Stadium Wetland Mitigation Project (San Diego River)

Mitigation Plan

Final

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Prepared for:
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Abbreviations

ATV	All Terrain Vehicle
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
City	City of San Diego
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRAM	California Rapid Assessment Method
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESL	Environmentally Sensitive Lands
MBTA	Migratory Bird Treaty Act
MHPA	Multi-Habitat Planning Area
MSCP	Multiple Species Conservation Program
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
PEP	Plant Establishment Period
PUD	Public Utilities Department
RPO	Resource Protection Ordinance
RWQCB	Regional Water Quality Control Board
SanGIS	San Diego Geographic Information Source
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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1.0 Introduction

Compensatory mitigation is required for unavoidable impacts to wetlands, streams, and/or other aquatic resource functions considered jurisdictional by the United States (U.S.) Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA) and by the California Department of Fish and Wildlife (CDFW) under Section 1602 of the California Fish and Game Code, as well as areas considered wetlands and/or ecologically important by the Regional Water Quality Control Board (RWQCB) and City of San Diego (City). Compensatory mitigation may be completed through obtaining credits from an established mitigation bank or contributing financially to an approved in-lieu fee program. However, an applicant may also establish their own mitigation site and complete permittee-responsible activities. When compared to established mitigation banks and in-lieu fee mitigation, permittee-responsible mitigation is the only mechanism where the permittee retains responsibility for implementation and success of methods (i.e., establishment, restoration, enhancement, or preservation) used to compensate for impacts to an aquatic resource (USACE 2008a).

The Stadium Wetland Mitigation Project (San Diego River) is proposed as advance permittee-responsible compensatory mitigation for City projects. Advance permittee-responsible compensatory mitigation is simply a form of permittee-responsible mitigation constructed in advance of a permitted impact. Advance mitigation is encouraged to reduce or eliminate temporal loss associated with concurrent mitigation as well as reduce the risk of unsuccessful mitigation. Advance mitigation also allows for the opportunity to improve an otherwise degraded biological resource that is important to the region.

The purpose of this document is to provide the requirements necessary for a compensatory mitigation plan, in accordance with 33 CFR 332.4c as well as state and local regulations. The benefits of restoring this portion of the San Diego River, which is an important resource to the City and surrounding communities, are also discussed.

1.1 Project Description (Background and Purpose)

The City Public Utilities Department (applicant) proposes to generate compensatory wetland mitigation credit for City projects by establishing an approximately 57.0 acre advance mitigation site along the San Diego River. The 57.0 acre site consists of restoration area, freshwater, and utility easement (where target species will be removed and modified restoration will occur but no compensatory mitigation is expected). The proposed mitigation site, once approved, will be restored and enhanced over a five-year period.

The USACE, CDFW, and RWQCB each have jurisdiction over the proposed mitigation site because of the importance of the San Diego River as a biological resource. Each agency and the City will have the opportunity to approve the restoration plan as well as comment on the use of the site to offset impacts to wetlands. Once the plan is approved, the agencies will approve use of credits from this site for applicable projects within the service area.

1.2 Project Location

1.2.1 Location

The project is located along the San Diego River situated between I-15 and I-805 south of Qualcomm Stadium within the City of San Diego, in San Diego County, California (Figure 1).

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FIGURE 1
General Location Map

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Stadium Wetland Mitigation Project (San Diego River)

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The general area is urban with the San Diego River watershed providing a corridor of open space spanning east to west throughout the area (Figure 2). This location corresponds to portions of Mission San Diego, Township 16 South, Range 2 West of the *La Mesa* and *La Jolla* U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (2011). The proposed mitigation site is also located within USGS Hydrological Map Unit Number 18070304 (U.S. Environmental Protection Agency [EPA] 2014). Finally, the proposed mitigation site is in the Multi-Habitat Planning Area (MHPA) of the City's Multiple Species Conservation Program (MSCP), which is discussed further in Section 2.1.1.1 below.

1.2.1.1 Site Selection

A watershed assessment completed by the City was used to determine the suitability of the site as mitigation and ensure the site will contribute to overall watershed goals. This watershed approach considered the importance of the landscape position and resource type for the sustainability of aquatic resource functions within the watershed. In addition, this assessment considered how this mitigation project would provide the desired aquatic resource functions over time in a changing landscape. This site was identified based on the following considerations:

- Sensitive species habitat requirements,
- Conversion trends and habitat loss,
- Sources of watershed impacts,
- Development trends,
- Requirements of stakeholders and regulatory programs affecting the watershed (e.g., storm water management and habitat conservation), and
- Potential availability of protection and maintenance of terrestrial resources including riparian and upland habitats.

The City in coordination with various stakeholders and regulatory agencies has created and adopted the San Diego River Park Master Plan (2013), which is further discussed in Section 2.1.2. This plan highlights the San Diego River as a source of life and vitality in the San Diego region and establishes five principles to guide future decisions regarding the river. The principles are:

- Restore and maintain a healthy river system;
- Unify fragmented habitats;
- Create a connected continuum, with a sequence of unique places and experiences;
- Reveal the river valley history; and
- Reorient development toward the river to create value and opportunities for people to embrace the river.

The San Diego River Park Foundation, a community-based non-profit organization that works to protect and enhance the river's valuable natural and cultural resources, rated the project location as the poorest overall quality of the entire watershed in 2013. Therefore, the project location is considered ecologically preferable for mitigation purposes, because restoration and enhancement of the area will contribute to the overall functionality of the watershed and is consistent with principles guiding regional planning efforts. Furthermore, the site is a preferred location, because the project is (1) mapped as a MHPA (see Section 2.1.1.1); (2) located directly downstream of other restoration activities, providing continuity with river restoration and long-term viability; and (3) located upstream of other river restoration projects that will directly benefit from the significant reduction in non-native plant propagules.

The City has decided to implement this large-scale compensatory mitigation approach to satisfy requirements for a greater number of small projects, rather than implementing individual small on- or off-site mitigation. Larger sites provide greater functions and services than small islands of mitigation. The proposed mitigation site is situated within the floodplain with existing stream channels and wetland habitat. Therefore, the physical and hydrological characteristics necessary for successful restoration of wetlands are present at the proposed mitigation site (USACE 2011).

1.2.1.2 Service Area

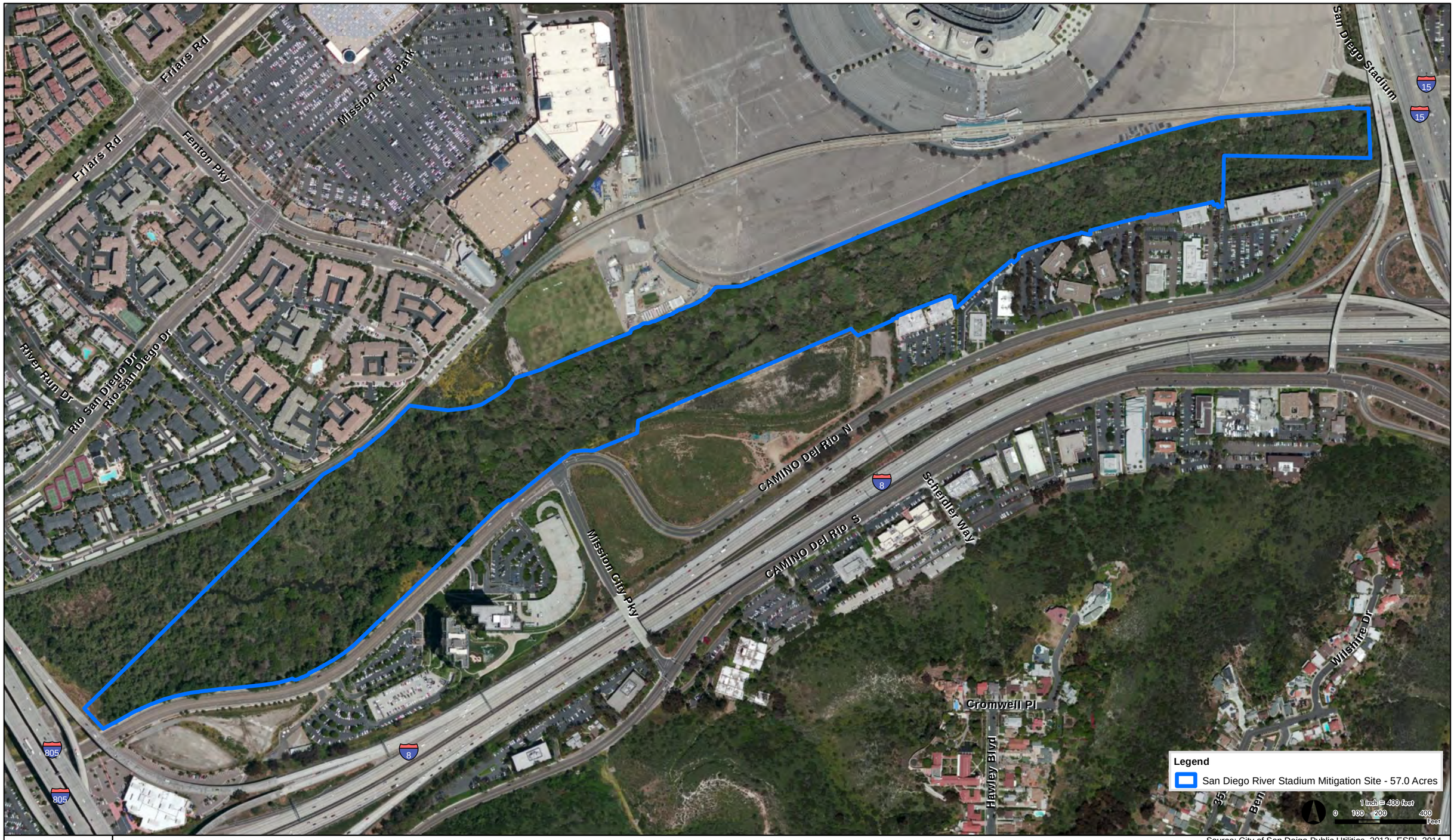
The service area is the geographic area within which impacts can be mitigated through efforts at the project location. The service area includes the Pueblo watershed, Peñasquitos watershed, and San Diego River watershed west of El Capitan Reservoir (Figure 3). All three adjacent watersheds contain significant portions of development for urban, industrial, and transportation land uses. These watersheds include heavily populated areas, such as La Jolla, downtown San Diego, and surrounding urban sprawl. Many sites that would potentially be available for mitigation within the watersheds cannot be restored, because of development and use of natural systems as storm channels and flood management. All three watersheds are sensitive to the effects of pollutants and runoff from development, because of their close proximity to each other and the cities. Also, because these watersheds are adjacent to one another in such a localized area, they all support habitat with similar structure and functions. Habitat in all three watersheds supports the same native flora and fauna, including locally important and sensitive species such as southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell's vireo (*Vireo bellii pusillus*). Because of these similarities, all three watersheds are appropriate to include in the service area for the proposed mitigation site.

1.3 Proposed Mitigation Site Goals and Objectives

The goal of the project is to improve critical functions at the proposed mitigation site, thereby providing compensatory mitigation credits for use by the City. Critical function associated with the condition of vegetation and the availability of habitat for native fauna is the focus of this project.

Improvement goals for the proposed mitigation site are in direct agreement with regulatory agency (USACE, USFWS, CDFW, and RWQCB) guidance and City policies for restoration projects. The goals are as follows:

- Restore habitat and native plant communities through the reduction and removal of anthropogenic trash and debris, site protections, and eradication of invasive nonnative plants.
- Ensure the long-term viability and sustainability of native ecosystem function and natural processes.
- Enhance the suitability of the area as an important wildlife movement corridor.
- Provide for flexible management that can adapt to changing circumstances and still achieve site objectives.



Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 2
Local Vicintiy Aerial Map

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Stadium Wetland Mitigation Project (San Diego River)

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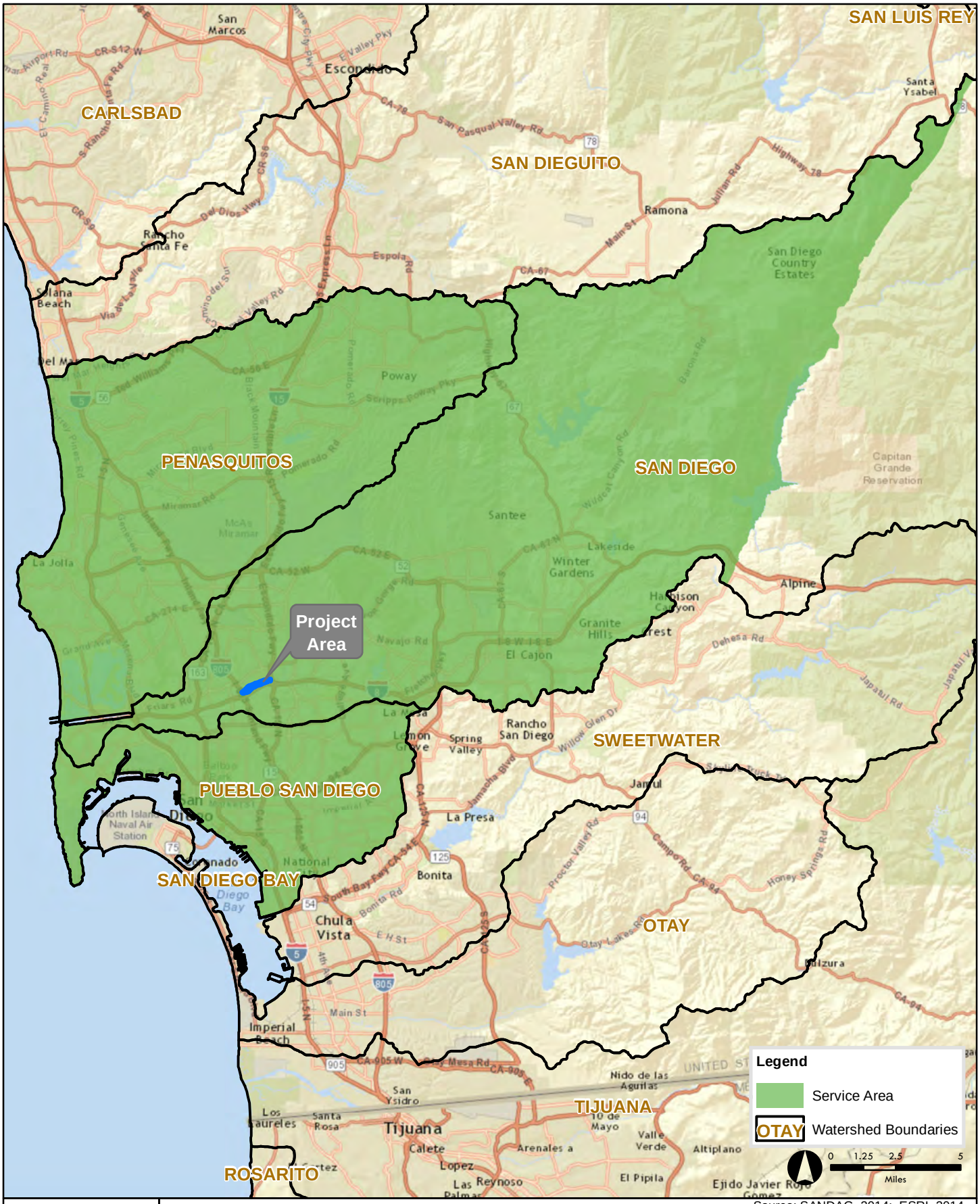

Source: SANDAG, 2014; ESRI, 2014

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FIGURE 3
Mitigation Site Service Area

100038033 Stadium Wetland Mitigation Project (San Diego River)

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The following objectives will be used to achieve project goals outlined above.

- Enhance approximately 32.2 acres of riparian habitat by promoting growth of a more complex and diverse native riparian system, removing target invasive species, and removing anthropogenic trash.
- Restore (rehabilitate) approximately 20.8 acres of riparian habitat by improving topographical complexity to reduce urban runoff, removing invasive vegetation, and establishing native plant communities. Removal of invasive biomass will also improve hydrological function by increasing flood capacity along the river and promoting a stabilized system.
- Transform 39.3 acres of non-wetland waters of the U.S. to USACE jurisdictional wetlands by promoting growth of a more diverse wetland plant community through the rehabilitation of 15.3 acres and the enhancement of 24.0 acres of USACE jurisdictional resources.
- Remove illegal encampments and trash, install additional site protection barriers, and increase management activities to protect the area from anthropogenic stress.

Activities outlined for this project will improve critical onsite functions associated with existing damage to hydrology, soils, and vegetation by achieving the goals and objectives. Improvement of critical functions will benefit special status and MSCP covered species by providing increased habitat value. The proposed mitigation site represents only a small portion of the larger San Diego River watershed. However, the project will improve the overall quality and function of the site and contribute positively to ongoing efforts to enhance the watershed as a whole and restore habitat within the region.

2.0 Existing Conditions

The site was previously identified by CDFW (through personal communications with City staff) as an appropriate and desirable place for mitigation. The location was ultimately chosen by the City for a mitigation site because of the high potential for restoration. Plus, restoration activities agree with local land use designations and planning efforts. Specific characteristics that support this location as the best choice for mitigation are outlined below.

A watershed approach was used to analyze information regarding watershed conditions and need, the site's potential for aquatic resources restoration, and identified priorities for aquatic resource conservation. Information used to evaluate the proposed mitigation site included the following (outlined in Section 2.1 through 2.3):

- Habitat loss and conversion for sensitive species;
- Cumulative impacts attributed to past development activities;
- Future development activities;
- The presences of sensitive species within the proposed mitigation site;
- Current site conditions that favor or prohibit the success of the project; and
- Continuing environmental influences (e.g., flooding and water quality).

2.1 Regional Context

2.1.1 Multiple Species Conservation Program

The proposed mitigation site is situated within the jurisdiction of the MSCP. The MSCP is a comprehensive habitat conservation planning program that addresses multiple species habitat needs and the preservation of native vegetation communities in the San Diego region. The overall goal of the program is to maintain and enhance biological diversity in the region and conserve viable populations of endangered, threatened, and key sensitive species and their habitats. The MSCP's core hard-line biological preserve system is referred to as the MHPA and includes areas targeted for conservation where limited development may occur (City of San Diego 2013a).

2.1.1.1 City of San Diego Multi-Habitat Planning Area

The proposed mitigation site is mapped per the MSCP within MHPA boundaries (Figure 4) and is subject to the City of San Diego MSCP Subarea Plan. The Subarea Plan forms the basis for the Implementing Agreement that allows the City to issue Federal incidental take permits at the local level. When land is preserved as part of the MSCP, management is necessary to ensure biological values are maintained over time. The City is responsible, under the MSCP, to manage and maintain lands within MHPA boundaries that the City owns. The management objectives for the MHPA provide the basis for the proposed mitigation site goals (City of San Diego 2013a).

According to the MSCP, the San Diego River includes open space that provides necessary habitat for native species in an otherwise urban setting. Areas along the river contribute to the public's experience of nature and the local native environment. One of the program guidelines requires the restoration of native vegetation along portions of the San Diego River, which is a large part of the work plan for the proposed mitigation site. Major issues include intense land use adjacent to covered species habitat, trash, encampments, utilities maintenance activities, non-native species, and urban runoff (City of San Diego 2013a).

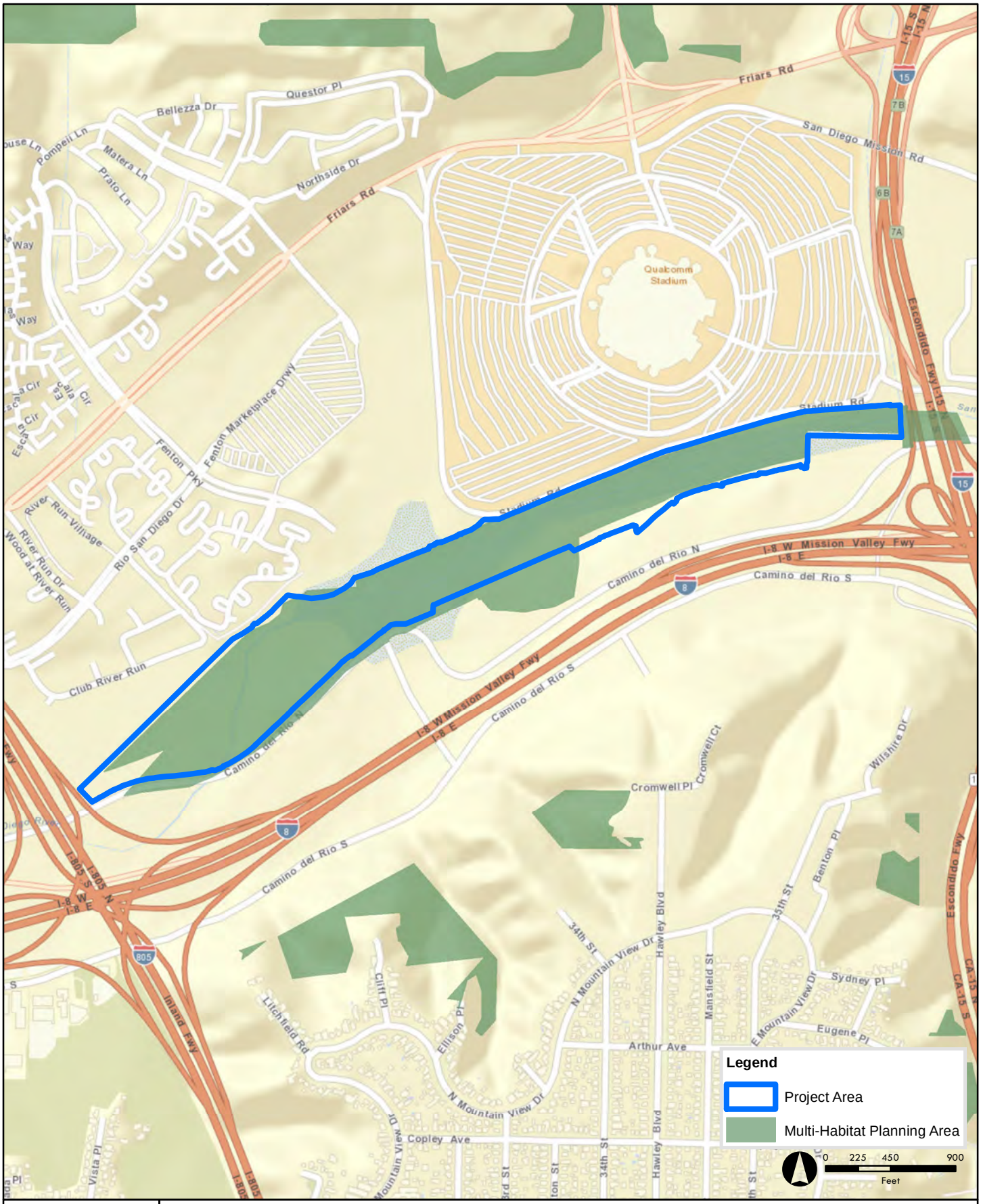

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FIGURE 4
Multi-Habitat Planning Areas

100038033 Stadium Wetland Mitigation Project (San Diego River)

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2.1.2 Mission Valley Community Plan

The Mission Valley Community Plan identifies the San Diego River watershed as a major open space asset. The plan identifies conditions to consider in future planning efforts, including flooding, protection of the river and associated sensitive habitat, and enhancement of recreational opportunities (City of San Diego 2013a). The Mission Valley Community Plan also recommends pursuing development of a Community Park at the Qualcomm Stadium site and consideration of the general area as a source of public recreation (City of San Diego 2013a). Development guidelines for the area are required to be consistent with Land Development Codes for Environmentally Sensitive Lands as well as Design Guidelines of the San Diego River Park Master Plan, which are consistent with project objectives.

