA Sampling Point: SP 11
Investigator(s): RJV, MCM Section, Township, Range: ______
Landform (hillslope, terrace, etc.): creek bed Local relief (concave, convex, none): concave Slope (%): 2-3
Subregion (LRR): C-Med Lat: 33.99077414 Long: -117.39031814 Datum: ______
Soil Map Unit Name: DoA NWI classification: FRESH H2O FORESTED/SHRUB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)
Are Vegetation –, Soil –, or Hydrology – significantly disturbed? N Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation –, Soil –, or Hydrology – naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ✓ No ______

Is the Sampled Area within a Wetland? **Yes** X **No** ______

Remarks: SP LOCATED IN CREEK CHANNEL BOTTOM. AN ADJACENT SOIL PIT WAS NOT DUG IN UPLAND AREA AS AREA OUTSIDE CHANNEL BOTTOM IS 1-2 FEET HIGHER AND HAS SHOWN TO BE UPLANDS IN ALL OTHER SIMILARLY SITUATED SOIL PITS. THIS SP (SP 11) WAS DUG TO AFFIRM CHANNEL BOTTOM WAS WETLAND AS HAS BEEN SEEN THROUGHOUT THE SITE.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Fraxinus VELUTINA	40	Y	FAC
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10)			
1. Fraxinus VELUTINA	5	Y	FAC
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5)			
1. Poa annua	95	Y	FAC
2. plantago erecta	3	N	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	98	= Total Cover	
Woody Vine Stratum (Plot size: 5)			
1. Vitus Cal.	15	Y	FAC
2.			
	15	= Total Cover	

% Bare Ground in Herb Stratum 2 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

SOIL

Sampling Point: SP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-6	10YR 3/2	94	10YR 4/6	6	C	M/PL	loamy clay	
6-15	10YR 3/2	85	7.5 4/6	15	C	PL/M	SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ______

Remarks: REDOX SEEN IN BOTH LAYERS + NEAR SURFACE

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☒ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☑ Drift Deposits (B3) (**Riverine**)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: aquatic invertebrate shells IN SOIL SAMPLE

Attachment 4

Request for Corps Jurisdictional Determination (JD)

Appendix 1 - REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: District Name Here

- I am requesting a JD on property located at: ________________________________
  (Street Address)
  City/Township/Parish: Riverside County: Riverside State: CA
  Acreage of Parcel/Review Area for JD: 94
  Section: ______ Township: _______ Range: _______
  Latitude (decimal degrees): 33.993997 Longitude (decimal degrees): -117.385669
  (For linear projects, please include the center point of the proposed alignment.)
- Please attach a survey/plat map and vicinity map identifying location and review area for the JD.
- ☐ I currently own this property. ___ I plan to purchase this property.
  ☐ I am an agent/consultant acting on behalf of the requestor.
  ☐ Other (please explain): ____.
- Reason for request: (check as many as applicable)
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
  ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
  ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
  ☐ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
  ☐ A Corps JD is required in order to obtain my local/state authorization.
  ☐ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
  ☐ I believe that the site may be comprised entirely of dry land.
  ☐ Other: ____
- Type of determination being requested:
  ☐ I am requesting an approved JD.
  ☐ I am requesting a preliminary JD.
  ☐ I am requesting a “no permit required” letter as I believe my proposed activity is not regulated.
  ☐ I am unclear as to which JD I would like to request and require additional information to inform my decision.

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

*Signature: ________________________________ Date: ________________

- Typed or printed name: ____
  Company name: ____
  Address: ____
  ____
  Daytime phone no.: ____
  Email address: ____

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.
Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

Appendix B

California Rapid Assessment Method (CRAM) Memorandum

California Rapid Assessment Method (CRAM) Report

1.0 Summary

This report discusses the methodology and results of the wetland condition assessment conducted for the San Bernardino Valley Municipal Water District Early Implementation of the Upper Santa Ana River Habitat Conservation Plan Evan's Lake project site (project). The project was evaluated using the California Rapid Assessment Method (CRAM) riverine module (CWMW 2013a) with a total of 3 Assessment Areas (AAs) completed over the entire project.

2.0 Project Description

San Bernardino Valley Municipal Water District proposes restoration of the Evan's Lake site as early implementation of the Upper Santa Ana River Habitat Conservation Plan. The project is one of five total restoration sites being implemented.

3.0 Project Location

The project is located downstream of Evan's Lake within Fairmount Park, adjacent to the Santa Ana River, within the city of Riverside, Riverside County, California (Figure 1; all figures are included as Attachment 1). The center coordinates for the project are approximately 33.993997°, -117.385669°.

4.0 CRAM Overview

CRAM has been in development over the last 10-plus years in collaboration with resource agencies and scientists throughout California. The overall goal of CRAM is to "provide rapid, scientifically defensible, standardized, cost-effective assessments of the status and trends in the condition of wetlands and related policies, programs, and projects throughout California" (CWMW 2013a). CRAM is a rapid assessment method that requires collecting Level 2 data (coarse data) for monitoring wetland conditions. It is expected to become the chosen functional assessment method for future permitted projects throughout California.

One of the benefits of CRAM is that it does not require an intensive watershed-level assessment to calibrate variable scores. Instead, CRAM has been calibrated throughout California and in various wetland types. CRAM is an ambient monitoring and assessment tool that can be performed on different scales, ranging from an individual wetland to across a watershed or a larger region. CRAM is designed to collect a coarse assessment of the site's ambient conditions but can be used to measure progress toward meeting success criteria established for wetland function/condition, and can be repeated over the long term if necessary or desired. Level 3 (fine scale) data are not necessary to complete a CRAM assessment but are useful when determining many of the CRAM attribute scores and interpreting the final CRAM scores. CRAM is being used for this project to provide baseline CRAM scores for comparison as the habitat restoration effort proceeds. CRAM may be used in the future to monitor improvements to wetland conditions associated with the habitat restoration.

5.0 Methodology

Prior to visiting the project, ICF CRAM practitioners reviewed and analyzed site maps depicting existing conditions within the project to determine the locations of potential CRAM AAs. Based on the pre-field analysis it was determined that riverine features were within the project.

ICF biologists R.J. Van Sant (certified CRAM practitioner), Kristen Klinefelter (certified CRAM practitioner), and Marissa Maggio (certified CRAM practitioner) conducted the CRAM assessments within the project on August 1 and 2, 2018.

In the field, the CRAM practitioners walked each AA and documented information used to score each metric. In addition, photos were collected at the upstream, downstream, and middle of the riverine AAs (Attachment 2). After recording observations within the AAs, the ICF CRAM practitioners scored each CRAM metric/submetric and calculated the attribute scores and a final overall CRAM score (see description below). The final CRAM score for each AA is composed of four main attribute scores (buffer and landscape context, hydrology, physical structure, and biotic structure), which are based on the metric and submetric scores (a measurable component of an attribute) (Table 1). The CRAM practitioners assign a letter rating (A–D) for each metric/submetric based on a defined set of condition brackets ranging from an “A” as the theoretical best case achievable for the wetland class across California to a “D,” the worst-case achievable. Each metric condition level (A–D) has a fixed numerical value (A=12, B=9, C=6, D=3), which, when combined with the other metrics, results in a score for each attribute. Each metric/submetric condition level (letter rating) has a fixed numerical value, which, when combined with the other metrics, results in a raw score for each attribute. That number is then converted to a percentage of the maximum score achievable for each attribute and represents the final attribute score ranging from 25 to 100%. The final overall CRAM score is the sum of the four final attribute scores, ranging from 25 to 100%.

5.1 Metric/Submetric Score Descriptions

Described below is a summary of each metric and submetric scored in CRAM, as described in the Riverine Wetlands CRAM Field Book (CWMW 2013b).

5.2 Attribute 1: Buffer and Landscape Context

5.2.1 Metric 1: Stream Corridor Continuity

An AA’s Stream Corridor Continuity within a landscape is assessed in terms of its spatial association with other areas of aquatic resources. For riverine wetlands, aquatic area abundance is assessed as the continuity of the stream corridor over a distance of 1,640 feet (500 meters) upstream and 1,640 feet (500 meters) downstream of the AA. While the stream corridor upstream and downstream generally reflects the overall health of the riverine system, of special concern for this metric is the ability of wildlife to enter the stream corridor from outside of it at any place within 1,640 feet (500 meters) of the AA, and to move easily though adequate cover along the stream corridor through the

AA from upstream and downstream. This metric is assessed by measuring the total length of unfavorable land use, referred to as "non-buffer land covers," that interrupts the stream corridor within 1,640 feet (500 meters) upstream or downstream of the AA.

5.2.2 Metric 2: Buffer

The buffer is the area adjoining the AA that is in a natural or seminatural state and currently is not dedicated to anthropogenic uses that would severely detract from its ability to entrap contaminants, discourage entry into the AA by people and nonnative predators, or otherwise protect the AA from adjacent stress and disturbance. The buffer metric is composed of three submetrics that assess various elements of the buffer habitat: presence, width, and condition (see below). The scoring for these submetrics is combined with the aquatic area abundance metric score (above) in a simple algorithm that results in the overall buffer and landscape attribute score.