2.1.3 San Diego River Park Master Plan

The San Diego River Park Master Plan provides a watershed context for justification of the proposed mitigation site as an appropriate location for the project. The plan was approved by the City Planning Commission on April 18, 2013 and adopted by the City Council on May 20, 2013. The plan provides the vision and guidance to restore a symbiotic relationship between the San Diego River and surrounding communities by creating a river-long park, stretching from the headwaters near Julian to the Pacific Ocean at Ocean Beach. The overall vision of the plan is to reclaim the valley as a common area that provides a synergy of water, wildlife, and people. The vision is supported by five guiding principles, as follows: 1) restore and maintain a healthy river system; 2) unify fragmented lands and habitats; 3) create a connected continuum, with a sequence of unique places and experiences; 4) reveal the river valley history; and 5) reorient development toward the river to create value and opportunities for people to embrace the river (City of San Diego 2013b).

The Master Plan discusses recommendations for the river in terms of six distinct reaches. The proposed mitigation site is located within the lower valley reach, as identified in the plan. Specific recommendations for the proposed mitigation site include (1) creating a pedestrian/bicycle connection over the river to access Qualcomm Stadium, (2) consider public recreation when planning future use at the Qualcomm Stadium site, and (3) provide interpretive signage along the San Diego River Pathway (City of San Diego 2013b).

Acreage associated with an access easement that crosses the river has been excluded from any mitigation credit proposals in this document. Any future project to create a vehicle/pedestrian/bicycle connection that would occur in this easement would be required to obtain approval from the regulatory agencies (i.e., USACE and USFWS) prior to implementation. Avoidance and preservation of the proposed mitigation site would be required for approvals. It is expected that any new trail would be located outside of wetlands or in the case of the river crossing trail, would be suspended above the river to prevent any direct or indirect impacts on the river and proposed mitigation site. Furthermore, the San Diego River Pathway is required to be outside the MHPA where potential overlap exists (The City of San Diego 2013b). Therefore, designation of the proposed section of river, which is within an MHPA area, as a compensatory mitigation site to be protected in perpetuity does not conflict with the San Diego River Park Master Plan.

2.1.4 San Diego River Watershed Management Plan

The San Diego River Watershed Management Plan (SDRWMP) identifies issues of concern within the watershed where management actions should be prioritized based on benefits and to maximize watershed improvements. This plan splits the watershed into three sections and includes the proposed mitigation site within the San Diego Management Area. The SDRWMP describes this area as highly

urbanized with the most pronounced water quality problems such as eutrophic conditions, hydromodification, trash, pesticides, and exotic species. This proposed mitigation project would address many of the issues identified in this plan.

2.2 Revegetation Site Characteristics

2.2.1 State of the River

Two programs exist (RiverBlitz and RiverWatch) to document the conditions within the lower San Diego River for trash, invasive non-native plants, and site condition issues. The surveys are conducted largely by volunteers of the San Diego River Park Foundation and are meant to help guide management decisions as well as track any progress toward reducing negative impacts. These data are compiled into an annual report that grades the overall river and individual sections on an A to F scale with A being the best and F being the worst as shown in Table 1 (The San Diego River Park Foundation 2013).

Table 1 San Diego River Park Foundation State of the River Grading Scale (2013)

Trash Bags per Acre	*Invasive Percent Cover*	*Water Quality Index*	*Letter Grade*	*Narrative*
<1	0 – 1.9	>75	A	Excellent
1.0 – 1.9	2 – 2.9	50 - 74.9	B	Good
2.0 – 2.9	3 – 3.9	36 – 49.9	C	Fair
3.0 – 3.9	4 – 4.9	25 – 35.9	D	Marginal
>4	>5	<25	F	Poor

The overall grade for the lower San Diego River in 2013 was found to be a C or fair. The section of the river where the proposed mitigation site is located was graded as F or poor. It was the only section of the lower San Diego River to be graded an F in 2013. Individual grades given for specific site characteristics within the proposed mitigation site were as follows: trash was rated an F with an average of 8.3 bags collected per acre; invasive, non-native plants received a grade of F due to an average invasive percent cover of 11.1; and water quality was rated as C because the Water Quality Index was 37.0. Approximately 84 percent of the volume of trash noted at the proposed mitigation site was associated with illegal campsites, which are prevalent in the area. The overall health of the San Diego River declined throughout most reaches in 2013. Trends in water quality over the last nine years of the lower section of the river suggest a correlation between rainfall and water quality. In average rainfall years, the water quality is typically fair, while in below-average rainfall years water quality is generally poor. It should be noted that 2013 was a year with below average rainfall. Water quality issues in the Mission Valley Area, where the proposed mitigation site is located, are primarily caused by urban runoff. An estimated 90 percent of local runoff contributes to the river in this area. Industry located along the river also leads to periodic detrimental spills or leakages. For example, groundwater contamination from industrial tank leakage is found in Mission Valley (606 Studio 2002). The only section of river observed to have an invasive canopy coverage high enough for an F ranking in 2013 is the area proposed as the mitigation site (The San Diego River Park Foundation 2013).

2.2.2 Vegetation Communities

Based on the San Diego Geographic Information Source (SanGIS) and data collected during field efforts, the proposed mitigation site consists of four primary vegetation communities, including coastal and valley freshwater marsh, non-native grassland, non-native riparian (with arundo-dominated riparian),

and southern riparian woodland. Table 2 provides the acreage of each vegetation community and Figure 5 shows their locations within the proposed mitigation site.

Table 2 Vegetation Community Acreage within the Proposed Mitigation Site

Vegetation Community	*Acreage*
Coastal and Valley Freshwater Marsh	0.2
Non-native Grassland	1.1
Non-native Riparian (with Arundo-Dominated Riparian)	21.8
Southern Riparian Woodland	33.9
Total Acreage	57.0

2.2.2.1 Coastal and Valley Freshwater Marsh

Coastal and valley freshwater marsh is described as, permanently flooded area dominated by perennial, emergent monocots that grow to a height of 13.1 to 16.4 feet (4.0 to 5.0 meters) tall. This habitat lacks significant water current, so deep, peat soils accumulate that support the emergent vegetation. Characteristic species include various sedges (*Carex* sp. and *Cyperus* sp.), bulrushes (*Scirpus* sp.), and cattails (*Typha* sp.) (Oberbauer et al. 2008). Dense stands of California bulrush (*Schoenoplectus californicus*) occur in small clusters along the San Diego River within the proposed mitigation site.

2.2.2.2 Non-native Grassland

Non-native grassland, or annual grassland, is described as a dense to sparse cover of annual grasses with flowering culms 0.7 to 1.6 feet (0.2 to 0.5 meter) high. This habitat is often associated with numerous species of showy-flowered, native annual forbs ("wildflowers"), especially in years of favorable rainfall. In San Diego County the presence of *Avena spp.*, *Bromus spp.*, *Erodium spp.*, and *Brassica* spp. are common indicators. In some areas, depending on past disturbance and annual rainfall, annual forbs may be dominant species; however, it is presumed that grasses will soon dominate. Germination occurs with the onset of the late fall rains; growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer-fall dry season, persisting as seeds. Remnant native species are variable. This can include grazed and even dry-farmed (i.e., disked) areas where irrigation is not present (Oberbauer et al. 2008).

Species observed within this habitat at the proposed mitigation site include wild oat (*Avena fatua*), black mustard (*Brassica nigra*), filaree (*Erodium botrys*), Italian rye grass (*Lolium multiflorum*), phacelia (*Phacelia* sp.), and other grasses. The non-native grassland at the proposed mitigation site was also highly influenced by human activities and trending toward disturbed habitat. Species commonly associated with disturbed habitat noted onsite, included Italian thistle (*Carduus pycnocephalus*), ice plant (*Carpobrotus edulis*), and Napa thistle (*Centaurea melitensis*).

Overall, the non-native grassland within the proposed mitigation site consisted primarily of areas at grade with the street above the floodplain. This habitat is mostly situated in areas where either river access is more easily achieved or human presence is a factor. Human activity within the non-native grassland, such as pedestrian and recreational uses, was commonly noted next to the highway and behind the commercial buildings adjacent to the proposed mitigation site. The presence of non-native forbs and human influence within the non-native grassland results in a trend toward a disturbed habitat classification.

2.2.2.3 Non-native Riparian

Non-native riparian is described as, densely vegetated riparian thickets dominated by non-native, invasive species. This designation should only be used where non-native, invasive species account for greater than 50 percent of the total vegetative cover within a mapping unit (Oberbauer et al. 2008). This habitat is extensive along major rivers in coastal southern California, including the San Diego River, and typically occurs in areas with human disturbance. Characteristic species observed within the proposed mitigation site include non-native species such as, arundo (*Arundo donax*), tamarisk (*Tamarix ramosissima*), and palms (*Phoenix canariensis* and *Washingtonia robusta*) along with native species such as Fremont cottonwood (*Populus* fremontii) and willow (*Salix* spp.).

The proposed mitigation site also includes arundo-dominated riparian habitat, which is a sub-classification within non-native riparian that applies to non-native areas where arundo accounts for greater than 50 percent of the total vegetative cover. Arundo-dominated riparian is typically situated on loose, sandy or fine gravelly alluvium deposited near steam channels during floods (Oberbauer et al. 2008). Arundo-dominated riparian occurs on about 10.4 acres of the proposed mitigation site and is the most dominant single stand, non-native species present.

2.2.2.4 Southern Riparian Woodland

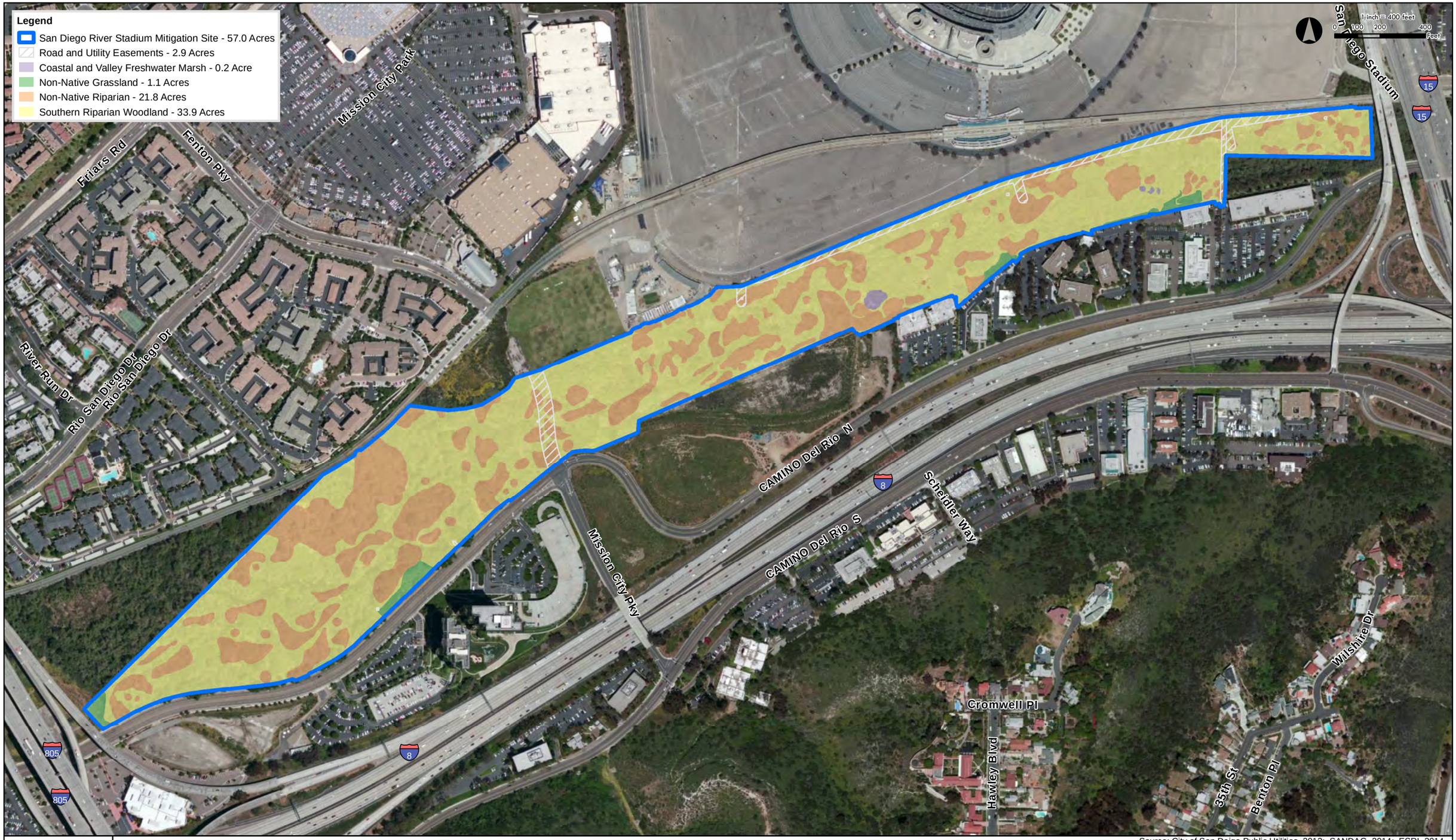
Southern riparian woodland is described as, moderate-density riparian woodlands dominated by small trees or shrubs, with scattered taller riparian trees (Oberbauer et al. 2008). This habitat is found throughout San Diego County along major river systems, such as the proposed mitigation site, where flood scour occurs. California sycamore (*Platanus racemosa*), Fremont cottonwood, and various willows are typically co-dominant species within southern riparian woodland. This habitat at the proposed mitigation site includes many invasive, non-native species although not quite to 50 percent cover when a classification of non-native riparian would apply. Species observed within the southern riparian woodland include native species, such as white alder (*Alnus rhombifolia*), Fremont cottonwood, California scrub oak (*Quercus dumosa*), and arroyo willow (*Salix lasiolepis*) interspersed with non-native species, such as Brazillian pepper tree (*Schinus terebinthifolius*), tamarisk, and palms.

2.2.3 Preliminary Wetland Delineation

Atkins biologists performed a Preliminary Delineation of Waters of the U.S., including wetlands for the project on February 19, 2014, a detailed report and wetland delineation data forms are included as Appendix A.

2.2.3.1 Results Summary

The report mapped both wetland and non-wetland waters of the U.S. within the study area. These features occupy a total of 40.4 acres. Additionally, a total of 55.9 acres of waters of the State occur within the study area. Table 3 below provides an acreage summary. Figure 6 presents the delineation map showing each delineated feature and sample pit locations.



Source: City of San Deigo Public Utilities, 2013; SANDAG, 2014; ESRI, 2014

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FIGURE 5
Vegetation Communities Map

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Stadium Wetland Mitigation Project (San Diego River)

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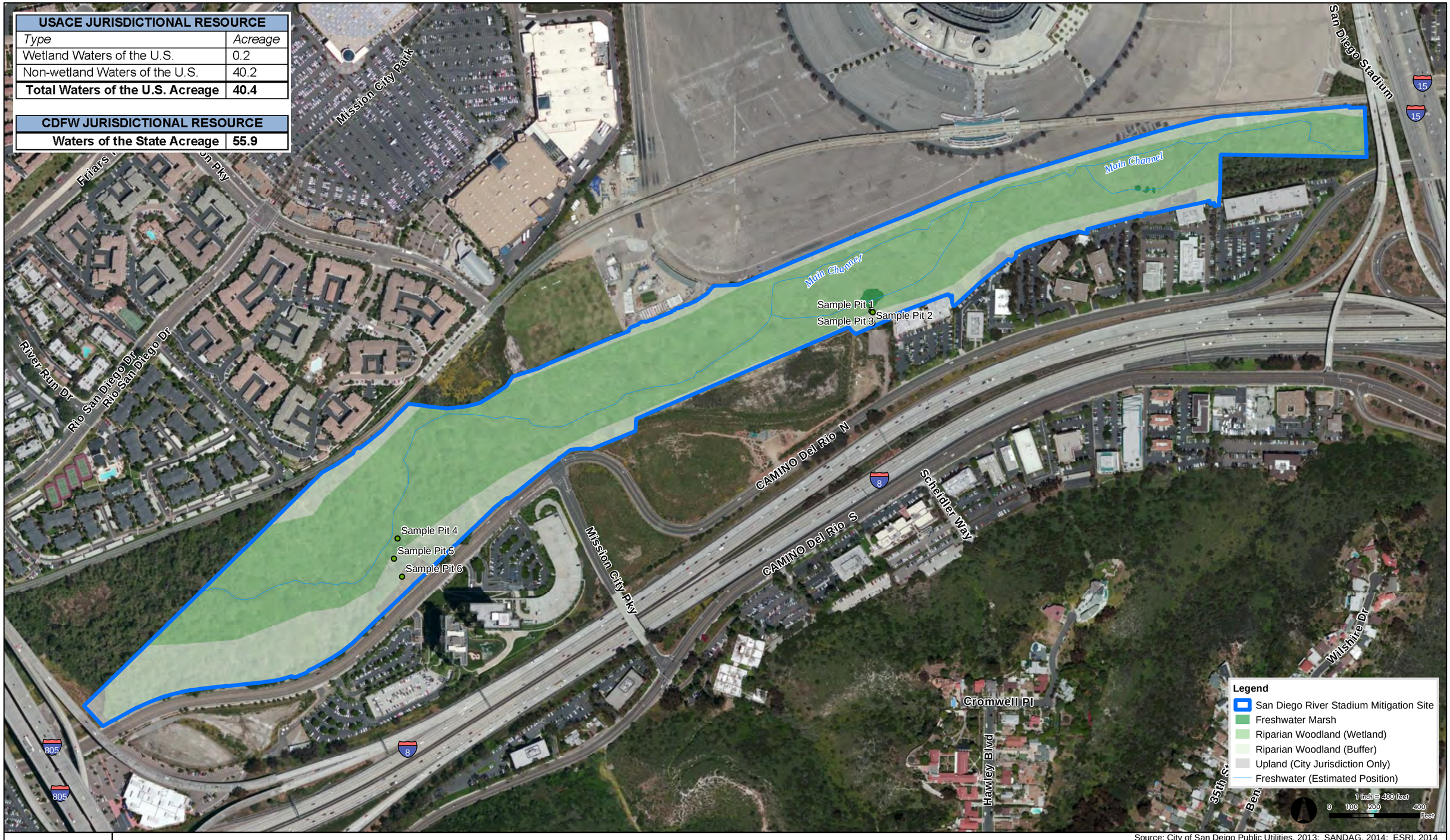
USACE JURISDICTIONAL RESOURCE	
Type	*Acreage*
Wetland Waters of the U.S.	0.2
Non-wetland Waters of the U.S.	40.2
Total Waters of the U.S. Acreage	**40.4**

CDFW JURISDICTIONAL RESOURCE	
Waters of the State Acreage	**55.9**



Source: City of San Deigo Public Utilities, 2013; SANDAG, 2014; ESRI, 2014

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FIGURE 6
Delineation Map

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Stadium Wetland Mitigation Project (San Diego River)

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Table 3 Delineation Acreage Summary	
Type	***Acreage***
USACE Jurisdictional Resource	
Wetland Waters of the U.S.	0.2
Non-wetland Waters of the U.S.	40.2
Total Waters of the U.S. Acreage	40.4
CDFW Jurisdictional Resource	
Waters of the State Acreage	55.9

2.2.3.2 USACE Jurisdictional Resources

The USACE, under the CWA, has permit authority over activities affecting waters of the U.S. Federal (USACE) jurisdiction typically includes lands below the OHWM and wetlands or similar areas with a significant nexus to a navigable waterway. Section 2.3 provides further detail regarding regulatory jurisdictions, including the USACE.

2.2.3.2.1 Wetland Waters of the U.S.

Approximately 0.2 acre of freshwater marsh dominated by California bulrush was mapped within the proposed mitigation site as wetland waters of the U.S. These dense stands are supported by flows in the San Diego River channel. This was the only area within the project site to meet all three parameters to be considered an USACE jurisdictional wetland.

2.2.3.2.2 Non-Wetland Waters of the U.S.

Approximately 40.2 acres of non-wetland waters of the U.S. were mapped within the proposed mitigation site. Non-wetland waters of the U.S. include the San Diego River channel and the adjacent flood plain. The main channel of the San Diego River flows through the site varying in width from about 20 to 30 feet (6.1 to 9.1 meters) over 6,327 linear feet (1,928.5 meters). The adjacent floodplains are vegetated with a mixture of native and non-native species, but non-native species are the most abundant. Drift deposits in the form of branches and other vegetation debris occur closest to the river channel. Topography is generally flat with portions that include large cobble and undulating relief. The portions of the floodplain furthest from the river channel situated at the bottom of a steep grade below street level, trend toward upland characteristics in regards to plants and hydrology but maintain indications of hydric soil. It is expected that after completion of the mitigation project the riparian habitat would support the necessary vegetation to be considered a jurisdictional wetland.

2.2.3.3 CDFW Jurisdictional Resources

The CDFW, under California Fish and Game Code, has jurisdiction of activities affecting the stream channel and all associated riparian vegetation to the edge of the vegetation drip line. The City's jurisdiction mimics State authority and extents to the limits of riparian and wetland vegetation. Section 2.3 provides further detail regarding regulatory jurisdictions, including the CDFW and City.