5.2.2.1 Submetric 1: Percent of Assessment Area with Buffer

This submetric is based on the relationship between the extent of buffer and the functions it provides to aquatic areas. The percentage of buffer surrounding the AA is obtained by calculating the percentage of the area adjoining the AA that is in a natural or seminatural state and is at least 16 feet (5 meters) wide.

5.2.2.2 Submetric 2: Average Buffer Width

The average width of contiguous buffer adjoining the AA is estimated, with a maximum width of 820 feet (250 meters). This submetric is assessed using eight straight lines extending perpendicular out from the AA boundary at regular intervals. The lines are placed in the area already determined to be buffer habitat and are extended from the AA boundary until they hit non-buffer land cover (urban development, parking, large road, etc.) or until they reach the maximum evaluation length of 820 feet (250 meters).

5.2.2.3 Submetric 3: Buffer Condition

The condition of the buffer area is determined by the quality of its vegetation cover (native versus nonnative species), the overall condition of its substrate (disturbed or undisturbed soils), and intensity of human use. Buffer condition is assessed only in areas that have been determined by submetric 1 to have buffer.

5.3 Attribute 2: Hydrology

5.3.1 Metric 1: Water Source

Water sources directly affect the extent, duration, and frequency of the hydrological dynamics within an AA. This metric is assessed based on water sources that affect the dry season hydrology of the AA and looks at both additional artificial inputs (urban runoff) and diversions (dams and drop structures).

5.3.2 Metric 2: Channel Stability

The patterns of increasing and decreasing flows, in conjunction with the size, composition, and amount of sediment that the flow carries or deposits, largely determine the form of riverine systems, including their floodplains, and thus also control their ecological functions. Under natural conditions, the opposing tendencies for sediment to stop moving and for flow to move the sediment tend toward a dynamic equilibrium. Large and persistent changes in either the flow regime or the sediment regime tend to destabilize the channel and change its form. Channel stability is assessed as the degree of channel aggradation (i.e., net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e., net loss of sediment from the bed causing it to be lower over time).

5.3.3 Metric 3: Hydrologic Connectivity

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, and for the wetland's ability to accommodate rising floodwaters without persistent changes in water level that can result in stress to wetland plants and animals. This metric is scored by assessing the degree to which the lateral movement of floodwaters is restricted. For riverine wetlands, the hydrologic connectivity metric is assessed based on the degree of channel entrenchment, a field measurement referred to as the *entrenchment ratio* and calculated as the *flood-prone width* divided by the *bankfull width*. Assessing hydrologic connectivity requires measuring the ability of flows to leave the channel and flood the surrounding landscape. The best estimate of this process is the entrenchment ratio. *Bankfull depth* is the channel depth measured between the thalwag and the projected water surface at the level of bankfull flow. The flood-prone channel width is measured at *flood-prone depth*, the elevation equal to twice the maximum bankfull depth.

5.4 Attribute 3: Physical Structure

5.4.1 Metric 1: Structural Patch Richness

Patch richness is the number of different obvious types of physical surfaces or features (i.e., patch types) that may provide habitat for aquatic, wetland, or riparian species. Patches can be natural or unnatural. The minimum size for most patches to be counted is 32 square feet (3 square meters). Riverine wetlands are classified as confined or non-confined, based on the ratio of valley width to channel bankfull width. A confined riverine system may support up to 12 patch types while a non-confined riverine system can support up to 17 patch types.

5.4.2 Metric 2: Topographic Complexity

Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical features and elevation gradients that affect moisture gradients or that influence the path of flowing water. This metric is scored for wadeable streams by taking a cross-sectional drawing at three points (upstream, middle, and downstream) in the AA. A critical determining feature when scoring this metric is how many benches a cross-section has. This is important because water flowing over these surfaces will have different hydraulic dynamics compared to water flowing in the active channel, typically having reduced velocity and shear stress. The effect of each bench is an increase in the range of complex velocity dynamics in the stream cross-section and an increase in the range of moisture gradients and thus habitat complexity. Examples of other topographic features that may influence habitat complexity include pools, runs, glides, pits, ponds, sediment mounds, bars, debris jams, cobble, boulders, slump blocks, tree-fall holes, and plant hummocks.

5.5 Attribute 4: Biotic Structure

5.5.1 Metric 1: Plant Community Metric

The plant community metric is composed of three submetrics: number of plant layers, number of co-dominant plant species, and percent invasion. A thorough reconnaissance of an AA is required to assess these submetrics.

5.5.1.1 Submetric 1: Number of Plant Layers Present

The more plant layers present in an AA the higher the CRAM score. Plant layers are divided into five categories or layers based on height: floating, short, medium, tall and very tall. To be counted in CRAM, a layer must cover at least 5% of the portion of the AA that is suitable for the layer. For instance, the aquatic layer called "floating" would be expected in the channel of the riverine systems, and would be judged as present if 5% of the channel area of the AA had floating vegetation. The "short," "medium," and "tall" layers might be found throughout the non-aquatic and aquatic areas of the AA, except in areas of exposed bedrock, deep water, or active point bars denuded of vegetation, etc. The "very tall" layer is usually exposed to occur along the backshore, but may occupy most of the riparian area in some locations.

5.5.1.2 Submetric 2: Number of Co-Dominant Species

All living plant species that compose at least 10% relative cover within each plant layer are considered dominant species. Although species may and often do occur as dominant species in multiple layers, an individual species is only counted once for the total number of co-dominants.

5.5.1.3 Submetric 3: Percent Invasion

Invasive plants often outcompete native species and can proliferate on a site creating a monoculture. Native plants and animals have adapted and evolved with native plant species, and can lose breeding, foraging, nesting, and shelter habitat and symbiotic relationships when invasive species are present in large numbers. CRAM measures the number of invasive species through a comparison of the number of invasive co-dominant species for all plant layers to the number of non-invasive co-dominant species for all plant layers.

5.6 Metric 2: Horizontal Interspersion

This metric is a measure of horizontal biotic structure, which refers to the variety and interspersion of plant "zones." Plant zones are often plant monocultures or obvious multispecies associations that are arrayed along gradients of elevation, moisture, or other environmental factors that seem to affect the plant community organization in a two-dimensional plan view. Interspersion is essentially a measure of the number of distinct plant zones and the amount of edge between them. Each zone must comprise 5% or more of the AA. An approximate drawing of interspersion observed at each AA can be found in the corresponding datasheets (Attachment 3).

5.7 Metric 3: Vertical Biotic Structure

The vertical component of biotic structure assesses the degree of overlap among plant layers. The same plant layers used to assess the plant community composition metrics are used to assess vertical biotic structure. To be counted in CRAM, a layer must cover at least 5% of the portion of the AA that is suitable for the layer.

6.0 Results

The completed CRAM datasheets are included as Attachment 3, the AA photos as Attachment 2 and the CRAM figure is in Attachment 1. The results below represent the assessment of CRAM metrics and submetrics based on ambient conditions observed during the field visit. Each AA was identified and scored separately. A single metric score was assigned to each AA based on the general observations made throughout the AA. The following discussion includes comments on the current conditions of each AA relative to each metric. The attribute score and total CRAM score are also discussed. It is important to note that the overall CRAM score is often less informative than the metric and attribute scores when considering potential for improvement from restoration.

As described above, the metric condition level ranges from “A” to “D,” with “A” representing the best case achievable throughout California and “D” representing the worst-case scenario. Each metric condition level (letter rating) has a fixed numerical value, which, when combined with the other metrics, results in a score for each attribute (Table 1). The final CRAM score is the average of the four final attribute scores, which is then converted to the percentage of the maximum score achievable, ranging from 25 to 100%.

Table 1. CRAM Metric, Submetric, Attribute, and Overall Scores

Attributes	CRAM Metric and Submetrics	AA1	AA2	AA3
Buffer and Landscape Context	Stream Corridor Continuity	A (12)	A (12)	A (12)
	Buffer Submetric A: Percent of Assessment Area with Buffer	A (12)	A (12)	A (12)
	Buffer Submetric D: Average Buffer Width	A (12)	A (12)	C (6)
	Buffer Submetric C: Buffer Condition	C (6)	B (9)	C (6)
	Final Attribute Score	**85%**	**93.3%**	**79.6%**
Hydrology	Water Source	C (6)	C (6)	C (6)
	Channel Stability	C (6)	B (9)	B (9)
	Hydrologic Connectivity	D (3)	A (12)	A (12)
	Final Attribute Score	**41.7%**	**75%**	**75%**
Physical Structure	Structural Patch Richness	C (6)	C (6)	C (6)
	Topographic Complexity	C (6)	B (9)	B (9)
	Final Attribute Score	**50%**	**62.5%**	**62.5%**
Biotic Structure	*Plant Community (PC) Submetric A: Number of Plant Layers*	B (9)	A (12)	B (9)
	PC Submetric B: Number of Co-dominant Species	D (3)	C (6)	D (3)
	PC Submetric C: Percent Invasion	A (12)	B (9)	A (12)
	Horizontal Interspersion	C (6)	B (9)	C (6)
	Vertical Biotic Structure	C (6)	B (9)	C (6)
	Final Attribute Score	**55.6%**	**75%**	**55.6%**
	Overall AA Score	58%	76.5%	68%

6.1 AA1

AA1 is located within the northern drainage channel at the project (Figure 2-AA1). The channel receives flows from what appears to be a culvert at the upstream end as well as overflows via a spillway from Evan's Lake. The AA received an overall attribute score of 85% for the Buffer and Landscape Context attribute. The Stream Corridor Continuity metric received an A with 164 feet (50 meters) of non-buffer segment upstream (Dexter Drive) from the AA and no breaks downstream. The submetric Percent of AA with Buffer received an A with 100% of the AA containing buffer. The average buffer width came to 787 feet (240 meters) and thus received an A. The buffer condition submetric received a C due to moderate human impact (homeless encampments) and soil disturbance and mowing of the buffer on the northern side.

The final Hydrology attribute score came to 41.7%. The Water Source metric scored a C because freshwater sources that affect dry season conditions of the AA are primarily urban runoff from the surrounding urban and residential areas within the drainage basin. The Channel Stability metric received a C with signs of severe incision/vertical banks in some places and the channel trending towards degradation. Due to the lake and development upstream it's likely sediment transport processes have been reduced and hydrology inputs have increased. The Hydrologic Connectivity metric received a D because the average entrenchment ratio was 1.21.

The AA received a final Physical Structure attribute score of 50%. Within this, the Structural Patch Richness metric received a C, exhibiting seven total patch types. Topographic Complexity received a C with the cross sections having no benches and some microtopography.

The Biotic Structure attribute received a final score of 55.6%. The Number of Plant Layers submetric received an B, with medium, tall, and very tall layers. The Number of Co-Dominant Species submetric received a D because the AA had four total co-dominant species. Of these species, 0% are considered invasive and thus the AA received an A for the Percent Invasion submetric. Horizontal Interspersion received a C with three assigned zones that had a low degree of plan-view interspersion. Vertical Biotic Structure received a C because 25% to 50% of the vegetated AA supported at least moderate overlap of two plant layers.

6.2 AA2

AA2 is located within the southern drainage channel at the project (Figure 2-AA2). The channel receives flows through a culvert from a riser spillway in Evan's Lake. Water was flowing into the channel at the time of the CRAM assessment. The AA received an overall attribute score of 93.3% for the Buffer and Landscape Context attribute. The Stream Corridor Continuity metric received an A with 164 feet (50 meters) of non-buffer segment upstream (Dexter Drive) from the AA and no breaks downstream. The submetric Percent of AA with Buffer received an A with 100% of the AA containing buffer. The average buffer width came to 768 feet (234 meters) and thus received an A. The buffer condition submetric received a B due to light/moderate human impact (homeless encampments) and soil disturbance and approximately 50% non-native vegetation, primarily on the far northern side.

The final Hydrology attribute score came to 75%. The Water Source metric scored a C because freshwater sources that affect dry season conditions of the AA are primarily urban runoff from the surrounding urban and residential areas within the drainage basin. The Channel Stability metric received a B with primarily signs of channel equilibrium. The Hydrologic Connectivity metric received a A because the average entrenchment ratio was 2.25.

The AA received a final Physical Structure attribute score of 62.5%. Within this, the Structural Patch Richness metric received a C, exhibiting six total patch types. Topographic Complexity received a B with the cross sections showing one bench in several areas with microtopography.

The Biotic Structure attribute received a final score of 75%. The Number of Plant Layers submetric received an A, with short, medium, tall, and very tall layers. The Number of Co-Dominant Species submetric received a C because the AA had six total co-dominant species. Of these species, 17% are considered invasive and thus the AA received an B for the Percent Invasion submetric. Horizontal Interspersion received a B with four assigned zones that had a moderate degree of plan-view interspersion. Vertical Biotic Structure received a B because more than 50% of the AA supported at least moderate overlap of two plant layers.

6.3 AA3

AA3 is located in a channel towards the western end of the project and is downstream of the confluence of the channels associated with AA1 and AA2 (Figure 2-AA3). The AA received an overall attribute score of 79.6% for the Buffer and Landscape Context attribute. The Stream Corridor Continuity metric received an A with 0 feet of non-buffer segment upstream and 295 feet (90 meters) of non-buffer downstream. The submetric Percent of AA with Buffer received an A with 100% of the AA containing buffer. The average buffer width came to 236 feet (72 meters) and thus received a C. The buffer condition submetric received a C due to heavy human impact (homeless encampments) and soil disturbance and approximately 50% non-native vegetation.

The final Hydrology attribute score came to 75%. The Water Source metric scored a C because freshwater sources that affect dry season conditions of the AA are primarily urban runoff from the surrounding urban and residential areas within the drainage basin. The Channel Stability metric received a B with signs of channel equilibrium but also some degradation. The Hydrologic Connectivity metric received an A because the average entrenchment ratio was 4.53.

The AA received a final Physical Structure attribute score of 62.5%. Within this, the Structural Patch Richness metric received a C, exhibiting eight total patch types. Topographic Complexity received a B with the cross sections showing one bench with microtopography.

The Biotic Structure attribute received a final score of 55.6%. The Number of Plant Layers submetric received an B, with medium, tall, and very tall layers. The Number of Co-Dominant Species submetric received a D because the AA had four total co-dominant species. Of these species, 0% are considered invasive and thus the AA received an A for the Percent Invasion submetric. Horizontal Interspersion received a C with four assigned zones that had a low degree of plan-view interspersion. Vertical Biotic Structure received a C because 25-50% of the AA supported at least moderate overlap of two plant layers.

7.0 Conclusion

The information and results presented herein document the investigation, best professional judgment, and conclusions of ICF. It is correct and complete to the best of our knowledge. These CRAM assessments were used as a baseline survey as a means of evaluating restoration opportunities and potential impacts, and for long-term monitoring of restoration success.

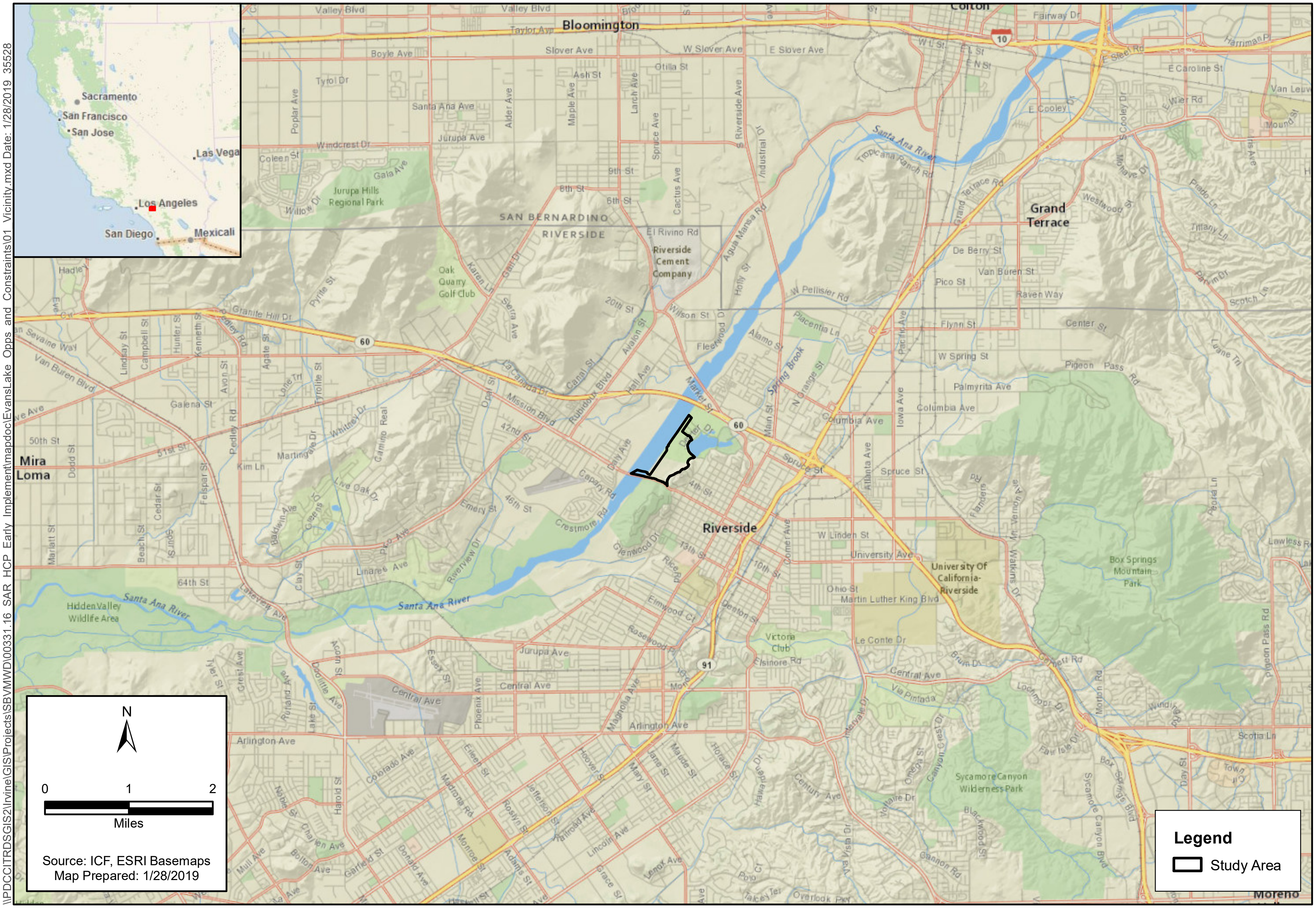
8.0 References

California Wetlands Monitoring Workgroup (CWMW). 2013a. California Rapid Assessment Method (CRAM) for Wetlands. *User's Manual*, Version 6.1. pp. 67.