A total of 55.9 acres of CDFW jurisdictional resources were mapped within the proposed mitigation site, this includes 0.2 acres of freshwater marsh and 55.7 acres of riparian woodland. Riparian vegetation is composed of a mixture of native and non-native vegetation, but with non-native vegetation being the most dominant. The San Diego River channel flows through this riparian community supporting dense vegetative cover and creating a wide floodplain. Riparian vegetation extends out and above the floodplain to the edge of urban development throughout most of the proposed mitigation site.

2.2.3.4 Dominant Vegetation

Between February 18 and February 20, 2014, Atkins biologists surveyed the proposed mitigation site to record baseline conditions, including information regarding existing vegetation and vegetation communities (section 2.2.2). Appendix B provides representative site photographs of conditions noted during field efforts. Much of the proposed mitigation site was found to include dominant stands of invasive species. Using a recent aerial photo to make notes while surveying onsite, the locations of various dominant species were recorded. Figure 7 shows areas onsite with the characteristic vegetation as it was recorded during field efforts. Appendix C presents a list of species observed throughout the proposed mitigation site. These findings provide the basis for designing the work plan and calculating mitigation credits available at the site.

2.2.3.5 Soils and Topography

The Web Soil Survey of San Diego County Area, California (U.S. Department of Agriculture 2013) identifies four mapped soil units within the proposed mitigation site, including Riverwash (map unit Rm), made land (map unit Md), Tujunga sand, 0 to 5 percent slopes (map unit TuB), and Salinas clay loam, 2 to 9 percent slopes (map unit SbC). These soil units are described in the Preliminary Delineation of Waters of the U.S., including Wetlands (Appendix A). A soils map of the proposed mitigation site is presented in Figure 8.

Topography in the vicinity of the proposed mitigation site is characterized by uplands and low hills that gently slope to the San Diego River system. Local terrain within the proposed mitigation site consists of generally flat to slightly sloping upland with steep concave relief along either side of the river channel, which occupies the lowest topographic position. Also, along either side (north and south) of the river are low, flat terraces or benches that comprise the floodplain situated directly above bankfull. A topographic map of the proposed mitigation site is provided in Figure 9. General topography within the area has remained consistent for the past 10 years, as shown in the aerial from 2004 in Figure 10.

2.2.3.6 Hydrology

The San Diego River flows approximately 52 miles (83.7 kilometers) west from its headwaters in the Volcan Mountains through San Diego County and the City of San Diego to the Pacific Ocean. The San Diego River watershed includes an area of approximately 440 square miles (1,139.6 square kilometers) comprised of major tributaries, such as Boulder Creek and San Vicente Creek, as well as numerous smaller tributaries, such as Oak Creek and Murray Creek (606 Studio 2002). This watershed is the second largest hydrologic unit in San Diego County with important resources, including five water storage reservoirs and a large groundwater aquifer for continued sustainability.

Legend

- San Diego River Stadium Mitigation Site - 57.0 Acres
- Road and Utility Easements - 2.9 Acres

Dominant Species

- 1 - Arundo (Arundo donax)* - 10.4 Acres
- 2 - Eucalyptus (Eucalyptus sp.)* - 0.4 Acre
- 3 - Palms (Phoenix canariensis and Washingtonia robusta)* - 0.7 Acre
- 4 - Fremont Cottonwood (Populus fremontii) - 0.1 Acre
- 5 - Ngaio Tree (Myoporum laetum)* - 1.1 Acres
- 6 - Brazilian Pepper Tree (Schinus terebinthifolius)* - 4.8 Acres
- 7 - Pampas Grass (Cortaderia jubata)* - 3.0 Acres
- 8 - Tamarisk (Tamarix ramosissima)* - 0.2 Acre
- 9 - Edible Fig (Ficus carica)* - 0.2 Acre
- 10 - Understory Mix (L. latifolium, Foeneculum vulgare, and Carpobrotus edulis)* - 0.1 Acre
- 11 - Cape Ivy (Delairea odorata)* - 0.1 Acre
- 12 - Shrub Mix (S. terebinthifolius and M. laetum)* - 0.5 Acre
- 13 - Oleander (Nerium oleander)* - Less than 0.1 Acre
- 14 - Castor Bean (Ricinus communis)* - Less than 0.1 Acre
- 15 - California Bulrush (Scirpus californicus) - 0.2 Acre
- 16 - Perennial Pepperweed (Lepidium latifolium)* - 0.1 Acre
- 17 - Populus fremontii and Salix sp. - 2.7 Acres
- 18 - Dominant Mixed Riparian with Eucalyptus - 0.2 Acre
- 19 - Dominant Mixed Riparian with Ngaio Tree - 0.1 Acre
- 20 - Non-native Grasses and Forbs* - 0.8 Acre
- 21 - Mixed Riparian 31.1 Acres

* = Introduced or Invasive Species

1 inch = 90 feet
0 20 40 80 Feet

Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 7
Vegetation Observed During Field Efforts - Page 1 of 6

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Stadium Wetland Mitigation Project (San Diego River)

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Legend

- San Diego River Stadium Mitigation Site - 57.0 Acres
- Road and Utility Easements - 2.9 Acres

Dominant Species

- 1 - Arundo (Arundo donax)* - 10.4 Acres
- 2 - Eucalyptus (Eucalyptus sp.)* - 0.4 Acre
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- 12 - Shrub Mix (S. terebinthifolius and M. laetum)* - 0.5 Acre
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1 inch = 90 feet
0 20 40 80 Feet

Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 7
Vegetation Observed During Field Efforts - Page 2 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Legend

- San Diego River Stadium Mitigation Site - 57.0 Acres
- Road and Utility Easements - 2.9 Acres

Dominant Species

- 1 - Arundo (Arundo donax)* - 10.4 Acres
- 2 - Eucalyptus (Eucalyptus sp.)* - 0.4 Acre
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- 10 - Understory Mix (L. latifolium, Foeneculum vulgare, and Carpobrotus edulis)* - 0.1 Acre
- 11 - Cape Ivy (Delairea odorata)* - 0.1 Acre
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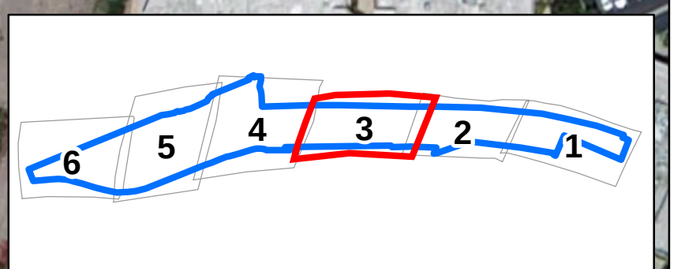
- 20 - Non-native Grasses and Forbs* - 0.8 Acre
- 21 - Mixed Riparian 31.1 Acres

* = Introduced or Invasive Species

1 inch = 100 feet
0 25 50 100 Feet



Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 7
Vegetation Observed During Field Efforts - Page 3 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Legend

- San Diego River Stadium Mitigation Site - 57.0 Acres
- Road and Utility Easements - 2.9 Acres

Dominant Species

- 1 - Arundo (Arundo donax)* - 10.4 Acres
- 2 - Eucalyptus (Eucalyptus sp.)* - 0.4 Acre
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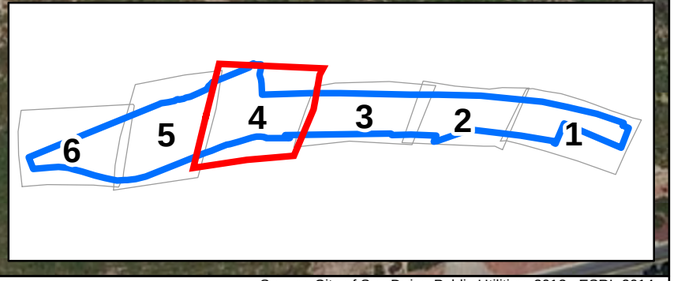
- 20 - Non-native Grasses and Forbs* - 0.8 Acre
- 21 - Mixed Riparian 31.1 Acres

* = Introduced or Invasive Species

1 inch = 130 feet
0 30 60 120
Feet



Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 7
Vegetation Observed During Field Efforts - Page 4 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Legend

- San Diego River Stadium Mitigation Site - 57.0 Acres
- Road and Utility Easements - 2.9 Acres

Dominant Species

- 1 - Arundo (Arundo donax)* - 10.4 Acres
- 2 - Eucalyptus (Eucalyptus sp.)* - 0.4 Acre
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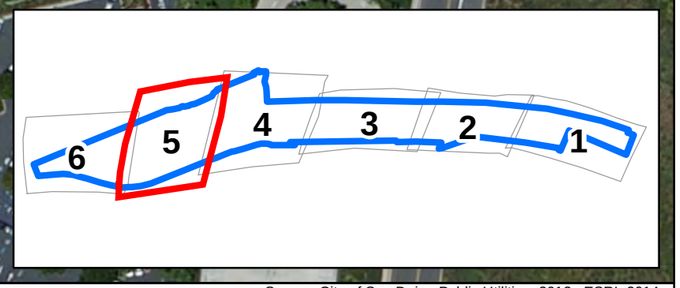
* = Introduced or Invasive Species

1 inch = 130 feet
0 30 60 120
Feet



Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 7
Vegetation Observed During Field Efforts - Page 5 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Legend

- San Diego River Stadium Mitigation Site - 57.0 Acres
- Road and Utility Easements - 2.9 Acres

Dominant Species

- 1 - Arundo (Arundo donax)* - 10.4 Acres
- 2 - Eucalyptus (Eucalyptus sp.)* - 0.4 Acre
- 3 - Palms (Phoenix canariensis and Washingtonia robusta)* - 0.7 Acre
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- 7 - Pampas Grass (Cortaderia jubata)* - 3.0 Acres
- 8 - Tamarisk (Tamarix ramosissima)* - 0.2 Acre
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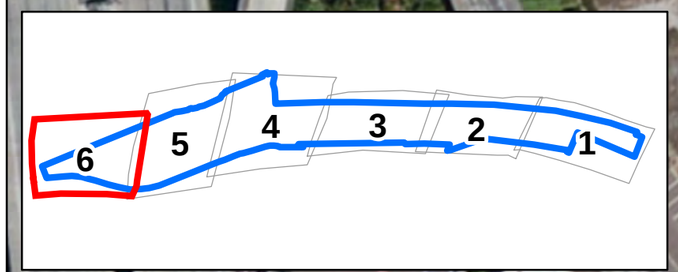
- 21 - Mixed Riparian 31.1 Acres

* = Introduced or Invasive Species

1 inch = 100 feet
0 25 50 100 Feet



Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

FIGURE 7
Vegetation Observed During Field Efforts - Page 6 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Source: City of San Deigo Public Utilities, 2013; USDA, 2013; ESRI, 2014

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FIGURE 8
Soils Map

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Stadium Wetland Mitigation Project (San Diego River)

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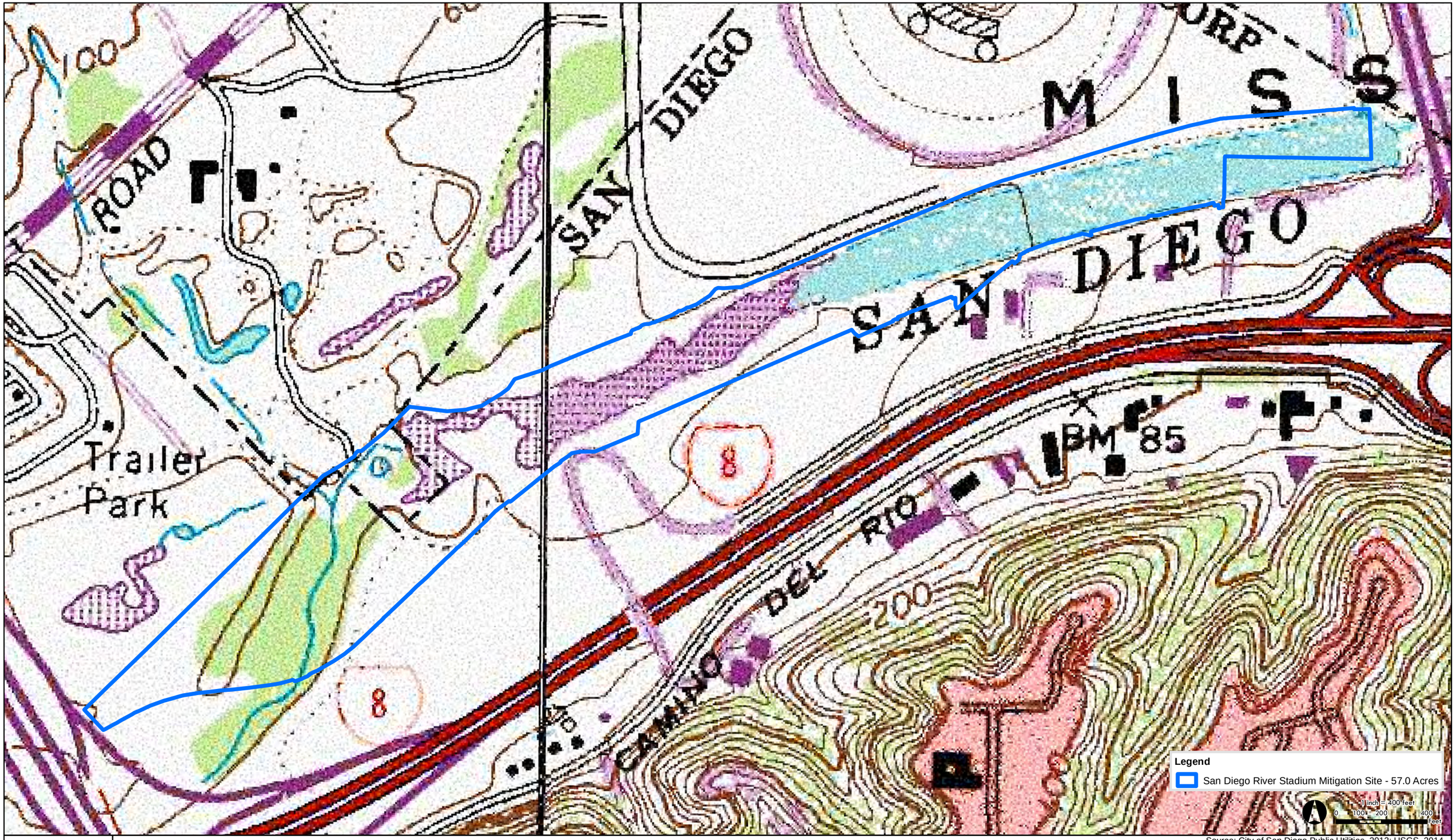

Source: City of San Diego Public Utilities, 2013; USGS, 2014

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FIGURE 9
Local Vicintiy 7.5-Minute USGS Topographic Map

100038033

Stadium Wetland Mitigation Project (San Diego River)

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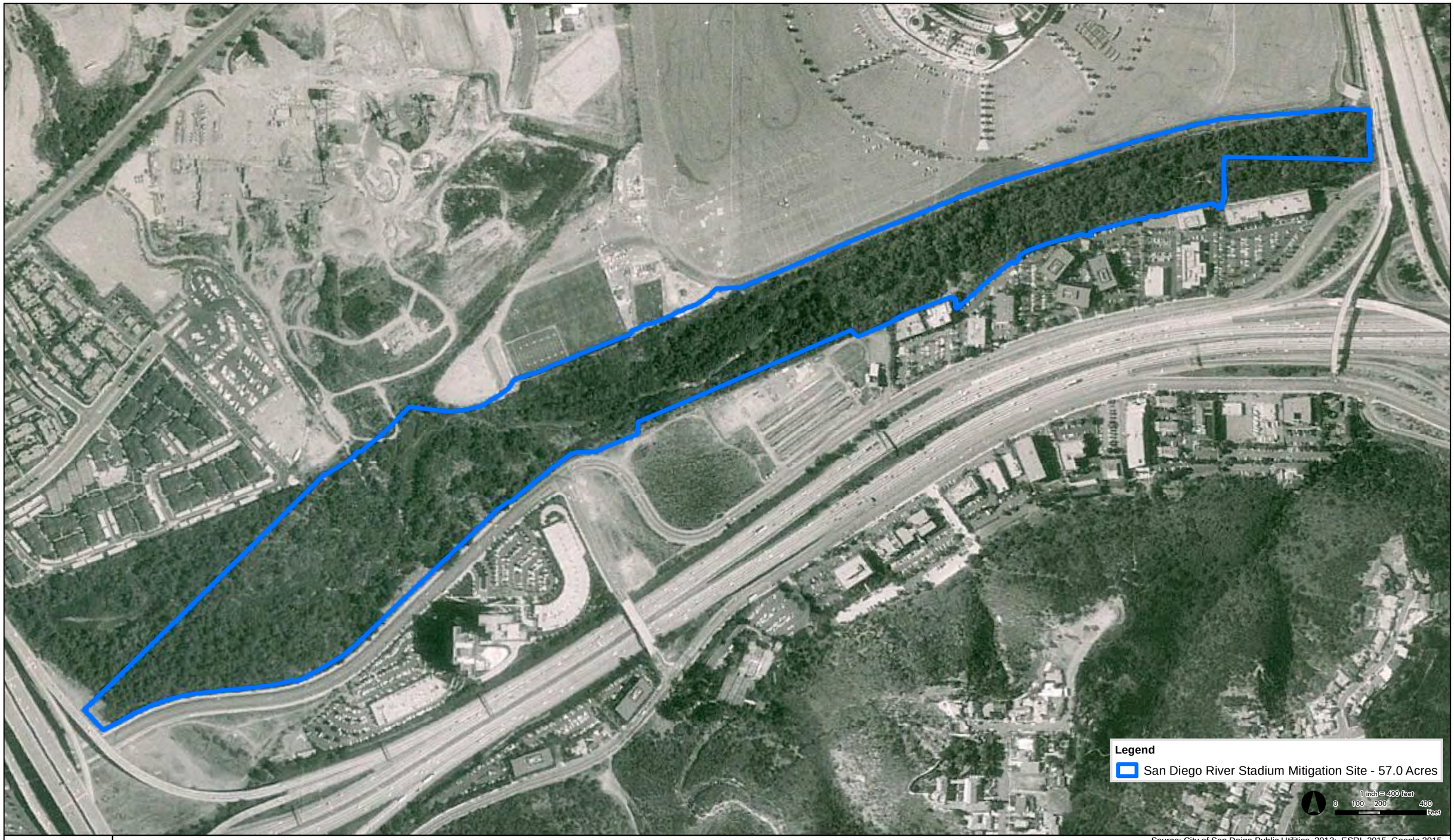

Source: City of San Deigo Public Utilities, 2013; ESRI, 2015, Google 2015

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FIGURE 10
Local Vicinity Historic Aerial Map from 1994

100038033

Stadium Wetland Mitigation Project (San Diego River)

P:\Projects - Biological Resources\100038033 San Diego River Stadium Mitigation Project\GIS\mxd\Fig10_HistoricAerial.mxd

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Drainage of the proposed mitigation site occurs primarily through surface runoff and irrigation practices from the surrounding urban areas. Water is conveyed to the site through the main river channel and natural sloping topography. Flows through the site are primarily through a single low-flow channel with few adjacent high-flow channels forming a very limited braided system. Downstream from the proposed mitigation site, the San Diego River flows approximately 7.8 miles (12.6 kilometers) to the Pacific Ocean.

The National Wetlands Inventory (NWI) defines the entire proposed mitigation site as a palustrine, forested system, and palustrine scrub-shrub system (PFO/SSC). Palustrine systems include all nontidal wetlands. Furthermore, the NWI classifies the area as a seasonally flooded water regime, where surface water is present for extended periods especially early in the growing season but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface (USFWS 2014).

Due to the characteristics of the overall watershed as well as observed local flows, hydrologic conditions at the site are suitable for long term sustainability of restored vegetation.

2.2.4 Functional Assessment

A functional assessment was performed at the proposed mitigation site (Figure 11) to establish and record pre-enhancement and restoration conditions. The California Rapid Assessment Method (CRAM) for riverine wetlands, which is an accepted methodology by the USACE for evaluating the performance of compensatory mitigation and restoration projects, was used for this assessment. CRAM is a cost-effective and scientifically defensible method for monitoring the conditions of wetlands throughout California that can be repeated over time to assist with evaluation of mitigation success.

CRAM was performed at three locations within the proposed mitigation site. CRAM assessment areas were chosen based on the guidelines of the *CRAM for Wetlands Riverine Wetlands Field Book ver. 6.1 (CRAM 2013)* and positioned to ensure AA's were entirely within the boundaries of the proposed mitigation site. The CRAM riverine method was used to analyze a set of metrics that are organized into four main attributes: buffer and landscape context, hydrology, physical structure, and biotic structure. Letter scores (A, B, C, or D) were assigned to each metric, then converted into whole integer scores (12, 9, 6, or 3, respectively) to calculate a final attribute score (or percentage). Each attribute score was then averaged to yield an overall CRAM score for the assessed area. Each attribute as it pertains to the project is discussed in detail in the CRAM letter report, which is included as Appendix D. A summary of CRAM results is provided below in Table 4.

Table 4 CRAM Result Summary

Attribute	*Final Mean Attribute Score*
Buffer and Landscape Context	72.1
Hydrology	81.0
Physical Structure	62.5
Biotic Structure	57.5
Overall Score	68

The overall CRAM score for the project assessment area is considered below average. There are various opportunities to enhance or restore the proposed mitigation site that would increase the overall structure and function of the riverine wetlands (included in Chapter 4 Site Preparation), thereby also increasing the overall CRAM score. CRAM will be used throughout implementation of the mitigation

project to adaptively manage activities and to evaluate the success of mitigation efforts upon completion.

2.2.5 Special Status Species

For the purposes of this investigation, special status species include plants and wildlife that are:

- Listed and protected under the Federal and/or California Endangered Species Acts;
- Listed and protected under other Federal and/or State regulations;
- Sufficiently rare to qualify for listing or protection under Federal and/or State regulations; or
- MSCP Covered Species.

No listed or sensitive species (plant or wildlife) were observed during field efforts associated with project design. Figure 12A and Figure 12B present California Natural Diversity Database (CNDDB) records within 1.0 mile and 5.0 miles (or 1.6 and 8.0 kilometers), respectively, of the proposed mitigation site. Because of the City's involvement with the MSCP, guidance and policies regarding listed and sensitive species as outlined in the MSCP will be followed for the duration of the proposed project. Restoration is a compatible land use in the MHPA, especially for enhancing linkages between prime habitat and eradication non-native species.