California Wetlands Monitoring Workgroup (CWMW). 2013b. California Rapid Assessment Method (CRAM) for Wetlands. *Riverine Wetlands Field* Book, Version 6.1.

Attachment 1
Figures

\\PDCC\TRDS\GIS2\Irvine\GIS\Projects\SBVMWD\00331.16 SAR HCP Early Implement\mapdoc\EvansLake Opps and Constraints\01 Vicinity.mxd Date: 1/28/2019 35528



Source: ICF, ESRI Basemaps
Map Prepared: 1/28/2019

Figure 1
Project Vicinity
Evan's Lake Restoration Site

Source: ICF 2017

\\PDCCITRDSGIS2\Irvine\GIS\Projects\SBVMWD\00331.16_SAR_HCP_Early_Implement\mapdoc\CRAM\EvansLake_CRAM_Aug2018.mxd 9/13/2018 35528

ICF

Figure 2-AA1
Evan's Lake CRAM Results
Early Implementation for the Upper Santa Ana River Habitat Conservation Plan

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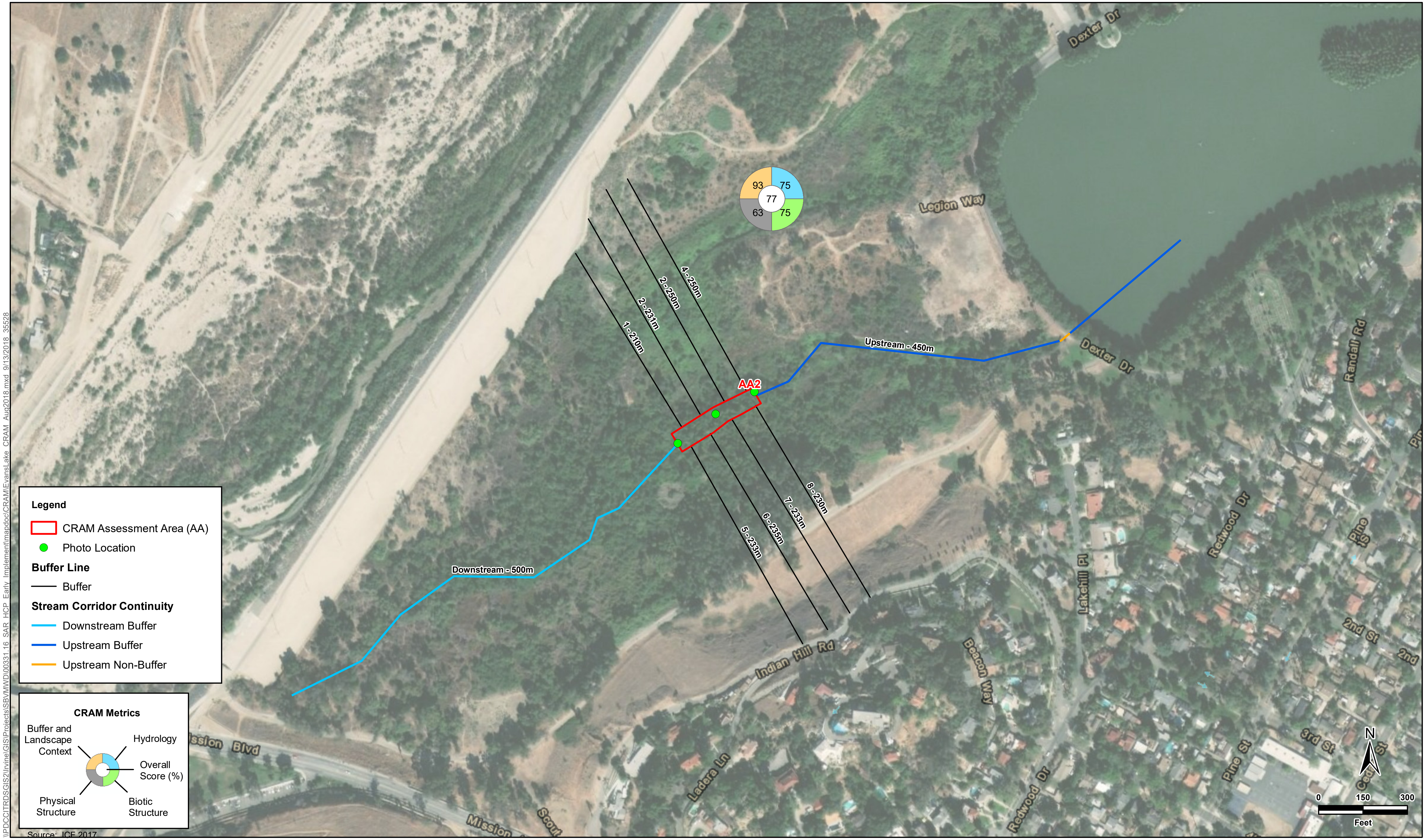

Source: ICF 2017

ICF

Figure 2-AA2
Evan's Lake CRAM Results
Early Implementation for the Upper Santa Ana River Habitat Conservation Plan

Source: ICF 2017

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Figure 2-AA3
Evan's Lake CRAM Results
Early Implementation for the Upper Santa Ana River Habitat Conservation Plan

Attachment 2

Photo Log

AA1. August 1, 2018. Upstream end of AA looking downstream.

AA1. August 1, 2018. Middle of AA looking upstream.

AA1. August 1, 2018. Middle of AA looking downstream.

AA1. August 1, 2018. Downstream end of AA looking upstream.

AA2. August 1, 2018. Upstream end of AA looking downstream.

AA2. August 1, 2018. Middle of AA looking upstream.


AA2. August 1, 2018. Middle of AA looking downstream.


AA2. August 1, 2018. Downstream end of AA looking upstream.

AA3. August 1, 2018. Upstream end of AA looking downstream.

AA3. August 1, 2018. Middle of AA looking downstream.

AA3. August 1, 2018. Middle of AA looking upstream.

AA3. August 1, 2018. Downstream end of AA looking upstream

Attachment 3
CRAM Data Forms

Basic Information Sheet: Riverine Wetlands

Assessment Area Name:

Project Name: EVAN'S LAKE

Assessment Area ID #: AA 1

Project ID #:

Date: 8/2/18

Assessment Team Members for This AA:

R J VAN SANT, MARISSA MAGGIO

Average Bankfull Width: 4,83

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100m

Upstream Point Latitude: 33,9953308 **Longitude:** -117.38414609

Downstream Point Latitude: 33.99502489 **Longitude:** -117.38520353

Wetland Sub-type:

Confined [✓ Non-confined]

AA Category:

Restoration [✓ Mitigation] Impacted Ambient Reference Training

Other: BASELINE

Did the river/stream have flowing water at the time of the assessment? yes [✓ no]

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

perennial [✓ intermittent] ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		Upstream	33.99533308	-117.3841609	
2		Middle Left	33.9952	-117.3846	
3		Middle Right	↓	↓	
4		Downstream	33.99502489	-117.38520353	
5					
6					
7					
8					
9					
10					

Site Location Description:

AA LOCATED IN NORTHEN CHANNEL OF SITE (SPILLWAY CHANNEL)
~ IN MIDDLE OF CHANNEL REACH

Comments:

Scoring Sheet: Riverine Wetlands

AA Name: AA 1			**Date:** 8/2/18
Attribute 1: Buffer and Landscape Context (pp. 11-19)			**Comments**
	Alpha.	Numeric	
Stream Corridor Continuity (D)	A	12	ROAD/CONCRETE SPILLWAY AT US END
Buffer:			
	Alpha.	Numeric	
Buffer submetric A: Percent of AA with Buffer	A	12	
Buffer submetric B: Average Buffer Width	A	12	
Buffer submetric C: Buffer Condition	C	6	mod human impact, soil disturbance from mowing at least 50% NN veg
Raw Attribute Score = D+[C x (A x B)½]½		20.5	**Final Attribute Score = (Raw Score/24) x 100** 85
Attribute 2: Hydrology (pp. 20-26)			
	Alpha.	Numeric	HIGHLY DEVELOPED/URBANIZED UPSTREAM.
Water Source	C	6	ARTIFICIAL FLOWS FROM LAKE DURING DRY SEASON
Channel Stability	C	6	MOD./SEVERE INCISION
Hydrologic Connectivity	D	3	obvious entrenchment. 5-6 FT VERTICAL BANKS IN SOME SPOTS
Raw Attribute Score = sum of numeric scores		15	**Final Attribute Score = (Raw Score/36) x 100** 41.7
Attribute 3: Physical Structure (pp. 27-33)			
	Alpha.	Numeric	
Structural Patch Richness	C	6	
Topographic Complexity	C	6	NO BENCHES, SOME MICRO TOPO
Raw Attribute Score = sum of numeric scores		12	**Final Attribute Score = (Raw Score/24) x 100** 50
Attribute 4: Biotic Structure (pp. 34-41)			
Plant Community Composition (based on sub-metrics A-C)			
	Alpha.	Numeric	VITUS GIRDINIA DOMINATING
Plant Community submetric A: Number of plant layers	B	9	SOME AREAS. GROWING OVER ALL VEG.
Plant Community submetric B: Number of Co-dominant species	D	3	
Plant Community submetric C: Percent Invasion	A	12	
Plant Community Composition Metric *(numeric average of submetrics A-C)*		8	
Horizontal Interspersion	C	6	
Vertical Biotic Structure	C	6	
Raw Attribute Score = sum of numeric scores		20	**Final Attribute Score = (Raw Score/36) x 100** 55.6
Overall AA Score (average of four final Attribute Scores)			58

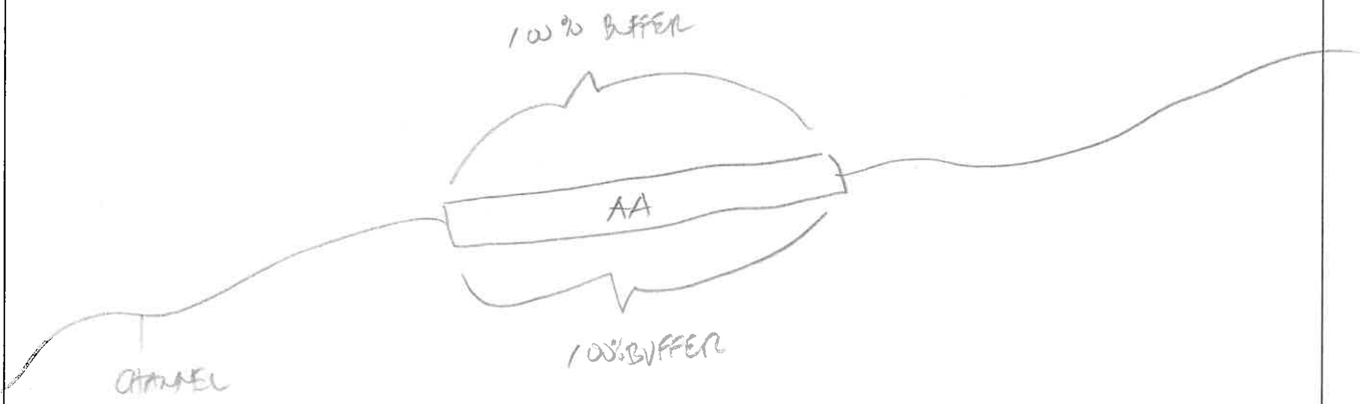
Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

ROAD + CULVERT

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	25	1	
2	25	2	
3		3	
4		4	
5		5	
Upstream Total Length	50	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.



SEE AERIAL

Percent of AA with Buffer: 100 %

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	201
B	221
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width *Round to the nearest integer*	240

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	**Field Indicators (check all existing conditions)**
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA.
	☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it.
	☑ There is leaf litter, thatch, or wrack in most pools (if pools are present).
	☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area.
	☐ There is little or no active undercutting or burial of riparian vegetation.
	☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation.
	☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar).
	☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA
	☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☑ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs.
	☐ There are abundant bank slides or slumps.
	☐ The lower banks are uniformly scoured and not vegetated.
	☑ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel.
	☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation.
	☐ The channel bed appears scoured to bedrock or dense clay.
	☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided).
	☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year.
	☐ There are partially buried living tree trunks or shrubs along the banks.
	☐ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced.
	☐ There are partially buried, or sediment-choked, culverts.
	☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour.
	☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	**Equilibrium** [✓ **Degradation**] **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

3.7
.40
.80

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	5.1	3.7	5.7
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	.7	.4	.51
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	1.4	.8	1.02
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	5.8	4.5	7.2
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.14	1.22	1.26
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.21

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

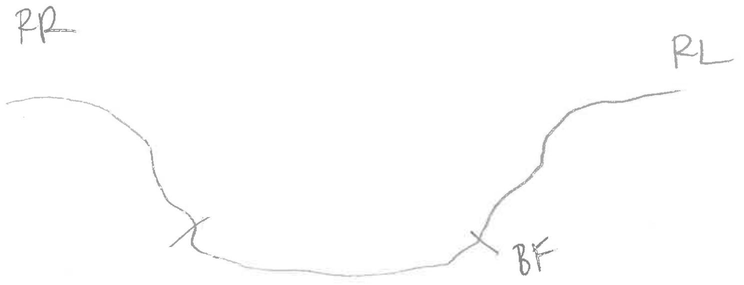
STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	[✓ 1]	1
Bank slumps or undercut banks in channels or along shoreline	[✓ 1]	1
Cobbles and/or Boulders	1	1
Debris jams	[✓ 1]	1
Filamentous macroalgae or algal mats	1	1
Large woody debris	[✓ 1]	1
Pannes or pools on floodplain	1	N/A
Plant hummocks and/or sediment mounds	1	1
Point bars and in-channel bars	1	1
Pools or depressions in channels (wet or dry channels)	[✓ 1]	1
Riffles or rapids (wet or dry channels)	1	1
Secondary channels on floodplains or along shorelines	1	N/A
Standing snags (at least 3 m tall)	[✓ 1]	1
Submerged vegetation	1	N/A
Swales on floodplain or along shoreline	1	N/A
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	[✓ 1]	1
Vegetated islands (mostly above high-water)	1	N/A
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)	7	

Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1

Profile 2



Profile 3

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

Special Note:

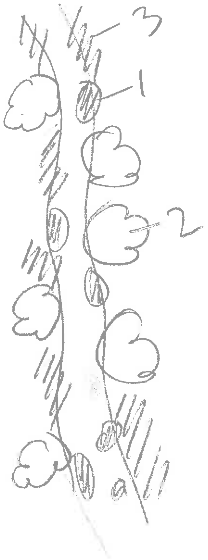
** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	**Invasive?**	**Short (<0.5 m)**	**Invasive?**
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
CYPERUS ERAGROSTIS	N	Salix laev.	N
VITUS GIRDINIA	N	VITUS GIRDINIA	N

Very Tall (>3.0 m)	**Invasive?**		
Salix laev.	N	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	4
VITUS GIRDINIA	N		
WASHINGTONIA ROB.	N	**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	0

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1) CAREX

2) WILLOWS

3) VITUS

4)

5)

6)

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	[✓ Yes]	No		
If yes, was it a flood, fire, landslide, or other?	flood	[✓ fire]	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	[✓ likely to affect site next 1-2 years]	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

FIRE IN ~OCT 2015. MOST VEG HAS GROWN BACK. UNSURE IF FIRE CHANGED VEG COMMUNITY

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		X
Flow diversions or unnatural inflows		X
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		X
Comments SITE PRIMARILY FED BY URBAN RUNOFF. ALTERED HYDROLOGY.		
↑ DRY SEASON FLOWS		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**	X	
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		X
Nutrient impaired (PS or Non-PS pollution)		?
Heavy metal impaired (PS or Non-PS pollution)		?
Pesticides or trace organics impaired (PS or Non-PS pollution)		?
Bacteria and pathogens impaired (PS or Non-PS pollution)		?
Trash or refuse		X
Comments MOD./HEAVY HOMELESS USE. TRASH/REFUSE PRESENT. LIKELY H_2O		
QUALITY IMPAIREMENTS DUE TO HEAVILY URBANIZED SETTING + LAKE UPSTREAM		
W/ FISHING SIGNS WARNING OF CONSUMING FISH		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		X
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)	LIKELY	
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		X

Comments

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		X
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		X
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		X
Passive recreation (bird-watching, hiking, etc.)	X	
Active recreation (off-road vehicles, mountain biking, hunting, fishing)	X	
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		

Comments SITE SURROUNDED BY RESIDENTIAL TO SE+E. PARK TO E.
NATURAL RIVER ON N+W SIDES. LAKE EVANS TO E

AA1 buffer width

USDA FSA | City of Riverside, County of Riverside, Esri, HERE, Garmin, iPC

Basic Information Sheet: Riverine Wetlands

Assessment Area Name:

Project Name: EVAN'S LAKE

Assessment Area ID #: AA2

Project ID #:

Date: 8/2/2018

Assessment Team Members for This AA:

RJ VAN SANT, MARISSA MAGGIO

Average Bankfull Width: 15.4 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100m