In accordance with the MSCP, the impacts of authorized take will be mitigated and minimized as described below. Further consultation with the USFWS or CDFW regarding additional mitigation to reduce impacts to listed species at the proposed mitigation site is not anticipated.

2.2.5.1 Listed and Sensitive Plants

Appendix E presents listed and sensitive plant species potentially occurring in the vicinity of the proposed mitigation site, as identified by the USFWS for the project, CNDDB within a 5.0-mile (8.0 kilometer) radius of the proposed mitigation site, and California Native Plant Society (CNPS) records for the *La Jolla* and *La Mesa* topographic quadrangles (USGS 2011). San Diego ambrosia (*Ambrosia pumila*) and oil neststraw (*Stylocline citroleum*) are species previously recorded as occurring within the proposed mitigation site according to CNDDB records. After considering each species general habitat requirements, those species determined possible to occur onsite are discussed further.

To reduce potential impacts on the species listed below from site restoration, a qualified botanist will survey the proposed mitigation site during the appropriate time of year (blooming period) to determine their presence or absence prior to ground disturbance. If any special status plant species are determined to occur within project boundaries, the population will be clearly marked and avoided during restoration efforts.

2.2.5.1.1 San Diego Ambrosia

San Diego ambrosia is included as a narrow endemic MSCP covered species. This perennial rhizomatous herb is federally listed as endangered and ranked 1B.1 by the CNPS. Habitat for this species includes sandy loam or clay, sometimes alkaline soils often in disturbed areas of chaparral, coastal scrub, valley and foothill grassland, or vernal pools. San Diego ambrosia blooms between April and October. This plant is threatened by development, non-native plants, vehicles, road maintenance, and pedestrian intrusion.

Source: City of San Deigo Public Utilities, 2013; SANDAG, 2014; ESRI, 2014

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FIGURE 11
CRAM Assessment Areas

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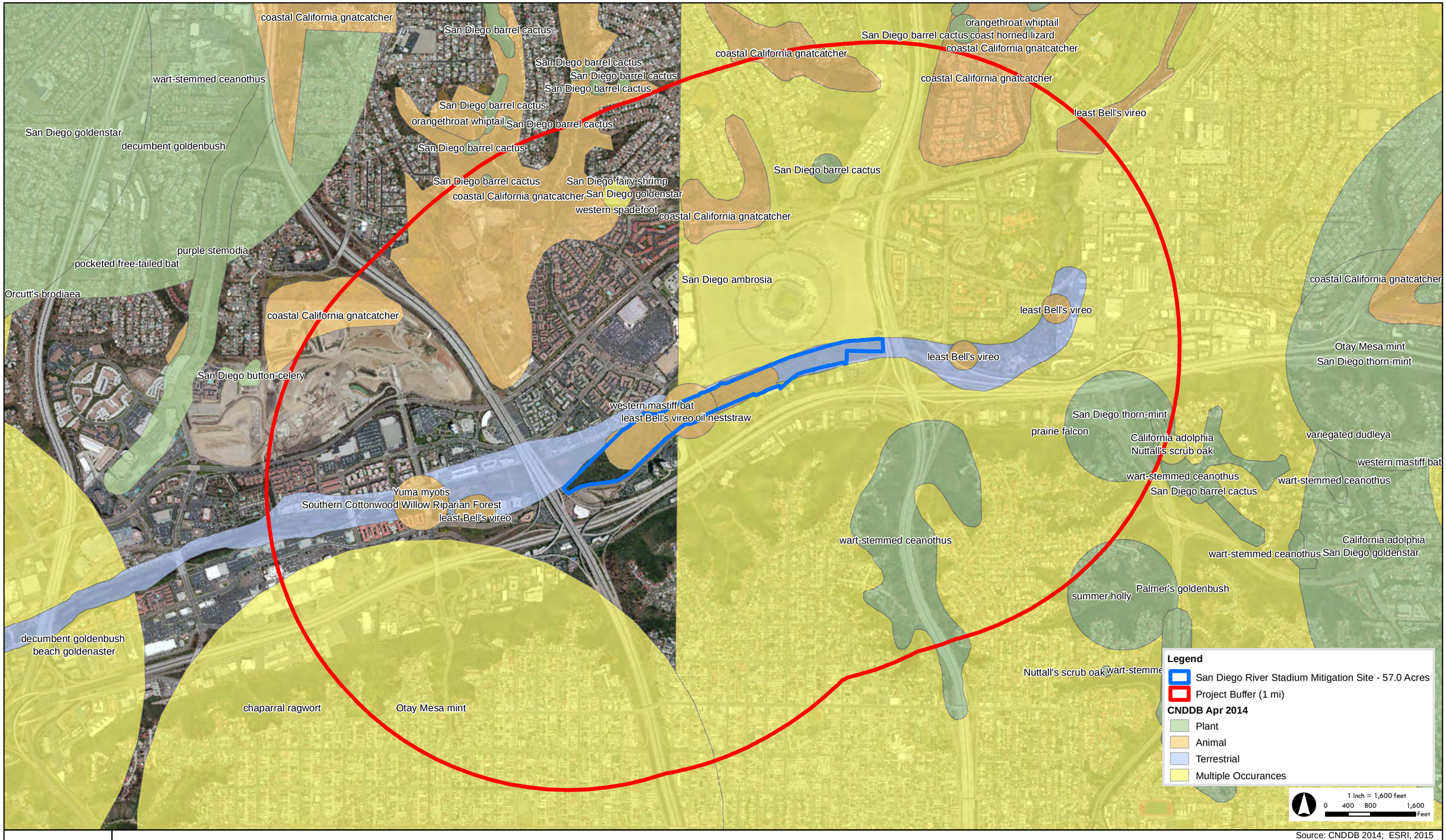
Stadium Wetland Mitigation Project (San Diego River)

P:\Projects - Biological Resources\100038033 San Diego River Stadium Mitigation Project\GIS\mxd\Fig11_CRAM_Site.mxd



Source: CNDDB 2014; ESRI, 2015

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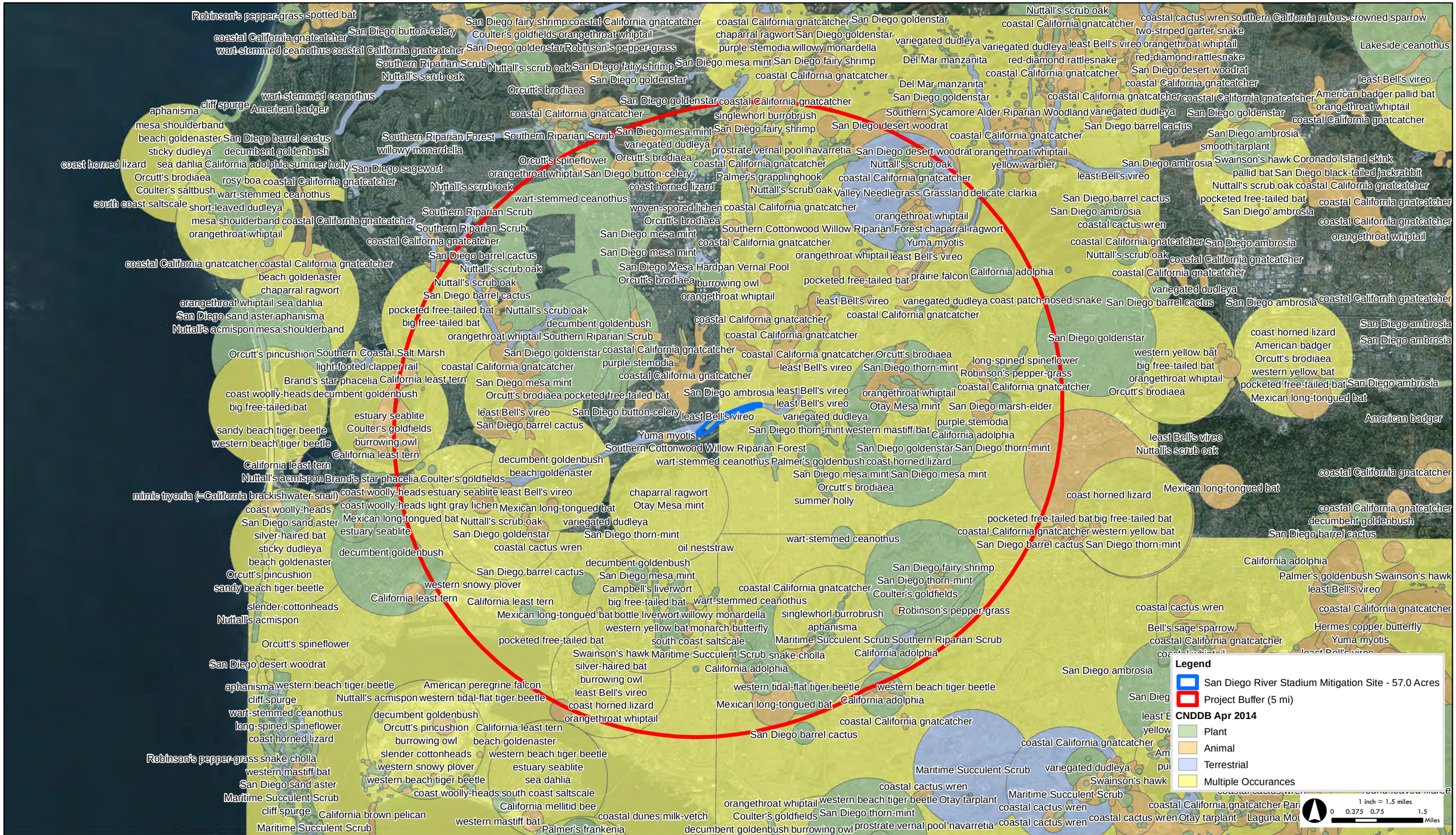
FIGURE 12A
CNDDB Map (1 Mile Radius)

100038033

Stadium Wetland Mitigation Project (San Diego River)

P:\Projects - Biological Resources\100038033 San Diego River Stadium Mitigation Project\GIS\mxd\Fig12A_CNDDB_1mi.mxd



Source: CNDDB 2014; ESRI, 2015

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FIGURE 12B
CNDDB Map (5 Mile Radius)

100038033

Stadium Wetland Mitigation Project (San Diego River)

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2.2.5.1.2 Wart-Stemmed Ceanothus

Wart-stemmed ceanothus (*Ceanothus verrucosus*) is included as a MSCP covered species. This perennial evergreen shrub is ranked 2B.2 by the CNPS. This species is typically found in chaparral habitat, but unidentified species of *Ceanothus* were observed within the proposed mitigation site. Wart-stemmed ceanothus blooms between December and May. This plant is mainly threatened by development.

2.2.5.1.3 Oil Neststraw

Oil neststraw is not a covered species under the MSCP. This annual herb is ranked 1B.1 by the CNPS. Habitat for this species includes clay soils in chenopod scrub, coastal scrub, and valley and foothill grassland. Oil neststraw blooms between March and April. Possible threats to this plant include energy development and urbanization.

2.2.5.2 Listed and Sensitive Wildlife

Appendix F presents listed and sensitive wildlife species potentially occurring in the vicinity of the proposed mitigation site, as identified by the USFWS for the project and CNDDB within a 5.0-mile (8.0 kilometer) radius of the proposed mitigation site. Prairie falcon (*Falco mexicanus*), least Bell's vireo, and western mastiff bat (*Eumops perotis californicus*) are species previously recorded as occurring within the proposed mitigation site according to CNDDB records. After considering each species general habitat requirements, those species determined possible to occur onsite are discussed further.

Existing conditions at the proposed mitigation site are extremely degraded and disturbed, so the site is unlikely to provide crucial habitat for any populations of sensitive or protected wildlife (i.e., nesting birds protected under the Migratory Bird Treaty Act [MBTA]). However, this section of the San Diego River does provide a link between it and other less degraded areas. Therefore, sensitive and other protected species may be present onsite. To reduce potential impacts to native wildlife species and reduce the likelihood of take to listed and protected species during project activities, the following measures will be implemented:

- An employee education program will be mandatory for every person working onsite. The program will be conducted by a qualified biologist and include descriptions and photographs of sensitive and local protected wildlife that can possibly occur onsite. The importance of the area for wildlife, importance of the project, applicable regulations, and procedures to follow if wildlife is encountered during work will also be included in the training. All onsite personnel will sign a log that they have completed the training and understand the sensitivity of the area in regards to biological resources. A refresher training session will be completed annually during project implementation.

- The project biologist, project manager, and City personnel will have stop work authority if a possible sensitive wildlife species is encountered during project activities. A City contact person will be established and phone number provided to all onsite personnel (and presented during the employee education program). Protocol will dictate that the City will be contacted and provide guidance prior to work resuming in any area that a potentially sensitive wildlife species was observed.

- Initial removal and treatment of non-native vegetation will not occur during the breeding season for Federal and State listed bird species or those protected under the MBTA known to potentially occur in the area (March 15 to September 15). Pupping season for bats should also be largely avoided by restricting initial clearing activities during this timeframe. However, maintenance activities will be conducted throughout the year. Maintenance activities, such as

weeding, will cause minimal disturbance to the proposed mitigation site, so no pre-activity surveys will be performed. However, all personnel working at the proposed mitigation site will complete the employee education program (described above), so it is expected that any sensitive or protected species, including nesting birds protected under the MBTA and bats, will be avoided and their presence reported to the City.

If any listed or protected species are found onsite during project activities, the sighting will be reported to the appropriate regulatory agency (USACE, USFWS, and/or CDFW) and the City will adaptively manage future site activities to further protect the species.

As the restoration site progresses and native habitat is restored, wildlife, including sensitive and protected species, is expected to be present and use the site more frequently. The project will benefit wildlife by providing additional habitat appropriate for cover and reproduction. Increased cover and native vegetation will also attract foraging prey species that will then support higher predators. Additional project benefits for specific species are included in the sections below.

2.2.5.2.1 Southern Steelhead

Southern steelhead (*Oncorhynchus mykiss irideus*) is not a MSCP covered species. This southern California distinct population segment is federally listed as endangered and a CDFW species of special concern. The Federal listing refers to populations from Santa Maria River south to San Mateo Creek in San Diego County. The mitigation project does not involve significant disturbance to the San Diego River and practices to maintain water quality will be implemented to the satisfaction of the RWQCB. Therefore, no significant impact to this species is expected during project implementation.

2.2.5.2.2 Western Pond Turtle

Western pond turtle (*Emys marmorata*) is included as a MSCP covered species. This reptile is a CDFW species of special concern. Habitat for this species includes rivers and streams with aquatic vegetation and suitable basking sites. Management conditions require restoration or enhancement of habitat, especially eradication of harmful non-native vegetation, and minimization of human intrusion impacts. The mitigation project is consistent with these objectives. While no western pond turtles have been observed within or adjacent to the proposed mitigation site, the project will improve potential habitat and remove/reduce human activity that may deter western pond turtles from using the site.

2.2.5.2.3 Two-Striped Garter Snake

Two-striped garter snake (*Thamnophis hammondii*) is not a MSCP covered species. This reptile is a CDFW species of special concern. Habitat consists of permanent freshwater, often along streams with riparian growth and rocky areas. Passive relocation measures, which will be described during the employee education program, should ensure avoidance of this snake during project implementation. Restoration of native riparian habitat at the proposed mitigation site will provide long-term benefits for survival of this species in the region.

2.2.5.2.4 Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is included as a MSCP covered species. This bird is listed as threatened in the State. Habitat for this species includes riparian corridors with nearby grasslands for forage. Swainson's hawk is considered a rare migrant through the San Diego area. Therefore, project implementation is not expected to significantly impact this species. Once complete, the project will create additional roost sites and potential nest areas for Swainson's hawk.

2.2.5.2.5 Yellow-Billed Cuckoo

Yellow-billed cuckoo (*Coccyzus americanus occidentalis*), western distinct population segment, is not a MSCP covered species. This bird is listed as federally threatened and State endangered. Habitat consists of riparian forest along broad, lower flood-bottoms of larger river systems. Roosting sites consist of densely vegetated riparian areas, typically with willows. Nesting occurs in riparian jungles of willow, often mixed with cottonwoods (*Populus* sp.), and having an understory of blackberry (*Rubus ursinus*), nettles (*Urtica dioica*), or wild grape (*Vitus californica*). Reproduction occurs from mid June to mid July. Loss of riparian habitat contributes to the decline of this species, so restoration of the proposed mitigation site will benefit the yellow-billed cuckoo by providing foraging and nesting habitat.

2.2.5.2.6 Southwestern Willow Flycatcher

Southwestern willow flycatcher is included as a MSCP covered species. This bird is listed as both federally and State endangered. Habitat consists of dense riparian areas for breeding during the spring and summer in southern California. Management considerations include clearing of occupied habitat between September 15 and March 15 (outside the nesting season). The mitigation project includes survey and avoidance measures, such as restricted work timeframes. Revegetation and restoration of native riparian habitat will benefit this species and provide additional potential nesting area. Therefore, the mitigation project is consistent with management objectives for southwestern willow flycatcher.

2.2.5.2.7 Prairie Falcon

Prairie falcon is not a MSCP covered species. This bird is on a CDFW watch list for population declines. Habitat consists of breeding sites on cliffs and foraging in open areas often far from nests. Occurrence of this species within the proposed mitigation site is likely restricted to the occasional foraging migrant. Therefore, project implementation is not expected to significantly impact prairie falcon. The project will ultimately increase potential prey for this species within the area.

2.2.5.2.8 American Peregrine Falcon

American peregrine falcon (*Falco peregrines anatum*) is included as a MSCP covered species. This bird has been federally delisted and CDFW fully protected. Habitat includes breeding sites on river or stream banks with open areas near water for forage. No known nest sites are located within or near the project site. Therefore, project implementation is not expected to significantly impact American peregrine falcon. Upon completion, the project will provide additional roost and forage opportunities for this species.

2.2.5.2.9 Least Bell's Vireo

Least Bell's vireo is included as a MSCP covered species. This bird is both federally and State listed endangered. The proposed mitigation site is situated along a section of river known to provide habitat for least Bell's vireo, which nests in the area after wintering in Baja, California. The birds typically arrive in San Diego County as early as mid-March and remain as late as September (City of San Diego 2013b). This species is of special concern for the project, because there are documented occurrences at the site. Impacts to least Bell's vireo will be avoided by performing the initial clearing of vegetation outside of the breeding season (between September 15 and March 15). Maintenance activities, such as herbicide application, trash removal, and irrigation, are not expected to have an effect on least Bell's vireo. Project revegetation and restoration of native riparian habitat with installation of upland buffer will benefit this species by providing additional nesting habitat. Therefore, the mitigation project is consistent with management objectives for least Bell's vireo.

2.2.5.2.10 Bats

Two CDFW species of special concern bats, western mastiff bat and western yellow bat (*Lasiurus xanthinus*) have the potential to roost within trees at the proposed mitigation site. Additional bat species that may occur onsite and have declining populations, but are not currently listed by Federal or State regulatory agencies, include silver-haired bat (*Lasionysteris noctivagans*), hoary bat (*Lasiurus cinereus*), and Yuma myotis (*Myotis yumanensis*). Employee education, especially for crews working in winter months when some bats hibernate, and passive relocation measures should ensure avoidance of these species during project implementation. Furthermore, restriction of initial clearance activities (between September 15 and March 15) should also serve to avoid peak pupping season for most bat species. Since non-native palms will be removed as part of this project, potential roosting sites may be reduced for some species, such as the western yellow bat. However, the impact of this reduction is not expected to be significant. Plus, restoration of native riparian habitat at the proposed mitigation site would provide roost alternatives, such as cottonwood, and increase native cover and foraging habitat that will ultimately benefit bats within the region.

2.2.5.3 Critical Habitat

Critical habitat is designated by the USFWS under the Federal Endangered Species Act. Critical habitat refers to a specific geographic area(s) that contain features essential for conservation of a threatened or endangered species and that may require special management and protection. This designation may include an area that is not currently occupied by the species but that will be needed for recovery.

No critical habitat was identified within the proposed mitigation site or is expected to be impacted by implementation of project objectives.

2.2.5.4 Wildlife Corridor

Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and undisturbed areas that would otherwise be fragmented. Maintaining the continuity of established wildlife corridors is important to *(a)* sustain species with specific foraging requirements, *(b)* preserve a species' distribution potential, and *(c)* retain diversity among many wildlife populations. Therefore, resource agencies consider wildlife corridors to be a sensitive resource.

The proposed mitigation site is located along the San Diego River, which provides an important movement corridor for regional wildlife to spread throughout an otherwise urban area.

2.3 Regulatory Jurisdictions

The USACE, USFWS, CDFW, RWQCB, and City have regulatory jurisdiction over the mitigation project as described below. The project has been designed in accordance with guidance from these entities for restoration of sensitive habitats. Each agency will have the opportunity to review and comment on the project. The City will also obtain appropriate permits and authorizations prior to project implementation.

The USACE, under the Clean Water Act, has permitting authority over activities affecting waters of the U.S., which include: navigable waters and their tributaries; all interstate waters and their tributaries; natural lakes; all wetlands adjacent to other waters; and all impoundments of these waters. USACE jurisdiction typically includes lands below the OHWM and wetlands or similar areas above the OHWM with hydrologic connection or significant nexus to a navigable waterway. The entire proposed mitigation

site is related to and supported by the San Diego River, a navigable waterway, and as such is subject to USACE jurisdiction.

The Fish and Wildlife Coordination Act requires consultation with the USFWS, National Oceanic and Atmospheric Administration Fisheries, and responsible state wildlife agency for any federally authorized action to control or modify surface waters. Therefore, any project proposed or permitted by the USACE under the CWA must also be reviewed by the Federal wildlife agencies and CDFW.

The CDFW also manages a Lake and Streambed Alteration Program, which requires notification of any proposed activity that may substantially modify a river, stream, or lake. The notification applies to any work undertaken in or near a river, stream, or lake that intermittently flows through a bed or channel, including ephemeral streams, desert washes, watercourses with a subsurface flow, and (at times) work undertaken within the floodplain of a body of water. These jurisdictional waters of the State are delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider. Therefore, the entire proposed mitigation site is within CDFW jurisdiction. Furthermore, under California Government Code, CDFW is required to conduct due diligence when approving government entities to hold and manage mitigation lands and works closely with USACE to evaluate mitigation options.