Upstream Point Latitude: 33.99358053 **Longitude:** -117.38507506

Downstream Point Latitude: 33.99310822 **Longitude:** -117.38593207

Wetland Sub-type:

Confined [✓ Non-confined]

AA Category:

Restoration [✓ Mitigation] Impacted Ambient Reference Training

Other: BASELINE

Did the river/stream have flowing water at the time of the assessment? [✓ yes] no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

[✓ perennial] intermittent ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		Upstream	33.99358053	-117.38567506	
2		Middle Left	33.99337760	-117.38550724	
3		Middle Right	"	"	
4		Downstream	33.99310822	-117.38593207	
5					
6					
7					
8					
9					
10					

Site Location Description:

AA LOCATED IN LOW-FLOW CHANNEL ~ MID-WAY B/T LAKE AND SA RIVER LEVEE

Comments:

Scoring Sheet: Riverine Wetlands

AA Name:				**Date:**
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**
	Alpha.	Numeric		
Stream Corridor Continuity (D)	A	12		ROAD + CULVERT AT US END
Buffer:				
	Alpha.	Numeric		
Buffer submetric A: *Percent of AA with Buffer*	A	12		
Buffer submetric B: *Average Buffer Width*	A	12		
Buffer submetric C: *Buffer Condition*	B	9		human visitation (homeless encampents) but less than other areas, 50% NN veg
Raw Attribute Score = D+[C x (A x B)½]½			22.4	**Final Attribute Score = (Raw Score/24) x 100** 93.3
Attribute 2: Hydrology (pp. 20-26)				
	Alpha.	Numeric		
Water Source	C	6		HIGHLY DEVELOPED/URBANIZED UPSTREAM ARTIFICIAL FLOWS FROM LAKE DURING DRY SEASON
Channel Stability	B	9		STABLE CHANNEL
Hydrologic Connectivity	A	12		2.75
Raw Attribute Score = sum of numeric scores			27	**Final Attribute Score = (Raw Score/36) x 100** 75
Attribute 3: Physical Structure (pp. 27-33)				
	Alpha.	Numeric		
Structural Patch Richness	C	6		
Topographic Complexity	B	9		
Raw Attribute Score = sum of numeric scores			15	**Final Attribute Score = (Raw Score/24) x 100** 62.5
Attribute 4: Biotic Structure (pp. 34-41)				
Plant Community Composition (based on sub-metrics A-C)				
	Alpha.	Numeric		VITUS GIRDIANA DOMINATING
Plant Community submetric A: *Number of plant layers*	A	12		SOME AREAS, GROWING OVER MOST VEG.
Plant Community submetric B: *Number of Co-dominant species*	C	6		
Plant Community submetric C: *Percent Invasion*	B	9		
Plant Community Composition Metric *(numeric average of submetrics A-C)*			9	
Horizontal Interspersion	B	9		
Vertical Biotic Structure	B	9		
Raw Attribute Score = sum of numeric scores			27	**Final Attribute Score = (Raw Score/36) x 100** 75
Overall AA Score (average of four final Attribute Scores)				76.5

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

ROAD+ CULVERT

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		**Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA**	
Segment No.	Length (m)	Segment No.	Length (m)
1	25	1	
2	25	2	
3		3	
4		4	
5		5	
Upstream Total Length	50	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

SEE AERIAL

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	**Buffer Width (m)**
A	210
B	231
C	250
D	250
E	233
F	235
G	233
H	230
Average Buffer Width ***Round to the nearest integer***	234

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☐ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	[✓ **Equilibrium**] **Degradation** **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet 6.7

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	6.5 m	20.4	19.4
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	.52	.5	.5
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	1.04	1	1
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	20.2	37	35.6
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	3.11	1.81	1.83
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			2.25

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	[✓ **1**]	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	[✓ **1**]	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	[✓ **1**]	**1**
Pannes or pools on floodplain	[✓ **1**]	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	[✓ **1**]	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	[✓ **1**]	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)	6	

Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

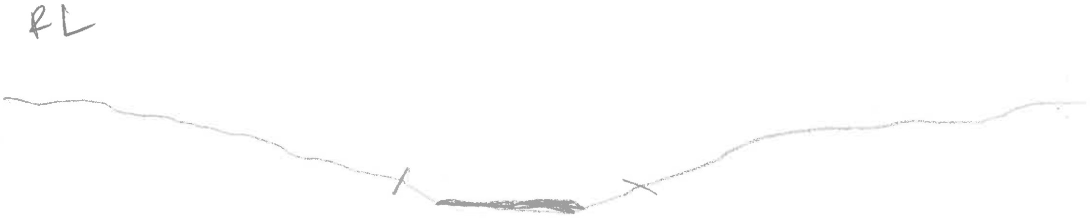
Profile 1 US

Profile 2

MID

Profile 3

lower



Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands

(A dominant species represents ≥10% *relative* cover)

Special Note:

* *Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		Vitus Girdina	N

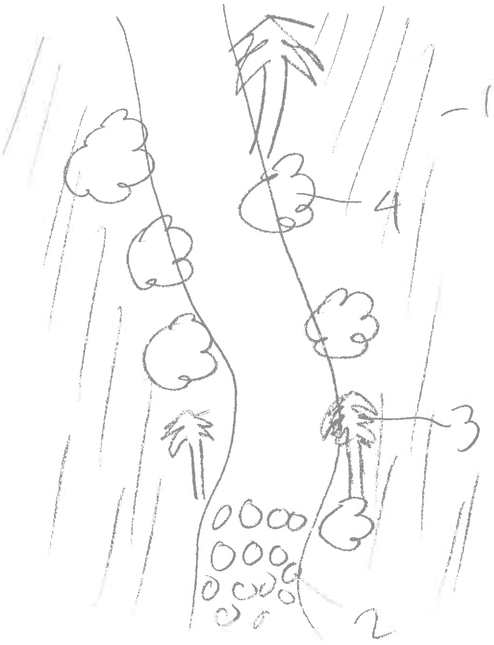
Medium (0.5-1.5 m)	Invasive?	Tall (1.5-3.0 m)	Invasive?
Vitus GIRDINIA	N	CIRSIUM VULGARE	Y
Carex ERAGROSTIS	N	VITUS GIRDINIA	N
erigeron can.	N		
CIRSIUM VULGARE	Y		

Very Tall (>3.0 m)	Invasive?
washingtonia rob	N
fraxinus sp.	N

Total number of co-dominant species for all layers combined (enter here and use in Table 18)	6
Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	17%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.

	**Assigned zones:** 1) VITUS, THISTLE, ERIGERON 2) CAREX, PERSCARIA 3) PALM 4) WILLOW 5) 6)

Worksheet for Wetland disturbances and conversions

<table>
<tr><td>Has a major disturbance occurred at this wetland?</td><td>[✓ Yes]</td><td colspan="2">No</td><td></td><td></td></tr>
<tr><td>If yes, was it a flood, fire, landslide, or other?</td><td>flood</td><td colspan="2">[✓ fire]</td><td>landslide</td><td>other</td></tr>
<tr><td>If yes, then how severe is the disturbance?</td><td>likely to affect site next 5 or more years</td><td colspan="2">likely to affect site next 3-5 years</td><td colspan="2">[✓ likely to affect site next 1-2 years]</td></tr>
<tr><td rowspan="4">Has this wetland been converted from another type? If yes, then what was the previous type?</td><td>depressional</td><td colspan="2">vernal pool</td><td colspan="2">vernal pool system</td></tr>
<tr><td>non-confined riverine</td><td colspan="2">confined riverine</td><td colspan="2">seasonal estuarine</td></tr>
<tr><td>perennial saline estuarine</td><td colspan="2">perennial non-saline estuarine</td><td colspan="2">wet meadow</td></tr>
<tr><td>lacustrine</td><td colspan="2">seep or spring</td><td colspan="2">playa</td></tr>
</table>

FIRE IN ~OCT 2015. MOST VEG HAS GROWN BACK. UNSURE IF FIRE CHANGED VEG COMMUNITY

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	**Present**	**Significant negative effect on AA**
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		X
Flow diversions or unnatural inflows		X
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		X

Comments SITE PRIMARILY FED BY URBAN RUNOFF. ALTERED HYDROLOGY

↑ DRY SEASON FLOWS

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	**Present**	**Significant negative effect on AA**
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		X
Nutrient impaired (PS or Non-PS pollution)		?
Heavy metal impaired (PS or Non-PS pollution)		?
Pesticides or trace organics impaired (PS or Non-PS pollution)		?
Bacteria and pathogens impaired (PS or Non-PS pollution)		?
Trash or refuse		X

Comments SOME HOMELESS USE. SOME TRASH, LIKELY H_2O QUALITY

IMPAIREMENTS DUE TO HEAVILY URBANIZED SETTING + LAKE UPSTREAM

W/ FISHING SIGNS WARNING OF CONSUMING FISH.

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		X
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)	LIKELY	
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		X
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		X
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		X
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		X
Passive recreation (bird-watching, hiking, etc.)	X	
Active recreation (off-road vehicles, mountain biking, hunting, fishing)	X	
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments SITE SURROUNDED RESIDENTIAL DEV. TO E + SE. PARK TO E.		
NATURAL RIVER ON N + W SIDES. LAKE EVANS TO E.		

AA2 buffer width

USDA FSA | City of Riverside, County of Riverside, Esri, HERE, Garmin, iPC

Basic Information Sheet: Riverine Wetlands

Assessment Area Name:

Project Name: EVAN'S LAKE

Assessment Area ID #: AA 3

Project ID #: **Date:** 8/1/18

Assessment Team Members for This AA:

RJ VAN SANT, MARISSA MAGGIO

Average Bankfull Width: 7.2m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100m

Upstream Point Latitude: 33.99129105 **Longitude:** -117.38935124

Downstream Point Latitude: 33.99080293 **Longitude:** -117.39024308

Wetland Sub-type:

Confined [✓ Non-confined]

AA Category:

Restoration [✓ Mitigation] Impacted Ambient Reference Training

Other: BASELINE

Did the river/stream have flowing water at the time of the assessment? yes [✓ no]

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

perennial intermittent [✓ ephemeral]

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		Upstream	33.99129105	-117.38935124	
2		Middle Left	33.99089690	-117.38999896	
3		Middle Right	"	"	
4		Downstream	33.99080293	-117.39024308	
5					
6					
7					
8					
9					
10					

Site Location Description:

AA LOCATED AT THE SW END OF SITE JUST UPSTREAM OF CULVERTS THAT CROSS UNDER SA RIVER BIKE TRAIL.

Comments:

Scoring Sheet: Riverine Wetlands

AA Name: AA3			**Date:** 8/1/2018
Attribute 1: Buffer and Landscape Context (pp. 11-19)			**Comments**
	Alpha.	Numeric	
Stream Corridor Continuity (D)	A	12	
Buffer:			
	Alpha.	Numeric	
Buffer submetric A: *Percent of AA with Buffer*	A	12	
Buffer submetric B: *Average Buffer Width*	C	6	
Buffer submetric C: *Buffer Condition*	C	6	50% NN veg, but lots of impact from human visitation
Raw Attribute Score = D+[C x (A x B)½]½		19.1	**Final Attribute Score = (Raw Score/24) x 100** 79.6

Attribute 2: Hydrology (pp. 20-26)			
	Alpha.	Numeric	
Water Source	C	6	HIGHLY URBANIZED UPSTREAM. ARTIFICIAL DRY SEASON FLOWS FROM LAKE EVANS
Channel Stability	B	9	MINOR INCISION
Hydrologic Connectivity	A	12	FLOODPLAIN ENGAGED
Raw Attribute Score = sum of numeric scores		27	**Final Attribute Score = (Raw Score/36) x 100** 75

Attribute 3: Physical Structure (pp. 27-33)			
	Alpha.	Numeric	
Structural Patch Richness	C	6	
Topographic Complexity	B	9	
Raw Attribute Score = sum of numeric scores		15	**Final Attribute Score = (Raw Score/24) x 100** 62.5

Attribute 4: Biotic Structure (pp. 34-41)			
Plant Community Composition (based on sub-metrics A-C)			
	Alpha.	Numeric	
Plant Community submetric A: *Number of plant layers*	B	9	
Plant Community submetric B: *Number of Co-dominant species*	D	3	
Plant Community submetric C: *Percent Invasion*	A	12	
Plant Community Composition Metric *(numeric average of submetrics A-C)*		8	
Horizontal Interspersion	C	6	
Vertical Biotic Structure	C	6	
Raw Attribute Score = sum of numeric scores		20	**Final Attribute Score = (Raw Score/36) x 100** 55.6
Overall AA Score (average of four final Attribute Scores)			68

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1		1	45
2		2	45
3		3	
4		4	
5		5	
Upstream Total Length	0	Downstream Total Length	90

CULVERT + SA RIVER
LEVEE

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

SEE AERIAL

Percent of AA with Buffer: 100 %

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	15
B	27
C	46
D	60
E	63
F	86
G	120
H	160
Average Buffer Width ***Round to the nearest integer***	72

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	**Field Indicators (check all existing conditions)**
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA.
	☑ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it.
	☐ There is leaf litter, thatch, or wrack in most pools (if pools are present).
	☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area.
	☐ There is little or no active undercutting or burial of riparian vegetation.
	☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation.
	☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar).
	☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA
	☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs.
	☐ There are abundant bank slides or slumps.
	☑ The lower banks are uniformly scoured and not vegetated.
	☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel.
	☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation.
	☐ The channel bed appears scoured to bedrock or dense clay.
	☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided).
	☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year.
	☐ There are partially buried living tree trunks or shrubs along the banks.
	☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced.
	☐ There are partially buried, or sediment-choked, culverts.
	☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour.
	☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	[✓ **Equilibrium**] **Degradation** **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	12.2	4.2	5.3
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	.34	.43	.39
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	.68	.86	.78
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	19.2	13	47.4
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.57	3.09	8.94
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			4.53

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at* www.cramwetlands.org *for photos of each of the following patch types.*

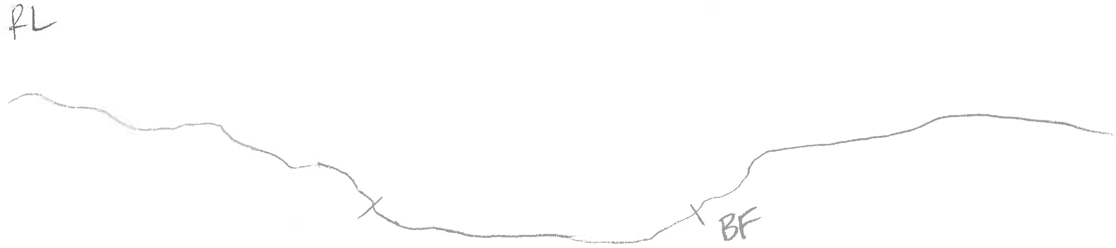
STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**$3\ m^2$**	**$3\ m^2$**
Abundant wrackline or organic debris in channel, on floodplain	[✓ 1]	**1**
Bank slumps or undercut banks in channels or along shoreline	[✓ 1]	**1**
Cobbles and/or Boulders	[✓ 1]	**1**
Debris jams	[✓ 1]	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	[✓ 1]	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	[✓ 1]	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	[✓ 1]	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	[✓ 1]	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)	8	

Worksheet for AA Topographic Complexity

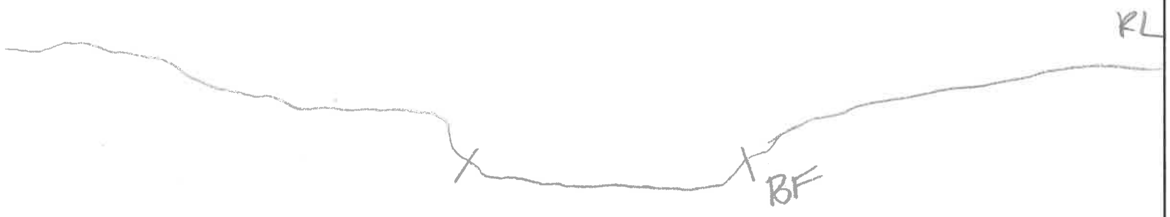
At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1 US.

Profile 2 MID



Profile 3 DS.



Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands

(A dominant species represents ≥10% *relative* cover)

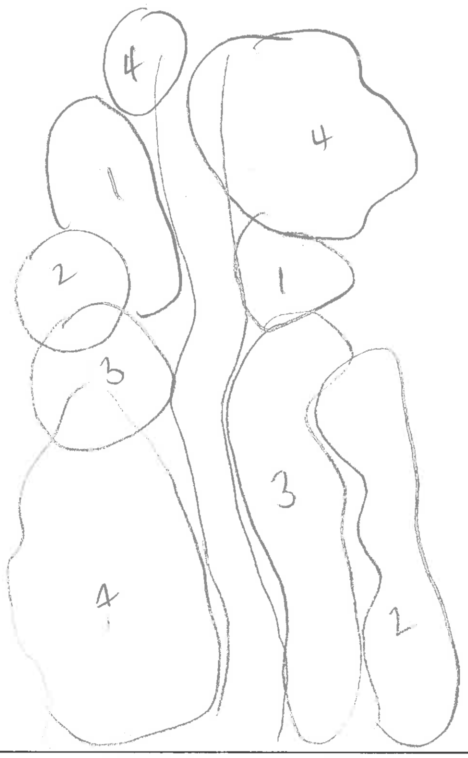
Special Note:

* *Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	**Invasive?**	**Short (<0.5 m)**	**Invasive?**
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
Vitus cal.	N	Vitus cal	N
		Fraxinus	N
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	4
Salix laev.	N		
frayinus	N	**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	0%
Eucalyptus sp.	N		

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1) grape
2) Eucalyptus
3) Ash
4) black willow
5)
6)