Under the CWA and the California Porter-Cologne Water Quality Control Act, an activity which may result in a discharge into a water body must request state certification from the RWQCB that the proposed activity will not violate Federal and State water quality standards. This generally includes all waters subject to the jurisdiction of the USACE and CDFW, including isolated waters excluded from USACE jurisdiction.

Lastly, the City protects sensitive environmental resources through implementation of the MSCP and City policies under the California Environmental Quality Act (CEQA). The mitigation project is consistent with MSCP guidance and City regulations.

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3.0 Mitigation Roles and Responsibilities

3.1 Ownership

The project site is located on City-owned property designated as conserved, open space.

3.2 Qualifications

The City is responsible for oversight of various mitigation projects that involve wetlands, water quality, and sensitive biological resource issues throughout its jurisdiction. Specifically, the Engineering and Program Management Division of the Public Utilities Department (PUD) has successfully completed mitigation projects in compliance with Federal, State, and local agencies to allow use of various sites as mitigation for water and sewer projects. Examples of similar past or ongoing mitigation projects specifically under the PUD include (City of San Diego 2014):

- Completion of various habitat re-vegetation projects associated with operations and maintenance for the pipeline and long-term access projects related to the Canyon Sewer and Long Term Access Program;
- Development of the Rose Canyon Mitigation Site (completion pending USACE approval) that created 5.05 acres of riparian forest as well as enhanced 0.61 acres of riparian forest and 5.03 acres of upland (native grassland and Diegan coastal sage scrub);
- Development of the Tecolote Canyon Mitigation site that created 1.61 acres of wetland habitat and restored 3.37 acres of upland habitat; and
- Development and completion of the San Diego Wetland Creation site that created 3.43 acres of riparian habitat and 2.0 acres of Diegan coastal sage scrub habitat, which is located directly adjacent to the project.

These mitigation projects will ultimately result in mitigation credits to be used at the discretion of the City to offset project impacts, just as restoration of the San Diego River proposed mitigation site discussed in this document will provide. The City also has numerous qualified biologists' permanently on staff to supervise implementation of the project and complete any required performance monitoring tasks.

3.3 Financial Assurances

3.3.1 Short Term

City Council approval is required to allocate funding and enter into a contract for implementation of this project; this formal approval provides the financial assurances necessary to effectively implement the project. This project will require a three step process to gain funding approval, this will include being presented and voted on at the Environment Council Committee, and two hearings at separate City Council Meetings. The approval of this project will require an Ordinance. An Ordinance is a law adopted by the City Council that: amends, repeals, or supplements the Municipal Code; provides zoning specifications; or appropriate money for specific purposes. Once an Ordinance has been issued for this project, the City guarantees to fund the project through completion. Additionally, the City's purchasing and contracting process requires additional assurances that all work under the proposed project is bonded and insured to ensure that all contracts are completed successfully.

3.3.2 Long Term

The City's general and enterprise funds provide for maintenance and management of City owned lands along the river through the budget process with approval from the City Council. For security issues, the City provides funding for the Police Department and a Ranger Program within the Park and Recreation Department (City of San Diego 2013b). Subsequent to the initial five-year work plan, ongoing maintenance is provided through the City's annual operations and maintenance budget. Based on cost of recent long term maintenance for existing PUD restoration projects, the average cost per an acre for long term maintenance is approximately $449 a year. This equates to roughly $25,593 for 57 acres, the Stadium Wetland Mitigation Project. PUD will be responsible for the long term maintenance of the site. Each year PUD's Environmental Section provides a five year budget projection that is included with the City's overall operation and maintenance budget. Each year this budget is reviewed at the Director level and then forwarded to the Mayor to present to the City Council and the Public. Over the next five years the Environmental Section's budget ranges from $2 Million to $3.3 Million annually. Estimated long term maintenance cost for the Stadium Project represent approximately 1% of the Environmental Section's annual budget, and will be included in the annual budget upon completion of the initial maintenance period. In addition, to ensure regulatory compliance with existing project permits and the desire to continue to allocate credits from the site in the future, funding for continued maintenance of the site would be prioritized above other projects.

3.4 Long-Term Assurances

Long-term monitoring and management of the proposed mitigation site will be in accordance with conditions outlined in the MSCP and MSCP Implementing Agreement. The agreement outlines City responsibilities for managing MHPA lands. Once the five-year term of the work plan is completed, the proposed mitigation site will continue to receive management and monitoring by the City in accordance with region-wide efforts to satisfy MSCP requirements.

3.4.1 Site Protection

The City is in a unique position to provide reliable long-term management and site protection due to the extensive preserve management responsibilities incorporated into the MSCP. Furthermore, the proposed mitigation site is owned by the City and a part of the MHPA, Designated Open Space in the City General Plan, and a part of the adopted San Diego River Park Master Plan and Mission Valley Community Plan. All these designations limit development within and encroachment of the proposed mitigation site through local government ordinance.

The USACE requires that long-term site protection be provided for by the project proponent. For government property like the City-owned proposed mitigation site, USACE stipulates that long-term protection may be achieved through integrated natural resource management plans such as the MSCP.

The City is obligated to protect and manage the Stadium Wetland Mitigation area for purposes of native habitat and species conservation in accordance with the MSCP Implementing Agreement (City of San Diego 1997a). Section 10.2 of the Implementing Agreement requires the City to preserve lands within the MHPA. Sections 10.3, 10.4, and 10.5 require the implementation of preserve guidelines, land use adjacency guidelines, and planning policies and design guidelines. These policies have been incorporated into the City's Land Development Code and serve to protect lands within the MHPA from direct and indirect habitat degradation. Section 10.6 of the Implementing Agreement defines the City's responsibilities for Preserve Management and refers to the MSCP Framework Management Plan which is Section 1.5 of the City's Subarea Plan (City of San Diego 1997a).

City MHPA resources are provided both interim and permanent protection under MSCP guidelines. Protection of biological resources occurs through the Open Space and Conservation Elements of the General Plan and other community plans, the Resource Protection Ordinance (RPO) and Guidelines, the Environmental Quality Ordinance, and Environmentally Sensitive Lands (ESL) regulations. The RPO in particular is designed to protect sensitive biological resources through limitation of encroachment into privately owned MHPA lands typically to a maximum of twenty –five percent of the parcel. City MHPA resources are permanently protected with open space easements, dedications, zoning, general plan designations or other protective measures to ensure that such lands are managed and preserved consistent with the MSCP. The proposed mitigation site occurs within City owned land in the MHPA that is designated Open Space, designated floodway, carries a sensitive habitat use restriction, and is included as open space in two City Council approved plans (San Diego River Park Master Plan and Mission Valley Community Plan).

Section 21.3 of the Implementing Agreement states that "not withstanding the stated term as herein set forth, the Parties agree and recognize that once Take of a Covered Species has occurred and/or their habitat modified within the Subarea, such Take and habitat modification will be permanent. The Parties, therefore, agree that the preservation and maintenance of the habitat provided for under this Agreement shall likewise be permanent and extend beyond the term of this Agreement." Therefore, although the Term of the MSCP is 50 years (1997 - 2047), the preservation of lands within the MHPA, especially in areas where preserved lands are specifically required due to a permanent impact/take, as in the Stadium Wetland Mitigation site, is explicitly permanent.

The City has established protections for lands within the MHPA, in conformance with the Implementing Agreement, through Section 143.0101 of the City's Land Development Code (Environmentally Sensitive Lands Regulations). This section of the Land Development Code incorporates Sections 1.4.1 and 1.4.2 of the MSCP Subarea Plan that restricts uses within the MHPA in a similar fashion as a conservation easement or deed restriction. The Land Development Code also incorporates Section 1.4.3 of the MSCP Subarea Plan that restricts land uses adjacent to the MHPA, and precludes establishment of potential adverse drainage conditions, toxic chemical uses, direct lighting, noise, and invasive species. These restrictions in particular, provide greater site protection and ensure a higher degree of long-term sustainability than typical conservation easements and/or deed restrictions.

3.4.2 Long Term Management

The proposed mitigation site will be monitored and managed in accordance with conditions outlined in the MSCP and MSCP Implementing Agreement. This includes such things as removing and controlling invasive species, removing litter and trash, installing barriers and signs, and enforcing, preventing, and removing illegal intrusions. Monitoring is a required component of the MSCP to document the protection and changes to habitats and covered species. Monitoring occurs on an annual basis for species specific monitoring and every three years for habitat monitoring as described in the *Biological Monitoring Plan for the MSCP* (Ogden 1996). These items are described in further detail below.

City of San Diego Proposed Long-Term Management:

Monitoring and Patrolling: The City is responsible for directing and/or conducting all long term monitoring efforts and remedial measures. City monitors will make periodic visits to the site to assess the site's condition and evaluate possible impacts from stressors such as: trash, invasive species presence, erosion, trespassing, vandalism, and other environmental and anthropogenic stressors which may negatively affect the site's status as native riparian habitat. Remedial and management actions will be consistent with MSCP and MHPA guidelines and regulations.

Trash: Anthropogenic trash, as well as non-native plant species biomass shall be removed from the site, and disposed of in a legal and appropriate manor. Biomass originating from native plant species shall remain on site for carbon cycling, and is not considered "trash." Potential sources of anthropogenic trash are mainly projected to come from storm flow, but small amounts may result from illegal trespass.

Non-Native Vegetation Control: Non-native plant species, particularly perennial species which have historically shown to be highly invasive, shall be controlled. Control may involve hand pulling prior to seed-set (for species where the entire root mass may be removed), herbicide application, cutting, mechanical removal, or a combination thereof. Any herbicide use shall be conducted following the manufactures recommendations, and applied in a manor compatible with applicable federal, state, and local regulations, consistent with MSCP management guidelines. Biomass from non-native vegetation shall be removed from the site, and disposed of in a legal and appropriate manor. Care will be taken to avoid spreading root, shoot or seed material around the site or in the stream which may provide opportunity for dissemination or additional colonization. Treatment and/or removal of non-native vegetation will be evaluated for absence/presence prior to engaging the control methods, particularly during the nesting/breeding season (generally March 15 through September 15). All federal, state and local work restrictions for native wildlife habitat shall be followed.

Trespassing: No public access to the site will be permitted. If evidence is observed that the site is being regularly accessed, the City shall evaluate the nature of the trespassing, and develop remedial measures to mitigate the impact, and further discourage site access by the public. Remedial actions may include increasing frequency of ranger patrols and monitoring, additional signage and/or addition of fencing as appropriate.

Other Potential Environmental Stressors: Other stressors which have the potential to negatively affect the habitat quality of the site include, but are not limited to: fire, flood, excessive erosion or aggradation, significant streambed migration, or effects from adjacent or upstream land uses. Should effects from environmental stressors or events be observed, the City shall perform an analysis to identify the effects of the stressor(s), and formulate remedial action(s) intended to support dynamic habitat equilibrium and wildlife use of the site. Depending on the nature of the stressor, consultation with additional regulatory agencies and/or specialists may be warranted. Any adaptive management, remedial action or regular management activity performed shall be implemented in accordance with applicable regulatory guidelines.

Biological Monitoring: The City developed a Biological Monitoring Plan (Odgen 1996). The City has implemented ongoing biological monitoring and preserve management in accordance with these documents. More recently, the City has partnered with other regional agencies responsible for management of lands in accordance with several Natural Communities Conservation Plans and Habitat Conservation Plans and has developed a plan for more efficient management at a regional scale: Management Strategic Plan for Conserved Lands in Western San Diego County (SDMMP 2013). It is expected that this regional approach will guide management and monitoring in the future while maintaining conformance with the MSCP Implementing Agreement.

3.5 Mitigation Credit Determination

Each regulatory agency defines wetland mitigation activities differently.

The USACE (per 33 CFR 332) defines rehabilitation and enhancement as described below:

- **Rehabilitation** (considered a type of restoration) is 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. Restoration is defined as the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource.
- **Enhancement** is the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

The RWQCB defines rehabilitation and enhancement as the following:

- **Rehabilitation** (considered a type of restoration) is the improvement of the general suite of functions of degraded vegetated or unvegetated waters of the U.S. and/or State (i.e., removal of a heavy infestation or monoculture of exotic plant species from jurisdictional areas and replacing with native species).
- **Enhancement** is the improvement to one or two functions of existing vegetated or unvegetated waters of the U.S. and/or State (i.e., removal of patches of exotic plant species from an area containing predominantly natural plant species).

The City uses traditional definitions for restoration and enhancement for wetland mitigation under ESL regulations as listed below (City of San Diego 2012):

- **Wetland restoration** is an activity that re-establishes the habitat functions of a former wetland. An example is the excavation of agricultural fill from historic wetlands and the re-establishment of native wetland vegetation.
- **Wetland enhancement** is an activity that improves the self-sustaining habitat functions of an existing wetland. An example is removal of exotic species from existing riparian habitat.

USFWS and CDFW do not provide official definitions for restoration or enhancement, but generally follow traditional definitions as described for the City.

Based on conditions observed while conducting baseline investigations and regulatory definitions for mitigation activities, compensatory mitigation can be achieved through restoration, specifically rehabilitation and enhancement of the site (Figure 13). As described by the USACE and RWQCB, rehabilitation credits will be attained through removal of heavy infestations or monocultures of target invasive species followed by establishment of native riparian species. Upland areas beyond the riparian habitat (approximately 1.1 acres of the proposed mitigation site) will be restored to Diegan coastal sage scrub for upland credit. Enhancement credits will be achieved in areas of the site that contain some native plant species in the over story, but where target species and anthropogenic trash will be removed from the understory for a minimum five year period; native vegetation will be augmented with

application of native seed mix to help develop a native understory. All areas where rehabilitation and enhancement activities occur will be subject to success standards. This excludes utility and access easements as well as the freshwater river channel. Therefore, full credit for all treated acreage outside utility easements and river channel shall be obtained.

The goal of compensatory mitigation achieved with this project is to offset impacts to aquatic resources through the restoration (rehabilitation and enhancement) of aquatic resources at the site. Both rehabilitation and enhancement will result in an increase in aquatic resource functions. No-net-loss credit will be achieved through extensive rehabilitation of large patches (or monocultures) of target species, such as arundo and pampas grass, which will result in an increase of native wetland area. Portions of the restoration areas are currently considered non-wetland waters of the U.S., following completion of this project, these areas are expected to meet USACE criteria to be considered jurisdictional wetlands. These rehabilitated areas should, therefore, be considered as mitigation for certain permanent impacts to achieve no-net-loss of wetland habitat. Rehabilitation restoration of heavy infestations of invasive monocultures has been used for no-net-loss credit by the USACE and other agencies in the past on a project-by-project basis as well as in the context of programmatic mitigation projects such as the Santa Ana River Mitigation Bank and Santa Margarita Arundo Control Fund In-Lieu Fee Mitigation Program (URS 2013). The amount of credit is based on the number of acres at the site where rehabilitation and enhancement activities will occur.

The pre- and post-construction site conditions are presented in Table 5 and the number and type of credits that will be created at the proposed mitigation site are shown in Table 6.

Table 5 Mitigation Site Credit Description (USACE Jurisdiction)

Pre-Construction Site Condition	*Post-Construction Site Condition*					
Habitat Types	*Habitat Types*	*Vegetation*	*Hydrology*	*Mitigation Method*	*Acres*	*CRAM*
Wetland Waters of the U.S.						
Fresh Water Marsh	Fresh Water marsh	Coastal and Valley Freshwater Marsh	Perennial	Enhancement	0.2	Riverine
				Total	0.2	
Non-Wetland Waters of the U.S.	***Wetland Waters of the U.S.***					
Riparian Woodland	Riparian Woodland	Southern Riparian Woodland	Perennial	Enhancement	24	Riverine
Non-Native Riparian	Riparian Woodland	Southern Riparian Woodland	Perennial	Rehabilitation	15.3	Riverine
				Total	39.3	
Buffer Habitats						
Riparian Woodland	Riparian Woodland	Southern Riparian Woodland	Perennial	Enhancement	8	Riverine
Non-Native Riparian	Riparian Woodland	Southern Riparian Woodland	Perennial	Rehabilitation	5.5	Riverine
				Total	13.5	
Non-Aquatic Mitigation Excluding Buffer Areas						
Non-native Grasslands	Coastal Scrub	Diegan Coastal Sage Scrub	Upland	Restoration	1.1	N/A
				Total	1.1	

Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 13
Mitigation Credit Areas

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Table 6 Jurisdictional Credit Acreage/Yield

Jurisdictional Resource	*Potential Acreage*		
	Enhancement	*Rehabilitation*	*Total*
USACE			
Freshwater Marsh (Wetland)	0.2	-	0.2
Riparian Woodland (Wetland)*	24.0	15.3	39.3
Riparian Woodland (Buffer)	8.0	5.5	13.5
Total USACE Credit	32.2	20.8	53.0
RWQCB			
Freshwater Marsh (Wetland)	0.2	-	0.2
Riparian Woodland (Wetland)*	24.0	15.3	39.3
Riparian Woodland (Buffer)	8.0	5.5	13.5
Total RWQCB Credit	32.2	20.8	53.0
CDFW			
Freshwater Marsh	0.2	-	0.2
Riparian Woodland	32.0	20.8	52.8
Total CDFW Credit	32.2	20.8	53.0
City of San Diego			
Freshwater Marsh	0.2	-	0.2
Riparian Woodland	32.0	20.8	52.8
Diegan Coastal Sage Scrub	-	1.1	1.1
Total City Credit	32.2	21.9	54.1

* This area is currently considered non-wetland waters of the U.S., but after restoration is expected to meet the criteria necessary to be considered jurisdictional wetland waters of the U.S.

The City proposes to establish the proposed mitigation site to its maximum potential within a five-year period.

The credit release schedule for the project is shown in Table 7. The schedule begins (at Year 0) with a funding commitment and contract award by the City. This solidifies the City's commitment to complete the project within the proposed timeline. The project will provide mitigation credit to offset both previous and future impacts from City projects within the service area (Figure 3) such as:

- Alvarado Channel Maintenance: Project involves restoring the capacity of the flood control channel by removing vegetation and performing necessary maintenance. Mitigation is required to compensate for wetland impacts during the event and for future channel maintenance.
- Murphy Canyon Channel Maintenance: Project involves restoring the capacity of the flood control channel by removing vegetation and is scheduled to be conducted in the fall of 2014. Mitigation is required to compensate for wetland impacts associated with the current project and subsequent maintenance activities.
- First San Diego River Improvement Plan: Proposed Public Works project for flood prevention that involves dredging in the San Diego River. Mitigation is required to compensate for wetland impacts associated with the project.

- Future Storm water Maintenance: New projects are currently in development for flood control maintenance that will involve impacts to channels with wetlands. Mitigation will be required to offset unavoidable impacts to aquatic resources.
- Future Public Utilities Projects: Maintenance, repair, or installation of public utilities projects in the future that would result in impacts to jurisdictional resources. Mitigation will be required to offset these impacts.
- Future City Projects: Projects could include, but are not limited to, the following: flood prevention dredging, installation of recreational trails, maintenance/repair activities, utility installation, road widening, construction activities, access path installation, and any other activity that the City would be expected to complete. Mitigation will be required to offset unavoidable impacts to aquatic resources when implementing such projects.

Table 8 provides credit information for City projects requiring mitigation. The City is committed to achieving credit within the timeline presented in order to satisfy mitigation requirements of the projects listed above as well as other potential future projects.

Mitigation credits can only be used on one occasion by the City and will not accumulate additional value over time once used. The resource agencies and City may define specific areas of the advance proposed mitigation site (and associated credits) to address specific proposed impacts. In some cases, proposed impacts may require both critical function mitigation onsite at the impact location and mitigation with advance credits (USACE 2012).

The City will maintain a ledger to document use of all advance credits. Each transaction proposed for a specific impacting project will be documented within the ledger and submitted to the appropriate agencies (see Appendix G for example ledger). The opportunity to use advance mitigation credits generated by the project will not expire as long as the performance standards have been achieved (USACE 2012).

Table 7 Credit Release Schedule

Percentage of Credit Release	*Release Criteria*	*Metric Methodology*
15%	Written project approval	Acceptance of project by regulatory agencies and concurrence site is suitable as compensatory mitigation; City funding commitment and contract award
25%	Site preparation and planting installation complete	Completion of invasive eradication and 120-Day Plant Establishment Period; Five-Year Maintenance Period and biological monitoring begins
25%	Year 1 monitoring report and performance standards	Continue maintenance program and biological monitoring; adaptively manage to achieve performance standards; Year one performance standards have been met.
20%	Year 3 monitoring report and performance standards	Year three performance criteria have been attained and the first comprehensive monitoring report submitted to USACE
15%	Year 5 monitoring report and performance standards	Final performance standards have been attained, and an annual status report has been submitted to USACE.

Table 8 City Projects Requiring Mitigation

	Riparian Woodland (USACE-Wetland) Rehabilitation[1]	*Riparian Woodland (USACE-Wetland) Enhancement*[1]	*Riparian Woodland (USACE-Buffer) Rehabilitation*	*Riparian Woodland (USACE-Buffer) Enhancement*	*Total*
Total Credits	15.3	24.2	5.5	8.0	53.0
Estimated Deduction for Murphy Canyon[2]	0.37	1.67	0.893	1.35	4.283
Estimated Deduction for Alvarado Canyon[2]	1.655	2.59	-	-	4.245
Estimated Deduction for FSDRIP Maintenance[2]	0.09	0.09	-	-	0.18
Estimated First Release and Deductions to Satisfy RWQCB Requirements					
1st Release (15%)[3]	2.295	3.63	0.825	1.2	7.95
Estimated Deduction for Murphy Canyon[4]	0.23	0.08	0.87	1.35	2.53
Estimated Deduction for Alvarado Canyon[4]	0.35	1.09	-	-	1.44
Estimated Deduction for FSDRIP Maintenance[4]	0.09	0.09	-	-	0.18
Total RWQCB Deductions	0.67	1.26	0.87	1.35	4.15

[1] Currently USACE Non-Wetland Waters

[2] Estimated deduction for City SDP mitigation and third-party agreements. Greater or lesser mitigation may be provided to other agencies, depending on their requirements.

[3] Total Credits and 1st Release are currently only an estimate, actual credits available will be determined upon implementation of the project. Any deficiencies in credit types required for already approved projects will be rectified by substituting with equal or higher value credit types and/or through discussions with the appropriate Agency.

[4] Estimated deduction for RWQCB mitigation. Greater or lesser mitigation may be provided to other agencies, depending on their requirements.

4.0 Site Preparation (Work Plan)

Compensatory mitigation is proposed to be achieved through implementation of the following work plan that will restore and enhance appropriate areas throughout the proposed mitigation site. Figure 14 provides a reference for the location of particular work plan actions. Policies established to protect sensitive wildlife as discussed in Section 2.2.5 shall be implemented throughout implementation of site preparation.

4.1 Equipment Required

Large equipment will be limited to dumpsters for biomass collection. Small equipment, such as bobcat, trench diggers, All Terrain Vehicles (ATV), and augers will be utilized throughout preparation as needed. These will either be transported to the site on small trailers or on the bed of pick-up trucks. Equipment stored at the proposed mitigation site overnight will be limited to designated staging areas as shown on Figure 14. Equipment will not be fueled or maintained within the proposed mitigation site or staging areas; maintenance will be performed off-site.

4.2 Site Access

Paved roads provide access to all staging areas. The project biologist will determine any path restrictions to the floodplain and flag them appropriately for avoidance by onsite personnel. Once within the work area, the route will be determined by the type of restoration or maintenance activity to be performed.

4.3 Site Protection

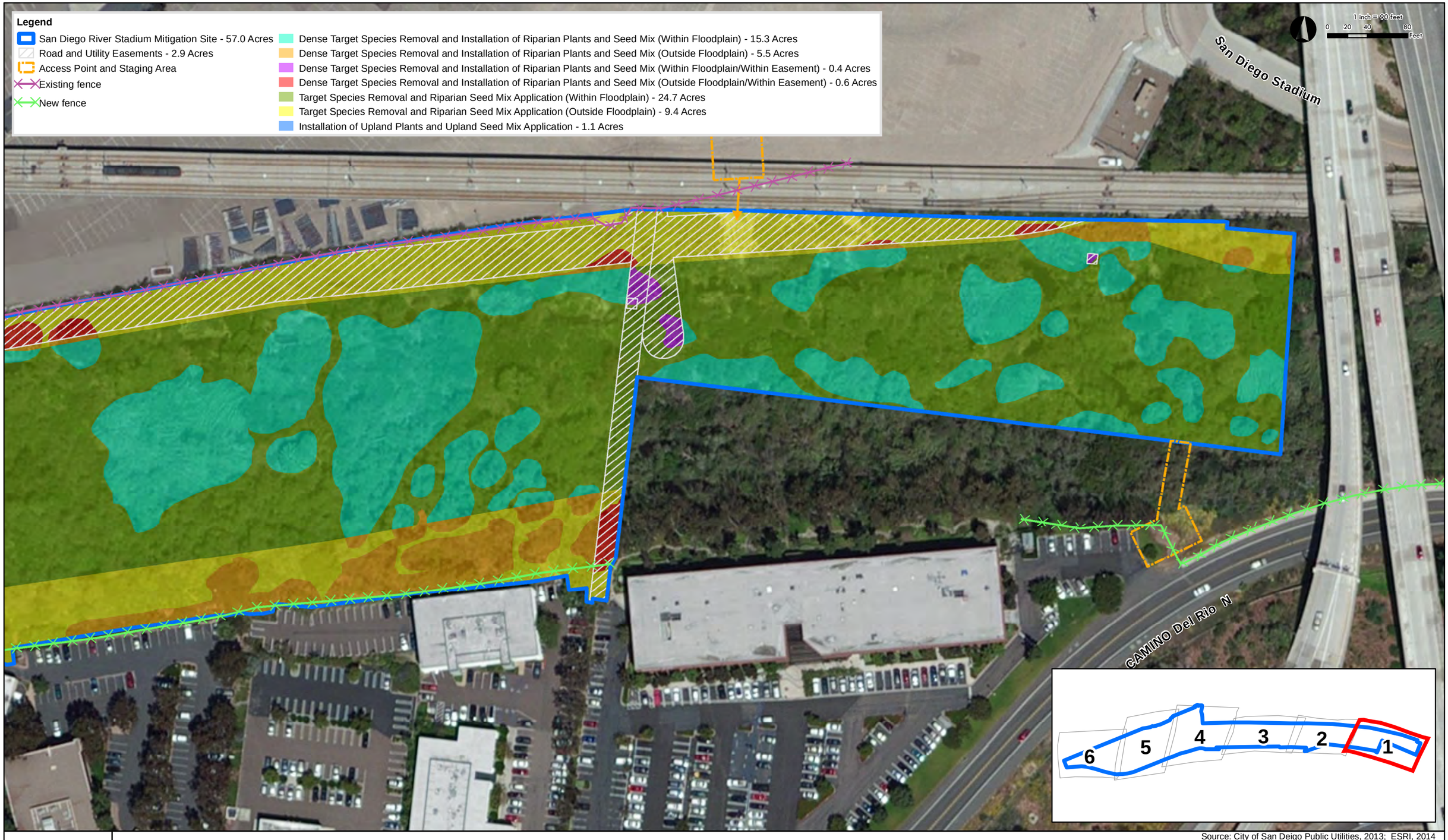
The 57.0 acre proposed mitigation site, which includes restoration area, freshwater, and utility easements (where target species will be removed and modified restoration will occur but no compensatory mitigation is expected), shall be staked in the field according to existing surveys and legal descriptions prior to any site preparation to ensure there is no encroachment into adjacent parcels or areas outside of the limits of the project. Construction access and staging areas shall be clearly designated (as shown in Figure 14) prior to the beginning of any site preparation work.

4.3.1 Fencing

Fencing currently exists in non-contiguous sections around the proposed mitigation site. Fencing will be installed around the site to create a continuous barrier to prevent un-authorized intrusions. Fencing will be chain link and 8.0-feet (2.4-meter) tall, pedestrian and vehicle access gates will be installed to provide access for maintenance, small opening (12 inches high by 18 inches wide or 0.3 meters high by 0.5 meters wide) in the bottom of the fencing shall be included every 100 feet (30.5 meters) to provide passage for wildlife. Approximately 4,000 linear feet (1.2 kilometers) of chain link fence will need to be installed. Existing fencing (about 6,500 linear feet or 2.0 kilometers) shall be maintained, repaired or replaced as needed.

4.3.2 Illegal Encampments

Prior to initiating non-native plan removal work, the Environmental Services Department will be contacted and arrangement will be made to remove all illegal encampments and related trash from the proposed mitigation site. The City's protocol for removal of illegal encampments will be followed which includes posting cleanup and removal notices for a minimum of three days and impoundment of personal items to be held for 90 days,



Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

ATKINS

FIGURE 14
Work Plan - Page 1 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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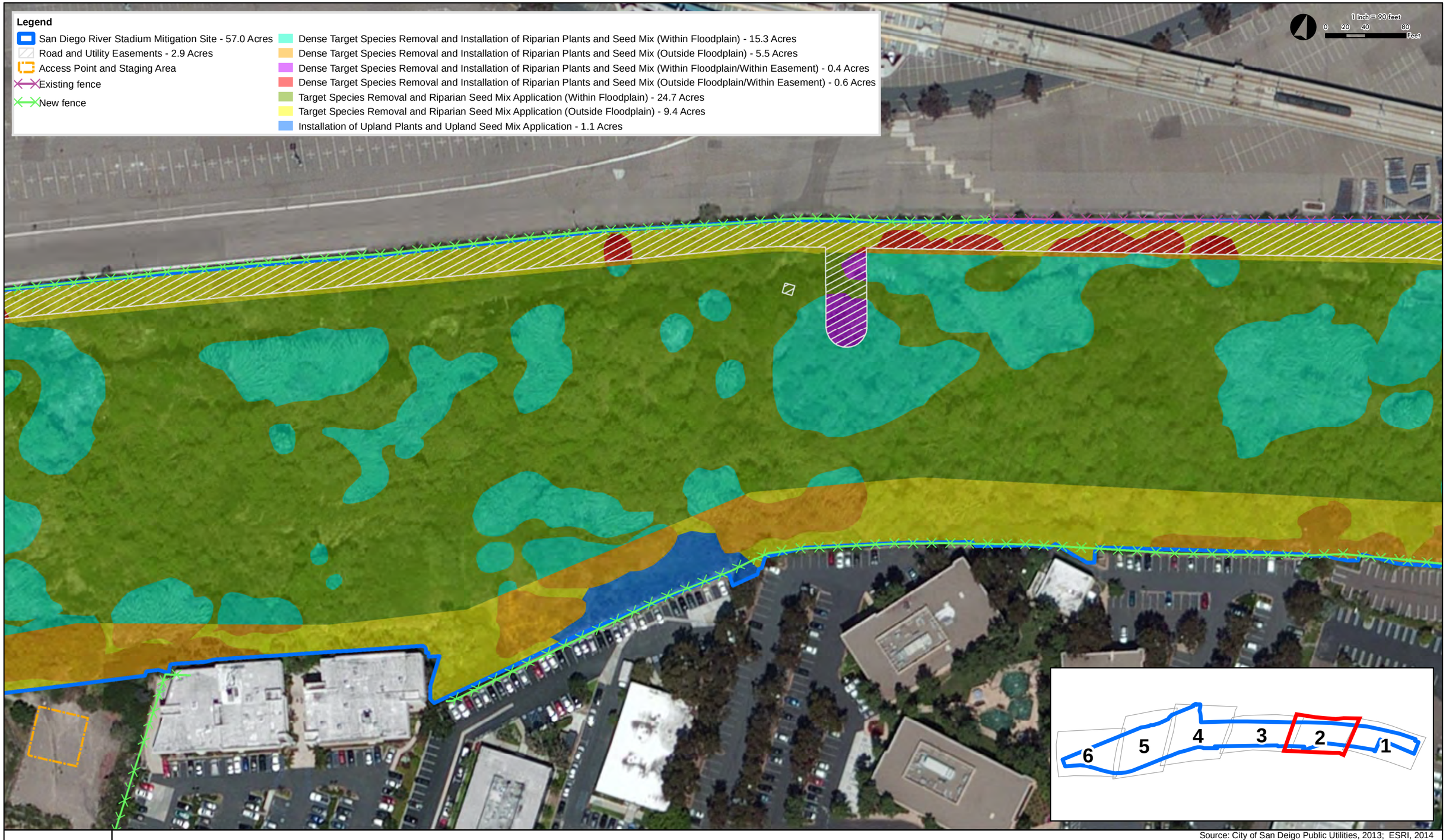

Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 14
Work Plan - Page 2 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 14
Work Plan - Page 3 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 14
Work Plan - Page 4 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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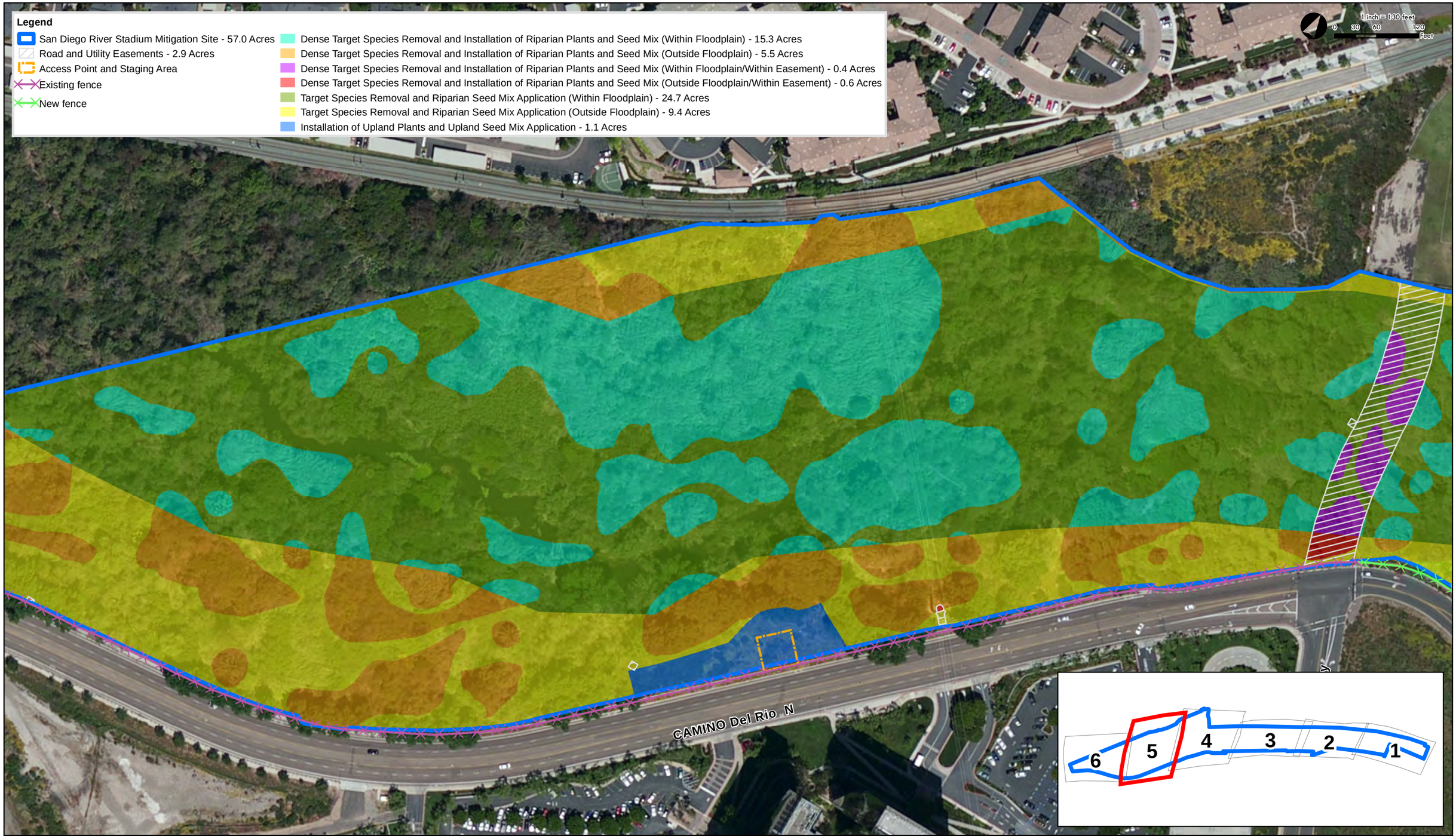

Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

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FIGURE 14
Work Plan - Page 5 of 6

100038033

Stadium Wetland Mitigation Project (San Diego River)

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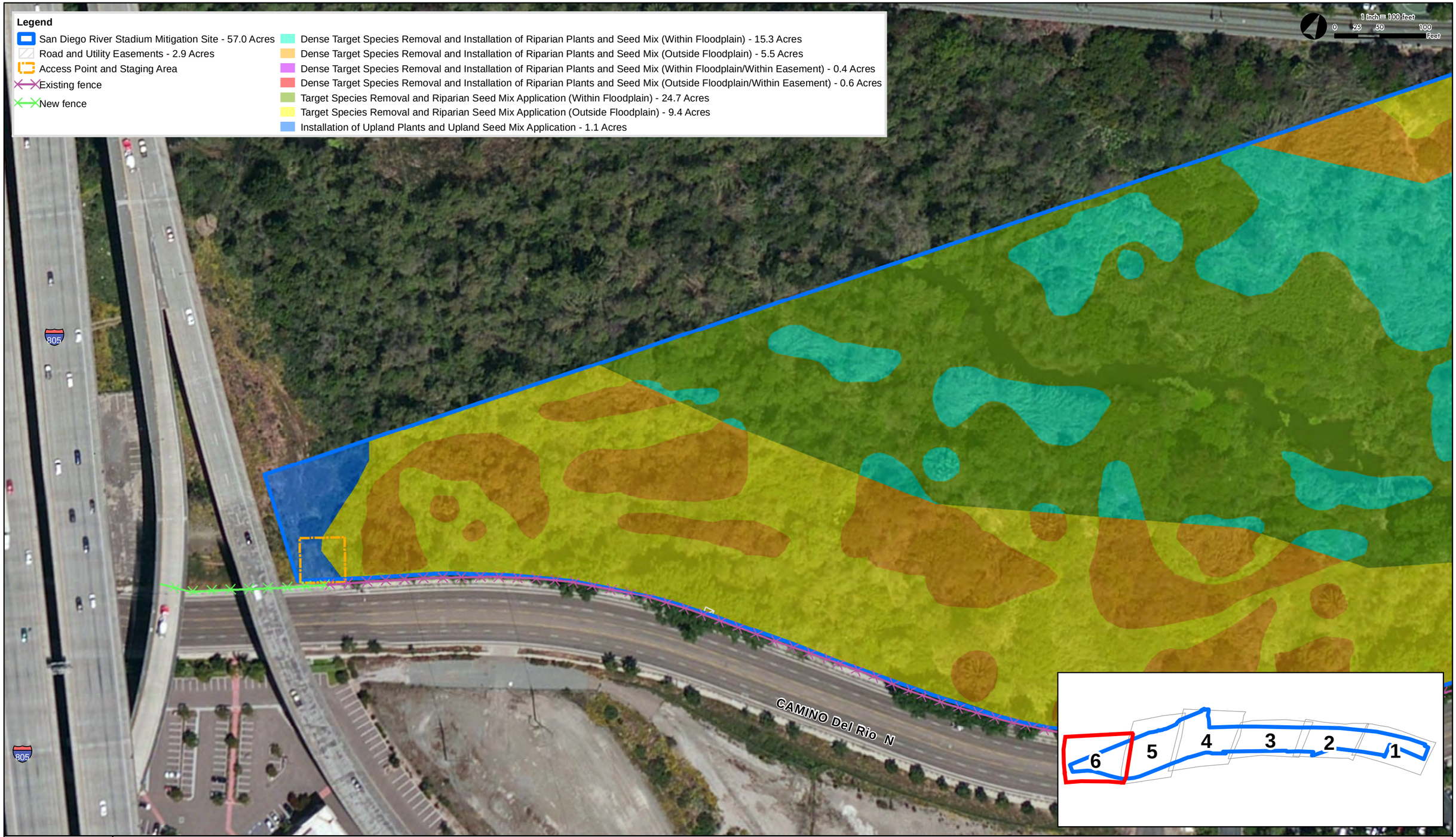

ATKINS

FIGURE 14
Work Plan - Page 6 of 6

Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Actions shall be taken to protect the site from continued human intrusion and illegal encampments. The City Public Utilities Department will coordinate with the City Police Department to increase the frequency of patrols along this section of river. Additional signage will be installed and public outreach brochures sent to the local businesses as well as other local groups concerned with the state of the river (i.e., The San Diego River Park Foundation) to educate them about this effort and enlist their help in reporting unauthorized human intrusion into the site. Prior to initial ground disturbance, signage will be posted around the site boundary approximately every 100.0 feet (30.5 meters) stating the date work will begin and that anyone found illegally on the site at that time will be removed by the City Police Department. Local social work groups shall also be engaged to provide options for people illegally encamped along this stretch of river prior to removal.

4.4 Non-native and Weed Eradication

The key to effective treatment of invasive non-native plant material is to kill the root mass through the use of systemic herbicide at the appropriate times of the year to ensure translocation to the roots. Rodeo® brand herbicide is a formulation of glyphosate. This herbicide is considered broad–spectrum and has proven very effective against the dominant invasive species found within the proposed mitigation site as well as most other monocots and dicots. Glyphosate is most effective in late summer or fall, after blooming but prior to change in leaf color, which also coincides with the preferred timeframe to avoid bird nesting season that ends in September. Only herbicides labeled for use in wetlands will be used in aquatic areas of the site. Non-wetland herbicides will be used outside wetland areas or as an adaptive management option if necessary after consulting with a pest control advisor. For example, monocot-specific chemicals, such as Fusilad-DX® and Post®, may prove useful in some situations, specifically when treating a stand of arundo or other invasive monocots that are intermixed amongst native dicots. It should be noted, however, that currently neither Fusilad-DX® nor Post® are specifically labeled by the manufacturer for use within wetlands, which is the reason they will be used as an adaptive management option only. All herbicides used onsite will be applied in accordance with their industry label.

Crews will remove non-natives beginning in the upper tributaries (east terminus and center sections of the proposed mitigation site leading from staging areas west) to prevent re-infestation of treated downstream areas from upstream sources. The Foliar Herbicide Application Method is the most effective and efficient method for eradication of many invasive species that dominate the site. The Foliar Herbicide Application Method will be employed as the general eradication method for all of the targeted non-native plant material. This method directs an herbicide/water mixture directly onto the leaves of a plant. Application is accomplished by personnel with a backpack sprayer. A tracer dye will be included with the spray solution to ensure effective coverage is achieved.

When the Foliar Herbicide Application Method cannot be used (or for certain species where alternative eradication methods have proven to be more affective as specified below), then the Cut-Stump Treatment Method or Drill and Kill Method will be implemented. The Cut-Stump Treatment Method is most effective when the plant is in a post-flowering state. After cutting a plant to eliminate or greatly reduce re-sprouts from the cut surface, stems will be treated with concentrated herbicide immediately to ensure tissue uptake. This more labor intensive plant specific herbicide application requires less herbicide, but due to the labor required, is not as effective or efficient as the Foliar Herbicide Application Method since it requires more time and manpower to perform the work. The Drill and Kill Method is applicable only to palms at the site (see Section 4.2.1.9).

Specific eradication methods for target non-native species that occur at the proposed mitigation site are provided below.

4.4.1 Target Species

Target species were chosen because of their dominant presence within the proposed mitigation site and higher concern rating by the California Invasive Plant Council. All target species that occur within site boundaries will be removed. Table 9 provides a list of target species and the preferred eradication method for each species.

Table 9 Target Species Eradication

Scientific Name	*Common Name*	*Eradication Method*
Arundo donax	arundo	Foliar Herbicide Application Method
Cortaderia sp.	pampas grass	Cut grass clumps followed by glyphosate herbicide treatment for large stands; clearing and grubbing for removal of small plants
Delairea adorata	Cape ivy	Foliar Herbicide Application Method
Eucalyptus camaldulensis	eucalyptus	Cut-Stump Method followed by herbicide application
Ficus carica	common fig	Cut-Stump Method followed by herbicide application
Lepidium latifolium	perennial pepperweed	Foliar Herbicide Application Method
Myoporum laetum	Ngaio tree	Cut-Stump Method followed by herbicide application; grubbing for removal of small seedlings
Nerium oleander	Oleander	Cut-Stump Method followed by herbicide application
Phoenix canariensis *Washingtonia robusta*	Canary Island date palm Mexican fan palm	Drill and Kill Method
Ricinus communis	castor bean	Cut-Stump Method followed by herbicide application
Schinus molle *Schinus terebinthifolius*	Peruvian pepper tree Brazilian pepper tree	Cut-Stump Method followed by herbicide application when not flowering; Basal Bark Herbicide Application Method when flowering
Tamarix sp.	Tamarisk	Cut-Stump Method followed by herbicide application
Various weeds, including: *Carpobrotus edulis* *Cortaderia jubata* *Foeniculum vulgare* *Pennisetum setaceum*	Various weeds, including: ice plant jubata grass sweet fennel fountaingrass	As needed herbicide treatment and/or mowing

All annual weeds will be treated with herbicide, mowed, and removed from the site unless the project biologist decides to leave the weeds in place. Perennial weed species will be completely killed and removed for successful eradication. Perennial weeds shall be hand pulled or sprayed with appropriate herbicides. Perennial weeds will not be mowed, since this often encourages growth.