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	[✓ Yes]	No		
If yes, was it a flood, fire, landslide, or other?	flood	[✓ fire]	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	[✓ likely to affect site next 1-2 years]	
Has this wetland been converted from another type? If yes, then what was the previous type? No	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

FIRE IN ~ OCT 2015. MOST VEG GROWN BACK. UNSURE IF FIRE CHANGED VEG COMMUNITY

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		X
Flow diversions or unnatural inflows		X
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)	X	
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		X
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		X

Comments SITE IS PRIMARILY FED BY URBAN RUNOFF / FLOWS FROM LAKE WHICH
ARE SUBSTANTIALLY DIFFERENT THAN PRE-DEVELOPMENT CONDITIONS.
SA RIVER LEVEE RESTRICTS ANY MOVEMENT OF RIVER INTO SITE

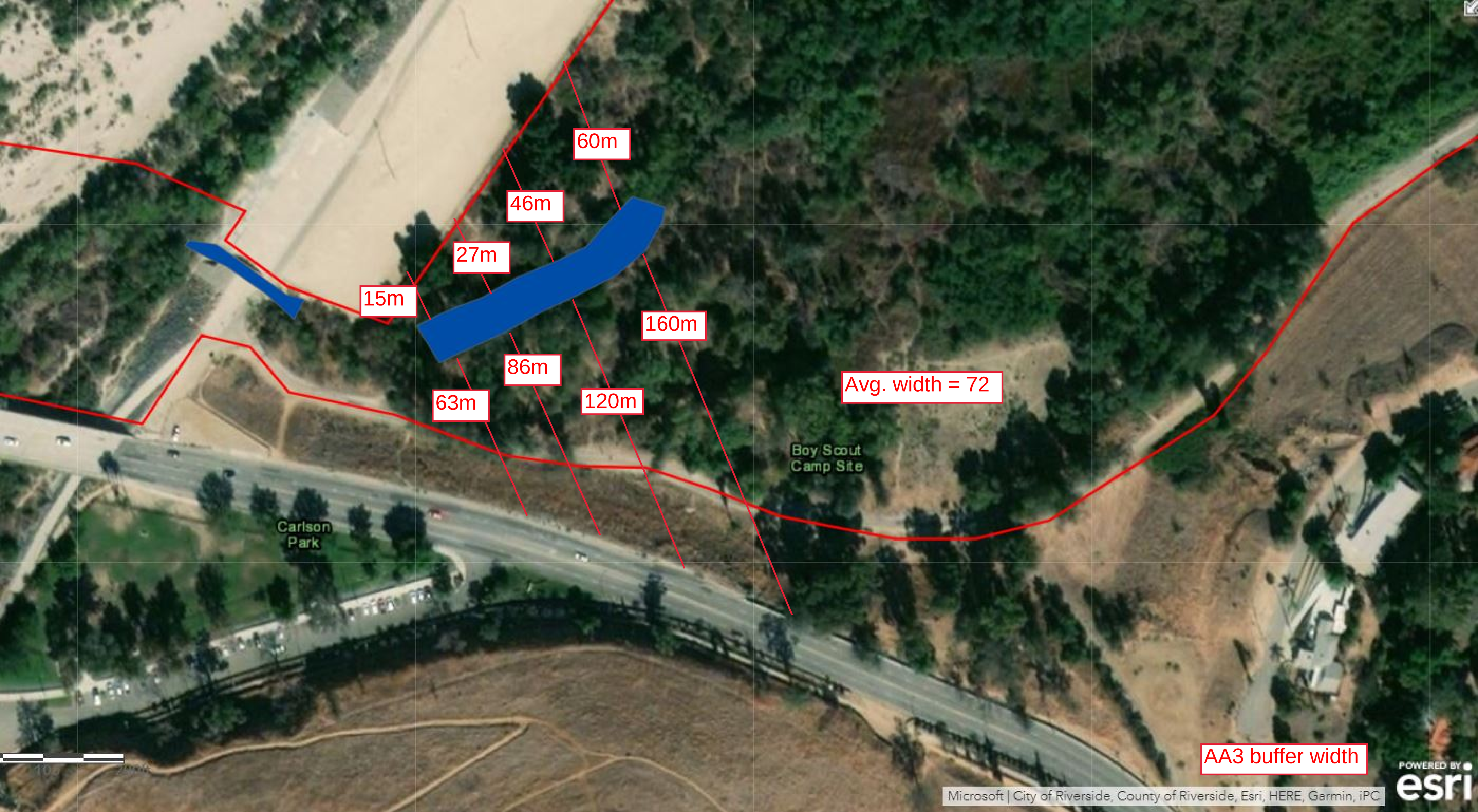
PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**	X	
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		X
Nutrient impaired (PS or Non-PS pollution)		?
Heavy metal impaired (PS or Non-PS pollution)		?
Pesticides or trace organics impaired (PS or Non-PS pollution)		?
Bacteria and pathogens impaired (PS or Non-PS pollution)		?
Trash or refuse		X

Comments HEAVY USE BY HOMELESS. TRASH/REFUSE THROUGHOUT. COMPACTION
ALONG TRAILS FROM HOMELESS + PARK USERS. LIKELY H_2O QUALITY IMPAIRMENTS
DUE TO HEAVILY URBANIZED SETTING + LAKE UPSTREAM W/ FISHING SIGNS
WARNING OF CONSUMING FISH.

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		X
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)	LIKELY	
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		X
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		X
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		X
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		X
Passive recreation (bird-watching, hiking, etc.)	X	
Active recreation (off-road vehicles, mountain biking, hunting, fishing)	X	
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		

Comments SITE SURROUNDED BY DEVELOPMENT. RESIDENTIAL TO SE. PARK TO E. NATURAL RIVER ON N + W SIDES. LAKE EVANS TO E.



AA3 buffer width

Microsoft | City of Riverside, County of Riverside, Esri, HERE, Garmin, iPC

Appendix C

Plant Species Observed

Lake Evans Plant List

Scientific Name	**Common Name**
Acmispon glaber	Deerweed
Ailanthus altissma	Tree of heaven
Alnus rhombifolia	White alder
Ambrosia acanthicarpa	Annual ragweed
Ambrosia psilostachya	Ragweed
Anemopsis californica	Yerba mansa
Artemisia californica	Coastal sage brush
Arundo donax	Giant reed
Atriplex semibaccata	Australian saltbush
Avena barbata	Slim oat
Baccharis pilularis	Coyote brush
Baccharis salicifolia	Mule fat
Bassia hyssopfolia	Fivehook bassia
Brassica nigra	Black mustard
Bromus diandrus	Ripgut brome
Bromus hordeaceus	Soft chess
Bromus madritensis ssp. rubens	Foxtail brome
Calystegia macrostegia	Island morning glory
Camissoniopsis bistorta	California sun cup
Carpobrotus edulis	Iceplant
Centaurea melitensis	Tocalote
Convolvulus arvensis	Field bindweed
Cortaderia selloana	Pampas grass
Croton californicus	California croton
Cucuribita foetidissma	Calabazilla
Cynodon dactylon	Bermuda grass
Elymus triticoides	Beardless wild rye
Erodium cicutarium	Coastal heron's bill
Erigeron canadensis	Common horseweed
Eucalyptus globulus	Blue gum
Festuca perennis	Italian rye grass
Ficus carica	Edible fig
Foeniculum vulgare	Fennel
Helianthus annuus	Annual sunflower
Heterotheca grandiflora	Telegraph weed
Hordeum murinum	Foxtail barley
Isocoma menziesii	White flowered goldenbush
Juglans californica	California walnut
Lactuca serriola	Prickly lettuce

Scientific Name	**Common Name**
Logfia gallica	Narrowleaf cottonrose
Malva parviflora	Cheeseweed
Marah macrocarpa	Chilicothe
Marrubium vulgare	Horehound
Melilotus albus	White sweetclover
Melilotus indicus	Annual yellow sweetclover
Opuntia oricola	Chaparral pricklypear
Phacelia sp.	Phacelia
Phoenix canariensis	Canary island date palm
Plantago major	Common plantain
Platanus racemose	California sycamore
Pluchea sericea	Arrow weed
Polypogon monspeliensis	Annual beard grass
Populus fremontii	Fremont's cottonwood
Pseudognaphalium californicum	Ladies' tobacco
Quercus agrifolia	Coast live oak
Ricinus communis	Castor bean
Rosa californica	California wild rose
Rumex crispus	Curly dock
Salix exigua	Narrowleaf willow
Salix gooddingii	Gooding's willow
Salix laevigata	Polished willow
Salix lasiolepis	Arroyo willow
Salsola tragus	Russian thistle
Sambucus nigra ssp. caerulea	Blue elderberry
Schinus molle	Peruvian pepper tree
Schoenoplectus californicus	California bulrush
Sisyrinchium bellum	Blue eyed grass
Sonchus asper	Spiny sowthistle
Sorghum halepensis	Johnsongrass
Tamarix ramosissima	Tamarisk
Toxicodendron diversilobum	Poison oak
Typha domingensis	Cattail
Vitis gridiana	Wild grape
Washingtonia robusta	Mexican fan palm
Xanthium strumarium	Cocklebur