Some non-native species not targeted at the proposed mitigation site will be left in place if they do not pose a threat to the success of establishment of native species. The project biologist will decide which non-native species will remain in place during work plan implementation. Common weeds that are expected to occur in disturbed areas, but then become replaced by natives as the project progresses, will be chosen to remain in place. These species include (but are not limited to) black mustard (*Brassica nigra*), various bromes (*Bromus* sp.), Italian thistle (*Carduus pycnocephalus*), Napa thistle (*Centaurea melitensis*), poison hemlock (*Conium maculatum*), Italian ryegrass (*Lolium multiflorum*), annual

rabbitsfoot grass (*Polypogon monspeliensis*), and wild radish (*Raphanus sativus*). These non-natives are also not rated a high concern by the California Invasive Plant Council.

Eradication activities will progress east to west (from the east terminus and center staging areas) with the specific methods described below being employed in the appropriate rehabilitation area of the site (including easements) as well as on isolated plants occurring in mixed riparian enhancement areas.

4.4.1.1 Arundo

Eradication of arundo will be accomplished with the Foliar Herbicide Application Method. The foliar application of a 2 to 5 percent solution of Rodeo® applied at a rate of 0.06 to 0.10 gallon per acre will be utilized onsite, as this concentration is known to be very effective on arundo and many other non-native invasive plant species. The application of herbicide shall take place in the fall when the plant is in its post-flowering/pre-dormancy period (typically mid-August to early November), which is when plants are actively transferring nutrients to the root mass in preparation for winter dormancy. Two to three weeks after the foliar herbicide treatment, the leaves and stalks will brown and soften to allow for easier clearing of the resultant biomass. Treated stems have little or no potential for rooting and are very brittle, so will be collected and removed from the site.

4.4.1.2 Pampas Grass

Since mostly large pampas grass stands occur onsite, a brush cutter will be used to cut grass clumps down to a 3.0- to 5.0-foot (0.9- to 1.5-meter) tall stump. Cutting the grass too short will be avoided, since this will reduce the plants ability to uptake herbicide. Once cut, debris will be cleared so that cut leaves are exposed and treated immediately with a minimum four percent glyphosate herbicide at 20 gallons per acre. Further control of pampas grass can be achieved through spot treatment with two percent glyphosate (Cal-IPC 2015). Alternatively, if exposed leaves are unable to be treated immediately, the cut clump will be left and treated later when re-growth has reached about 0.7 foot (21.3 centimeters) in height. For smaller clumps of pampas grass, the plants will be eradicated through clearing and grubbing activities, then removed from the site and left upside down with the roots exposed to die and prevent re-growth. Live pampas grass root material will never be retained onsite as this may allow the species to spread.

4.4.1.3 Cape Ivy

Eradication will be accomplished with the Foliar Herbicide Application Method. A mixture of 0.5 percent glyphosate, 0.5 percent triclopyr, and 0.1 percent silicone surfactant in water shall be applied as late in the spring as possible, ideally when plants are photosynthesizing actively but past flowering so the herbicide can be transported with sugars to underground storage organs. Plants will slowly shrivel over time and shall be monitored and removed appropriately after spraying. Re-sprouts shall be re-treated as they are noted.

4.4.1.4 Eucalyptus

Eucalyptus will be eradicated using the girdling method (cutting through the cambium resulting in dead tissues above the cut) and left as snags to provide habitat for birds. When safety is an issue and trees are located adjacent to sidewalks, roads, or parking lots trees will be treated with the Cut-Stump Method. Trees shall be cut as close to ground as possible and the remaining stump treated with triclopyr (Garlon 3A® or Garlon 4® Ultra) immediately after cutting at a rate of 80 percent in an oil carrier. Cutting and herbicide application yields maximum results if completed in the fall, which also coincides with the end of nesting season. Re-sprouts will be re-treated when they reach 3.0 to 5.0 feet (0.9 to 1.5 meters) in

height with an application of triclopyr or glyphosate. The project biologist will determine which trees will be eradicated with the Cut-Stump Method.

4.4.1.5 Common Fig

An efficient control method for common fig has not yet been proven. After cutting, trees vigorously re-sprout and are difficult to control without additional herbicides. Therefore, eradication of common fig will be accomplished with the Cut Stump Method followed by herbicide application. All trunks and sucker shoots shall be cut to 6.0 to 18.0 inches (15.2 to 45.7 centimeters) above the ground and cut stumps saturated with a 100 percent solution of an amine formulation of triclopyr herbicide, such as Garlon 3A® or Brush-B-Gone A®. Additional shoots will be retreated with herbicide as necessary.

4.4.1.6 Perennial Pepperweed

Eradication of perennial pepperweed will be accomplished with the Foliar Herbicide Application Method through use of glyphosate herbicide. Timing of herbicide application is critical for eradication of this species. Results are best achieved when herbicide is applied at the flower bud stage in the spring. For seedlings, herbicide will be applied as soon as possible once noted to prevent plants from producing new lateral shoots from the root. The overall success of the eradication will be greatly improved by reseeding with native plant material to provide natural competition.

4.4.1.7 Ngaio Tree

Both seedlings and established Ngaio tree will be eradicated with the Cut-Stump Method. Grubbing will also be used on a limited basis as an alternative method of treatment when eradicating small seedlings. For use of the Cut-Stump Method, each trunk shall be cut to ground level and saturated with a concentrated glyphosate herbicide. Care will be taken to ensure that the trunk is cut as low as possible to avoid leaving any amount of stump that may allow for re-sprouting. Cut surfaces will then be monitored and retreated as necessary. For the Grubbing Method (as an alternative eradication method), Ngaio tree seedlings will be pulled. If seedlings are pulled, it will be done when the soil is moist and the seedlings are small. Ngaio tree seedlings have long, strong taproots and leaving any root remains in the ground will result in the plant vigorously re-sprouting. Therefore, the Grubbing Method is not feasible and will not be used for established Ngaio trees.

4.4.1.8 Oleander

Eradication of oleander will be accomplished with the Cut Stump Method followed by herbicide application. All trunks and shoots shall be cut to 6.0 to 18.0 inches (15.2 to 45.7 centimeters) above the ground and cut stumps saturated immediately with a concentrated glyphosate herbicide. Additional shoots will be retreated with herbicide as necessary.

4.4.1.9 Palms

Canary island date palms and Mexican fan palms will be eradicated through use of the Drill and Kill Method. Fronds will be removed and drilling will occur to the center of the palm to allow for injection of concentrated glyphosate herbicide. The palm will be monitored and reapplied with herbicide as necessary until dead. Palms will be left in place to slump upon themselves unless removal is required for native replanting or there is a safety concern.

4.4.1.10 Castor Bean

Eradication of castor bean will be accomplished with the Cut-Stump Method. Each plant will be cut as close to the ground as possible and the remaining stump treated with 100 percent solution of an amine formulation of triclopyr herbicide, such as Garlon 3A® or Brush-B-Gone A® immediately after cutting. Consistent follow-up work to eradicate re-sprouts will be implemented to reduce future infestations.

4.4.1.11 Brazilian and Peruvian Pepper Trees

Brazilian and Peruvian pepper trees will be eradicated with the Cut-Stump Method when not flowering. Trunks will be cut as close to the ground as possible when the plant is not fruiting (generally fall and winter) to avoid reproduction by seeds contained in the fruits. If fruit is present on the trees at the time of cutting, care shall be taken not to spread the fruits to other locations. Once cut, glyphosate shall be carefully applied to the thin living cambium tissue layer of the remaining stump.

The Basal Bark Herbicide Application Method will be employed when trees are flowering. This involves herbicide application around the entire circumference of an uncut tree trunk approximately 12.0 to 18.0 inches (30.5 to 45.7 centimeters) above the base of the tree. The herbicide used shall contain triclopyr ester. Acceptable herbicides include Garlon 4® diluted with a penetrating oil or Pathfinder II®, which is pre-mixed with penetrating oil. The presence of the penetrating oil will allow the herbicide to pass through the bark and reach the target cambium layer. It should be noted that girdling the tree trunk is not advisable, since it will reduce the effectiveness of the herbicide to travel throughout the tree.

Treated Brazilian and Peruvian pepper trees will be observed after administering herbicide for evidence that the treatment has been successful. It may take several weeks before evidence that the treatment was successful is noted. Signs of a successful treatment will include defoliation of the tree and the presence of termites. Treated Brazilian and Peruvian pepper trees may retain their fruit and will be monitored on a regular basis to eradicate any seedlings that might appear. A Foliar Herbicide Application Method using herbicide containing glyphosate will be administered for the eradication of Brazilian and Peruvian pepper tree seedlings.

4.4.1.12 Tamarisk

Eradication of tamarisk will be accomplished with the Cut-Stump Method. Each tree will be cut as close to the ground as possible and the remaining stump treated with Garlon 3A or Garlon 4 Ultra immediately after cutting. It is imperative that the stump be treated immediately, because tamarisk will begin to form a defensive crust over the open cut directly after cutting. The most opportune time to cut and spray tamarisk is between November and February/March.

4.4.2 Herbicide Application

Ground crew application of herbicide is especially effective in the understory beneath tree cover or where stands are intermixed with native plants as occurs at the proposed mitigation site. Where access allows, herbicide will be applied using 15-25 gallon ATV mounted sprayers. ATV access is sometimes limited due to terrain, plant density, or the ecological sensitivity of certain areas (i.e., nest location). Where access is limited, herbicides will be applied by hand with 3-5 gallon backpack sprayers. No herbicide application shall be applied when the temperature exceeds 80 degrees Fahrenheit, within 24 hours of new plantings, or when wind conditions exceed 10 miles (16.1 kilometers) per hour. Furthermore, no herbicide application shall be applied when rain is expected within 2 to 3 hours of the proposed application time.

4.5 Soil and Mulch

4.5.1 Soil Preparation

An agricultural soils analysis with a written report by a qualified soil testing laboratory will be completed for rehabilitation areas of the site to determine the suitability of the soil as a viable growing medium for new native plantings. The report will provide recommendations for nitrogen, phosphorus, and potash nutrients as well as soil amendments to be added, so the planting soil will yield satisfactory production. The report will also identify the presence of problem salts, minerals, or heavy metals, and if present, provide additional recommendations for corrective action prior to plantings. Existing soils will be amended based on recommendations shown on the agricultural soils analysis reports.

4.5.2 Mulch

All seed applications throughout the site must receive an organic source of carbon. This application is necessary for protection against erosion, increasing seed germination, and decreasing weed growth. Therefore, a single application of hydromulch, which is typically composed of sixty percent wood fibers, forty percent paper, and an organic tackifier, will occur following each seeding.

4.6 Clearing, Grubbing/Grading, and Recontouring

Removal (clearing) of invasive and/or weedy material is important to reduce competition from invasive species during the establishment period. Mowing may be required for clearing prior to planting, reducing exotic seed recruitment, or enhancing perennial plant growth. If mowing for the purposes of clearing, the mower height will be adjusted as necessary. If mowing for the purposes of seed removal and/or plant enhancement, the height of the mower and species present will be more carefully considered to achieve the desired outcome.

Clearing and grubbing (removal of undesirable vegetation and root mass) within the proposed mitigation site shall be completed by scraping off the top layer of soil (i.e., 1.0 to 3.0 inches [2.5 to 7.6 centimeters]) and above-ground litter using a small bulldozer (bobcat). Removal of the top soil layer will prevent resprout of invasive species from root material and/or existing seed banks. This will be completed at the direction of the City in rehabilitation areas, which do not contain native vegetation that may be impacted by the bulldozer. In enhancement areas where native species are present, non-native species and root removal shall be completed by hand or focused herbicide application at the discretion of the City.

To the maximum extent possible, the overall existing topography and elevation will be maintained during clearing and grubbing. Grading and excavation resulting in minor topographic alterations at the proposed mitigation site will be limited to actions pertaining to invasive removal and re-planting of native species. Best management practices to control erosion at the site will be outlined in a Storm Water Pollution Prevention Plan.

Recontouring of the proposed mitigation site will occur as invasive roots are removed leaving shallow depressions, which will be retained (not back-filled with soil) to increase infiltration of runoff from the adjacent heavy industrial and commercial areas. Shallow undulations will result from large invasive vegetation (root mass) removal and slight depression creation around new plantings to retain water. If plants are located on a sloped surface, the depression shall be located on the downhill side of the slope. The slight depressions will serve to retain water long enough to allow infiltration to the root zone of the plants.

Additionally, appropriate haul out topography (shallow banks) will be maintained or contoured along the river secondary channels. Each of the two secondary channels will have a minimum of three haul out locations appropriate for local reptiles and amphibians. At the time of field efforts, potential haul out locations were noted along the secondary channels. The need for contouring additional locations will be determined by the City during enhancement and revegetation of these areas.

4.7 Biomass Removal

Due to the large, dense stands of invasive species at the proposed mitigation site, biomass removal will be accomplished throughout the site by hand-cutting with a chainsaw or brush cutter followed by physically hauling off of the cut biomass by vehicle to the Miramar Greenery Landfill. Bundles of green waste no more than 40.0 pounds (18.1 kilograms) will be amassed onsite in the staging areas and removed to the landfill daily. Biomass that is not acceptable green waste, such as palm fronds, pampas grass, and large (greater than 6 inches [15.2 centimeters] in diameter) tree stumps will be bundled separately from other green waste in sealed trash bags and disposed of as standard waste.

4.8 Supplemental Irrigation

Restoration of riparian habitat will require supplemental irrigation, especially if drought conditions exist during the first three years of the post-planting establishment period. The contractor shall install a temporary above ground irrigation system. The irrigation system shall be installed to provide supplemental watering to rehabilitation areas where container plants will be installed, approximately 21.5 acres. Watering will occur as frequently as necessary to ensure plant survivorship and establishment. The project biologist will adaptively manage the watering schedule during each phase of the work plan to account for varying climate conditions and ensure project success. The irrigation system will be removed as soon as restored areas are deemed self-sustainable by the project biologist.

4.9 Plant Installation Specifics

4.9.1 Species Composition

To achieve a natural riparian system with buffer lands dominated by native vegetation, the species selected for seeding and planting are listed in Tables 10a-10f. All species occur naturally along rivers within San Diego County and within the watersheds included as the project service area.

Table 10a Riparian Seed Mix (Within Floodplain)

Scientific Name	*Common Name*	*Density (lbs/acre)*	*Wetland Indicator Status*
Anemopis californica	yerba mansa	2.0	Obligate
Artemisia douglasiana	mugwort	8.0	Facultative
Cyperus eragrostis	tall flatsedge	2.0	Facultative wetland
Eleocharis macrostachya	spike rush	2.0	Obligate
Iva haysiana	San Diego marsh elder	10.0	Facultative wetland
Juncus acutus	spiny rush	2	Facultative wetland
Juncus bufonius	toad rush	2	Facultative wetland
Pluchea odorata	marsh fleabane	2.0	Facultative wetland
Schoenoplectus acutus var. occidentalis	tule	4.0	Obligate
Schoenoplectus californicus	California bulrush	4.0	Obligate

Table 10a Riparian Seed Mix (Within Floodplain)

Scientific Name	*Common Name*	*Density (lbs/acre)*	*Wetland Indicator Status*
Sisyrinchium bellum	blue-eyed grass	2.0	Facultative wetland

Table 10b Riparian Seed Mix (Outside Floodplain)

Scientific Name	*Common Name*	*Density (lbs/acre)*	*Wetland Indicator Status*
Ambrosia psilostachya	ragweed	6.0	Facultative upland
Artemisia dracunculus	tarragon	2.0	None
Artemisia palmeri	San Diego sagewort	8.0	None
Isocoma menziesii	coastal goldenbush	2.0	Facultative
Oenothera hookeri	evening primrose	2.0	Facultative wetland
Pluchea odorata	marsh fleabane	2.0	Facultative wetland
Sisyrinchium bellum	blue-eyed grass	2.0	Facultative wetland
Urtica dioca spp. holosericea	giant stinging nettle	4.0	Facultative

Table 10c Upland Seed Mix

Scientific Name	*Common Name*	*Density (lbs/acre)*	*Wetland Indicator Status*
Acmispon glaber	deer weed	2.0	None
Artemisia californica	California sagebrush	4.0	None
Bromus carinatus	California brome	4.0	None
Deinandra fasciulata	tarplant	2.0	None
Eriogonum fasciculatum	California buckwheat	3.0	None
Eriophyllum conferiflorum	golden yarrow	3.0	None
Eschscholzia californica	California poppy	2.0	None
Lupinus succulentus	arroyo lupine	4.0	None
Mimulus aurantiacus	monkeyflower	2.0	Facultative Upland
Plantago erecta	plantain	2	None
Salvia apiana	white sage	3.0	None
Salvia mellifera	black sage	4.0	None
Stipa lepida	foothill needlegrass	2.0	None
Stipa pulchra	purple needlegrass	2.0	None

Table 10d Riparian Plant Palette (Within Floodplain)

Scientific Name	*Common Name*	*Minimum Number Per Acre*	*Unit Size*	*Spacing On Center*	*Wetland Indicator Status*
Trees					
Platanus racemosa*	sycamore	50	1 gallon pot	18-foot centers	Facultative
Populus fremontii*	cottonwood	35	1 gallon pot	18-foot centers	Facultative

Table 10d Riparian Plant Palette (Within Floodplain)					
Scientific Name	***Common Name***	***Minimum Number Per Acre***	***Unit Size***	***Spacing On Center***	***Wetland Indicator Status***
Salix gooddingii*	Goodding willow	35	cuttings	6-foot centers	Facultative wetland
Salix laevigata*	red willow	35	cuttings	6-foot centers	Facultative wetland
Salix lasiolepis*	arroyo willow	65	cuttings	6-foot centers	Facultative wetland
Shrubs					
Artemisia palmeri	Palmer's sagewort	65	1 gallon pot	6-foot centers	None
Baccharis salicifolia	mule fat	75	1 gallon pot	6-foot centers	Facultative
Pluchea sericea	arrow weed	65	1 gallon pot	6-foot centers	Facultative wetland
Salix exigua	sandbar willow	40	cuttings	6-foot centers	Facultative wetland
Half-Shrubs, Herbs, Vines, Grasses, Groundcovers, Perennials					
Carex spissa	San Diego sedge	75	1 gallon pot	4-foot centers	Facultative
Clematis ligusticifolia	western white clematis	40	1 gallon pot	4-foot centers	Facultative
Juncus acutus ssp. Leopoldii	spiny rush	75	1 gallon pot	4-foot centers	Facultative wetland
Juncus bufonius	toad rush	75	1 gallon pot	4-foot centers	Facultative wetland
Juncus mexicanus	Mexican rush	75	1 gallon pot	4-foot centers	Facultative wetland
Mimulus cardinalis	scarlet monkey-flower	75	1 gallon pot	3-foot centers	Facultative wetland
Rosa californica	California rose	60	1 gallon pot	3-foot centers	Facultative
Rubus ursinus	California blackberry	60	1 gallon pot	4-foot centers	Facultative
Vitis girdiana	southern California grape	60	1 gallon pot	4-foot centers	Facultative

Table 10e Riparian Plant Palette (Outside Floodplain)

Scientific Name	Common Name	Minimum Number Per Acre	Unit Size	Spacing On Center	Wetland Indicator Status
Trees					
*Juglans californica**	California black walnut	10	1 gallon pot	18-foot centers	Facultative
*Platanus racemosa**	sycamore	30	1 gallon pot	18-foot centers	Facultative
*Populus fremontii**	cottonwood	30	1 gallon pot	18-foot centers	Facultative
*Quercus agrifolia**	coast live oak	25	1 gallon pot	20-foot centers	None
Sambucus nigra ssp. *Caerulea**	Mexican elderberry	35	1 gallon pot	15-foot centers	Facultative
Shrubs					
Atriplex lentiformis	Saltbush	35	1 gallon pot	6-foot centers	Facultative
Artemisia palmeri	Palmer's sagewort	75	1 gallon pot	6-foot centers	None
*Baccharis salicifolia**	mule fat	75	1 gallon pot	6-foot centers	Facultative
Pluchea sericea	arrow weed	60	1 gallon pot	6-foot centers	Facultative wetland
Half-Shrubs, Herbs, Vines, Grasses, Groundcovers, Perennials					
Carex spissa	San Diego sedge	75	1 gallon pot	4-foot centers	Facultative
Clematis ligusticifolia	western white clematis	50	1 gallon pot	4-foot centers	Facultative
Elymus glaucus	blue-wild-rye	60	1 gallon pot	4-foot centers	Facultative upland
Rosa californica	California rose	60	1 gallon pot	3-foot centers	Facultative
Rubus ursinus	California blackberry	50	1 gallon pot	4-foot centers	Facultative
Vitis girdiana	southern California grape	50	1 gallon pot	4-foot centers	Facultative

Table 10f Upland Plant Palette

Scientific Name	Common Name	Minimum Number Per Acre	Unit Size	Spacing On Center	Wetland Indicator Status
Artemisia californica	California sagebrush	450	1 gallon pot	4-foot centers	None
Cylindropuntia prolifera	coast cholla	75	cuttings	4-foot centers	None
Encelia californica	California encelia	150	1 gallon pot	4-foot centers	None
*Malosma laurina**	Laurel sumac	150	1 gallon pot	8-foot centers	None
Opuntia littoralis	coast prickly pear	75	cuttings	4-foot centers	None
*Rhus integrifolia**	lemondadeberry	150	1 gallon pot	8-foot centers	None
Ribes speciosum	fuchsia flower gooseberry	90	1 gallon pot	5-foot centers	None
Salvia mellifera	black sage	150	1 gallon pot	4-foot centers	None

* These species are not to be planted within utility easements, adjust planting palettes as necessary to achieve minimum plants per an acres.

4.9.2 Planting Arrangement

Enhancement areas will receive riparian seed mix within and outside of the floodplain as needed to attain performance goals. Application will be employed in areas designated by the project biologist where non-native species removal has occurred and/or vegetation complexity is lacking. Rehabilitation areas will require installation of riparian plants within and outside of the floodplain following dense target species removal. Areas below the floodplain will receive slightly denser plantings closer to the river, while upland plantings will be sparser. Riparian seed mix will also be applied in rehabilitation areas with the specific mix determined by location (within or outside of the floodplain). Easements will be treated the same as other enhancement and rehabilitation areas with a modified selection of plants to maintain height restrictions outlined in the sewer design guidelines. Therefore, no plants with an adult height over 5.0 feet (1.5 meters) will be installed within 5.0 feet (1.5 meters) of the existing pipes (in the easements) and no trees will be installed within 10.0 feet (3.0 meters) of the pipes. Upland plants and upland seed mix will be installed and applied, as necessary, to restore Diegan coastal sage scrub in non-native grassland areas beyond the riparian woodland. There are no easements in areas were Diegan coastal sage scrub will be restored. Table 11 provides a summary of total plants and seed mix as well as installation densities to be used during revegetation of the proposed mitigation site.

Table 11 Total Container Plants and Seed Mix

Ares	*Lbs/Acre*	*Maximum Acres*	*Total*
Seed Mix			
Riparian Seed Mix (Within Floodplain)	40	40.4	1,616.0 lbs
Riparian Seed Mix (Outside Floodplain)	28	15.5	434.0 lbs
Upland Seed Mix	39	1.1	42.9
TOTAL		57.0	2,092.9 lbs
Area	***Number/Acre***	***Maximum Acres***	***Total***
Container Plants			
Riparian (Within Floodplain)	1,060	15.7	16,642
Riparian (Outside Floodplain)	720	6.1	4,392
Uplands	1,290	1.1	1,419
TOTAL		22.9	22,453

The goal is to achieve a natural arrangement where stands of dense intertwined, hydrophytic (obligate or facultative wetland indicator status) foliage occur within the floodplain. Vegetation will gradually become less dense and more xerophytic (facultative upland and upland indicator status) as the distance from the river increases creating a natural buffer between the river and surrounding urban area.

4.10 Planting Procedure

Two seeding techniques will be used at the proposed mitigation site. Hydroseeding will be employed within rehabilitation areas following installation of container plants. Hydroseeding will also be employed in enhancement areas where non-native species have been removed and/or vegetation complexity is lacking. Hand broadcasting will be used as needed for more focused application throughout the site,

where hydroseeding cannot be employed, and/or at the discretion of the project biologist. Container plants will be installed in rehabilitation areas. Plant cuttings will be used to supplement both seed applications and container plantings, but will not exceed 30 percent of any single restoration area.

4.10.1 Hand Broadcasting

The soil surface will be mildly smoothed by landscape rakes. Seed shall be cross hand broadcasted at 90 degree passes. Wood chips (or other mulch approved by the project biologist) shall be applied and pressed deeper than 0.25 inch (0.6 centimeter) into the native soil with the seeds by means of a standard landscape roller.

4.10.2 Hydroseeding

Hydroseeding application shall be accomplished through a two-pass application process. The first pass shall consist of hydroseed, Root Guard at the suppliers recommended rate, and 500.0 pounds (226.8 kilograms) of mulch material per acre. The second pass will include application of hydromulch, which is typically composed of sixty percent wood fibers, forty percent paper, and an organic tackifier. The two pass process ensures seeds are trapped in mulch material, which will decrease seed failure due to inconsistent water absorption processes.

4.10.3 Installation of Container Plants

A qualified biologist shall inspect all container plants proposed for installation at the site. All plants that are deemed to be unsatisfactory will be rejected and are to be removed from site with 48 hours. All plant material shall be stored and maintained in an approved storage and staging area prior to planting. All container plants shall be adequately watered and maintained in a healthy and vigorous growing state. Planting holes shall be excavated with a shovel, posthole digger, or power auger. All holes shall have vertical sides with roughened surfaces. Excavated holes are to be two times the width and twice the depth of the root ball or container. Any existing non-native biomass shall be removed at least 18 inches (45.7 centimeters) away from the center of plant. Prior to installation, all planting holes shall be prepared by filling each empty hole half full with water, then backfilling with loose, un-compacted native topsoil. After adding native topsoil, additional water shall be added to the hole and firmly tamped to eliminate air pockets and minimize settling. The plant root ball shall be thoroughly saturated with water while still in container. All girdled roots shall be pulled loose from the root ball. If necessary, the root ball shall be scarified to eliminate girdled roots and promote new growth. Native soil backfill material is to be thoroughly mixed with three teaspoons of mycorrhizal fungi inoculums (Endonet or Bionet brands only), prior to backfilling plant material.

Each plant shall be individually watered at the time of planting. Sufficient water shall be provided to saturate the root zone and reach the lower roots of the plant. During installation, the base of each plant shall be provided a 1.0- to 2.0-inch (2.5 to 5.0 centimeters) layer of mulch approved by the project biologist (i.e., coarse, organic, weed-free bark or woodchip mulch) to cover the entire basin area. Post planting irrigation shall be provided to each plant shortly after installation. Plants shall be irrigated from the top down to fill each irrigation basin. Water shall also be sprinkled around the plant to help settle backfill, mulch, and berm around basin. After the first application of water has completely infiltrated the soil, a second water application shall be provided following the same procedure as the initial application.

4.10.4 Installation of Plant Cuttings

Any cuttings to be installed shall be collected within five days of planting. Cuttings shall be taken from healthy, vigorous plants that are dormant at the time of collection. Cuttings shall not be collected from more than 50 percent of the plants in a given area and no more than 20 percent of any plant shall be removed. Only sharp, clean tools shall be used for collection. Plant cuttings shall measure between 12 and 36 inches (30.5 and 91.4 centimeters) in length and between 0.5 and 1.0 inch (1.3 and 2.5 centimeters) in diameter. Each cutting shall be made square at the top, above a leaf bud and at an angle of approximately 45 degrees, below the leaf bud at the base. Leaves and branches shall be trimmed from the cuttings and made flush with the stem. All plant cutting shall be placed in water for a minimum of four days prior to planting. Any cuttings not planted by the fourth day or allowed to dry out, shall not be used. Unused cuttings shall be legally disposed at an off-site location.

4.11 Cost

Based on costs associated for similar type projects, non-native eradication (by two crews working concurrently, each consisting of one supervisor, twelve laborers, and two equipment operators) is expected to range between $6,000 - $7,000 per acre for selective clearing and grubbing plus biomass removal as planned for the proposed mitigation site. In addition, arundo eradication can cost an estimated $75,000 per acre when the species occurs in dominant stands based on similar removal projects. There are 10.4 acres of arundo that require eradication at the proposed mitigation site.

Planting estimates are based on the cost of species presented in the seed mix and planting palettes (Tables 10a through 10f). The cost associated with hydroseed application and cuttings is estimated at $.08 per square foot. Container plantings cost approximately $8.00 per plant. Planting densities will depend on position at the proposed mitigation site (i.e., inside or outside the floodplain) and are presented in Table 11.

For long-term management, a recent estimate accepted by the City for a similar mitigation site along the San Diego River within MHPA boundaries was calculated at approximately $3,400 per acre per year. This cost estimate included long-term management costs for patrolling, trash removal, non-native vegetation control, remedial action, wildlife monitoring, and administration (Dudek 2014). The City is estimating that maintenance will cost approximately $3,877 per-an-acre each year (over five years) for the proposed mitigation site.

A preliminary cost estimate for project implementation for the entire 57.0 acre site is provided in Table 12.

It should be noted that costs included in this project are considered preliminary estimates based on implementation of similar activities. Refinement of the cost estimate should be completed when contracting for implementation of the work plan.

Table 12 Preliminary Cost Estimate

Project Phase	*Estimated Total Cost ($)*
Site Preparation	
Non-native eradication ($302,900/ 46.6 acres and $780,000 for arundo)	1,082,900
Fence Installation ($25.00/linear foot for 4,000 linear feet of new fence)	100,000
Irrigation Installation	300,000
Plantings	
Hydroseed and Cuttings ($.08/square foot)	198,600
Container plantings ($8/plant)	179,600
Maintenance	
Maintenance (five-year period)	1,105,000 (221,000 per year)
Monitoring	1,000,000
Overall Total	*$3,966,100*

5.0 Maintenance Program

All ongoing maintenance activities (schedule and work plan) will be approved by the City biologist to ensure overly aggressive actions are avoided. Maintenance will occur in two distinct phases, the 120-Day Plant Establishment Period (PEP) and the five-year period following the PEP.

5.1 120-Day Plant Establishment Period

Native plants will be monitored consistently for the first 120-days after installation, which is the PEP. During the 120-day PEP, the Installation Contractor under the supervision of the project biologist will provide regular maintenance of all installed plantings and seeding. Maintenance will include regular supplemental watering, weed eradication, pest control, dead plant replacement and trash removal as necessary to ensure the success and active growth of all restoration plantings. The Installation Contractor shall provide supplemental watering three times per week for the first month after installation to ensure successful survivorship/establishment of planted material. The watering schedule will be adjusted as needed at the discretion of the project biologist to ensure project success. Control of all non-native species, weeds, and trash removal will occur weekly during the PEP unless the project biologist approves an alternative schedule.

All plantings and seeding shall be surveyed at the end of the 120-day PEP. Any dead or diseased container plant material shall be replaced in-kind. Areas that have been planted with seeds or cuttings will be replaced at the discretion of the City.

5.2 Five-Year Maintenance Period for Each Year Following the 120-Day Plant Establishment Period

All maintenance activities are to be performed for the duration of the five year period following the PEP or until full establishment of all native plant communities occurs and the project biologist deems a particular action to no longer be required for project success. A maintenance contractor will, at a minimum, conduct monthly maintenance visits during the five year maintenance period.

5.2.1 Supplemental Watering

Rehabilitation areas shall be watered as necessary to ensure successful germination of seed and survivorship/establishment of planted material. Watering shall mimic and supplement natural rainfall and seasonal conditions.

5.2.2 Weed Eradication

Weed species include both native and exotic plants that tend to be primary succession species or prevalent in disturbed areas. These species are expected to occur at the site during initial phases of the project and then overtaken by healthy native habitats as new plant growth continues. All targeted non-native and weed species observed during monthly maintenance visits will be removed and/or treated immediately.

5.2.2.1 Annual Weeds

Annual weeds are extremely fast-growing and high water/nitrogen consumers. This allows for production of seed before completion of their annual life cycle. Maintenance timing is critical to control seed production and spread of annual weeds. Activities will involve hand-pulling weeds, mowing, or

spraying herbicide before seed production occurs. All annual weeds will be removed from the site unless the project biologist determines there is no threat to native establishment and project success. Species that may be left in place include (but are not limited to) common ruderal plants, such as wild oat (*Avena fatua*), black mustard, various bromes, Italian thistle, Italian ryegrass, annual rabbitsfoot grass, and wild radish.

5.2.2.2 Perennial Weeds

Unlike annual weeds, perennial weeds must be completely killed or removed in order to eradicate them from the site. Perennial weeds will be hand pulled or sprayed with herbicide to remove dense growth. Mowing is not an option for perennial weeds, as it tends to enhance the growth of these species.

5.2.3 Mowing

Mowing will occur at the site when clearing areas prior to planting and reducing exotic seed recruitment. Mowing can enhance the growth of perennial species or be counter-productive if the height is incorrect. The location, timing, and height of mowing activities will be discussed and approved by the project biologist.

5.2.4 Herbicide Application

Maintenance will involve herbicide treatment to control any re-sprouts of non-natives. A retreatment cycle each of the first five years is recommended depending on the rate of native vegetation establishment and information provided during monitoring efforts. All target non-native species observed onsite shall be eradicated immediately upon observation using the prescribed methodology (Section 4.4.1). Care will be taken to ensure herbicides or application methods do not damage desirable plants or native vegetation.

5.2.5 Pest Control

Maintenance will include actions to deter infestation by insects and browsing by local wildlife as needed. A reasonable level of impact by insect and rodent species during habitat establishment is to be expected, but typically does not interfere with the success of habitat restoration. The City shall take appropriate measures to suppress pest populations if levels of impact become extreme.

5.2.6 Pruning and Leaf Litter

No pruning or leaf litter removal of native species shall take place within the site unless a safety hazard exists, otherwise, all (native) dead branches and organic materials shall be left in place or scattered throughout the area. All leaf litter, fallen branches/trees, and other organic target species materials will be removed from the site.

5.2.7 Replacement of Dead or Diseased Plant Materials

Container/nursery materials will be re-surveyed one year following installation. Dead or diseased container plant material shall be replaced in-kind. Areas that have been planted with seeds or cuttings will be replaced at the discretion of the City.

5.2.8 Trash Removal

All trash and illegally dumped debris will be removed at least once every three months throughout the five-year maintenance period. Care will be taken that these trash removal activities minimize or avoid

damage to plantings in the proposed mitigation site. Weed debris and mow cuttings will also be removed and disposed of at Miramar Greenery Landfill.

5.2.9 Site Access

Throughout the duration of the project the proposed mitigation site will be monitored for unauthorized entry and illegal encampments, all encampments will be removed immediately. If illegal site access interferes with project success, additional patrols will be performed. Also, local businesses will be engaged to assist with reporting illegal ingress and additional “No Trespassing” signs will be installed.

6.0 Biological Monitoring

6.1 Performance Criteria

Success standards will be assessed for all rehabilitation and enhancement areas as well as the Diegan coastal sage scrub restoration portions of the proposed mitigation site. Success standards do not apply to the utility and access easements where revegetation is restricted (maintenance for weed control will occur) and the freshwater river channel. The primary criteria for measuring success will be vegetation cover and diversity. Cover will be represented in terms of total cover (all vegetation) throughout the restoration area and relative cover (percent of vegetated areas) provided by either native plants or ruderal species. Diversity is expressed in terms of number of species of native plants that are dominant or sub-dominant in the restoration area.

The following minimum standards must be achieved or exceeded by the end of the five-year maintenance period for the revegetation effort to be considered successful:

1. **Native Vegetation Coverage:** Native species must provide at least 90 percent total coverage throughout the site in rehabilitation and enhancement areas as well as 80 percent total coverage in Diegan coastal sage scrub restoration areas.

2. **Exotic Vegetation Coverage:** Target non-native species as specified in Table 9 must not contribute more than one percent of all vegetative cover for the rehabilitation and enhancement areas and three percent of all vegetative cover for the Diegan coastal sage scrub restoration areas.

3. **Species diversity:** The composition of vegetation in the proposed mitigation site must exhibit species diversity indicative of a natural riparian corridor with Diegan coastal scrub upland. Diversity will be measured in terms of the number of dominant and sub-dominant native trees, shrubs, and herbs identified by both visual estimates and linear transect data collection. By the end of the five-year maintenance period, the proposed mitigation site should support three vegetation layers in riparian areas with at least eight co-dominant native plant species throughout those layers. The coastal Diegan sage scrub should support two vegetation layers with at least eight co-dominant native plant species.

4. **Irrigation Limitation:** In order for the proposed mitigation site to be self-sustaining under natural conditions, supplemental irrigation will be discontinued for a minimum of two years prior to project completion or as stipulated in project permits and resource agency approvals.

Additionally, the overall success of project efforts will be evaluated by using CRAM (in riparian areas), which will allow for assessment of changes to hydrology, physical structure, and biotic structure at the site. An increase in overall CRAM score of approximately three points from a baseline score of 68 (as detailed in Table 13) should follow with project implementation.

A record of sensitive wildlife observations shall be maintained and should show increased utilization of the proposed mitigation site over time. However, no specific performance criteria (or expected rate of increase) are provided as many factors outside the control of the City (i.e., climate, disease, etc.) contribute to use of a particular area by wildlife.

Tables 13 and 14 below provide standards to assess performance criteria of the riparian enhancement and rehabilitation areas as well as the Diegan coastal scrub restoration areas during annual monitoring inspections.

Table 13 Performance Goals for Five Years (Enhancement and Rehabilitation Areas)

Year	*CRAM Score*	*Native Plant Coverage Range (percent)*	*Exotic Vegetation Coverage Range (percent)*	*Native Co-Dominant Species*
1	68	20–30	10	5
2	-	31–50	6-8	-
3	68-69	51–65	4-6	5-6
4	-	66–85	2-4	-
5	71 or above	greater than or equal to 90	≤1	≥8

Table 14 Performance Goals for Five Years (Diegan Coastal Sage Scrub Restoration Areas)

Year	*Native Plant Coverage Range (percent)*	*Exotic Vegetation Coverage Range (percent)*	*Native Co-Dominant Species*
1	10–20	10	5
2	21–40	6-8	-
3	41–55	5-6	5-6
4	56–75	4-5	-
5	greater than or equal to 80	≤3	≥8

If annual performance standards are not met, the City biologist will work with the regulatory agencies to implement additional measures to address problems. Substantial amendments to the overall design of the proposed mitigation site shall require concurrence by the regulatory agencies (USACE, USFWS, CDFW, and/or RWQCB) prior to implementation. Minor problems, such as isolated plant mortality, occasional trash, and small-scale weed invasions can be rectified immediately and included in the annual monitoring report.

If the performance standards are deemed too aggressive for the suggested timeframe once the work plan has begun, the City may request a modification of the standards in accordance with 33CFR 332.7 (c)(4).

If the proposed mitigation site does not meet the performance criteria and the criteria are considered accurate and reasonable, the maintenance and monitoring obligation will continue until performance criteria are achieved or contingency measures are negotiated (in writing) with the regulatory agencies. The City understands that failure of any significant portion of the proposed mitigation site may result in a requirement to replace that portion of the site and/or extend the monitoring and maintenance period until the regulatory agencies concur that all performance criteria are met.

6.2 Monitoring Requirements

Progress monitoring and performance assessments will be conducted by the City for the duration of the five-year work plan. Monitoring will occur monthly during the first two years, bimonthly for year three, and quarterly thereafter through the end of the five-year period. Additional monitoring can occur if problems arise that require assessment at a higher frequency. An annual monitoring report will be prepared each year summarizing the monitoring data.

Quantitative data will be collected annually to determine survivorship, relative and total coverage by species, and to assess species composition and diversity. Qualitative surveys, consisting of a general site walkover and characterization of the coverage and species distribution exhibited throughout the entire proposed mitigation site, will be completed during each monitoring visit. General observations, such as fitness and health of revegetation species, weed or pest problems, signs of over watering or drought stress, and fauna will be noted during each survey.

Annual monitoring will be performed at a minimum of twelve permanent sampling transects to be established (by the project biologist) across the various treatment types. Transects will have a minimum length of 100.0 feet (30.5 meters). Photograph stations will be established to obtain views of each transect area.

The following techniques will be employed to assess percent coverage and densities of plant species in revegetated areas:

- A meter tape will be extended between two staked points at the terminus of each of the permanent transects.
- Percent cover will be determined by measuring the plant intersect length, which is the length of the plant directly in contact with the tape measure, of each species. This measurement will be made for each individual plant (or cluster) and summed for each species to provide percent cover. From the sum for each species, the total native and non-native cover can be calculated according to the following equation: PC=t/T x 100, where “PC” is percent coverage, “t” is the sum of all intercepts for a species, and “T” is the total length of the transect. Percent coverage figures can be greater than 100 percent due to the overlap between the herbaceous and shrub canopies.
- Species diversity will be measured by recording all species observed during transects and qualitative monitoring. Species observation data will be maintained and included in annual monitoring reports. The co-dominant species from each transect and qualitative monitoring area will be combined to determine the total number of co-dominant species throughout the proposed mitigation site for that year; species occurring in multiple areas will only be counted once.
- A qualitative estimate of cover values for the entire proposed mitigation site will be used to compare data recorded from the linear transects.
- A qualitative estimate of the diversity of plant species will be completed by making a list of species in their representative plant layers (floating, short, medium, tall, or very tall) and determining visually what species are dominant within the layers. All species observed will be recorded, but a distinction will be made between natives and non-natives during annual reporting. This can be accomplished through CRAM.

Finally, a CRAM assessment will be performed at the end of year one, three, and five to grade and monitor hydrology, physical structure, and biotic structure changes within the site. There will be three assessment areas within the proposed mitigation site, the mean of all three areas will be used to determine the overall CRAM score for the proposed mitigation site. CRAM will also be performed at a reference site concurrently in order to account for any changes that might not be the result of the restoration project. The reference site is located approximately 4.0 miles (6.4 kilometers) upstream from the proposed mitigation site within Mission Trails Regional Park. A CRAM assessment for this site has been completed and is included as part of Appendix D.

In accordance with the MSCP, the City shall report actions related to the proposed project annually to all regulatory agencies (USACE, USFWS, CDFW, and RWQCB). The contents of yearly monitoring status reports will be in accordance with Regulatory Guidance Letter No. 08-03 (2008b). Each report shall consist of a brief narrative that includes:

- A project overview
- Requirements established for the site
- Summary data);
- Maps and plans;
- Pictures
- Conclusions; and
- Supporting data.

The focus of each report shall be to provide the appropriate supporting data, such as functional assessment results and photographs, to outline how the project is progressing toward meeting and/or maintaining performance standards (USACE 2008b).

7.0 Schedule of Activities

Approximately four months will be allowed to contract grow plant material. This will begin prior to and continue during site preparation efforts. A soils analysis will also be performed to determine if soil remediation will be required prior to planting. The anticipated start date for site preparation is September 15, 2015. Clearing and grubbing of the entire site will take about two months to complete until on or about November 15, 2015.

Restoration work will begin as soon as ecologically feasible after eradication work has been completed. The soils report will determine if planting must be delayed so new plants will not be adversely affected by the herbicide used during the eradication process or background conditions. It is anticipated that revegetation will begin no later than February 15, 2016 and continue for about two months through approximately April 15, 2016. The PEP will continue for 120-days following initial installation from February 15, 2016 to on or about August 14, 2016 when regular maintenance activities will commence. Maintenance will then continue until approximately February 15, 2021 when the five-year monitoring schedule will be complete and project objectives shall be achieved.

Table 15 provides a general overview of the schedule.

Table 15 Schedule

Tasks	*Site Preparation*	*120-Day PEP/Year 0*	*Year 1 (15Feb16-15Feb17)*	*Year 2 (15Feb17-15Feb18)*	*Year 3 (15Feb18-15Feb19)*	*Year 4 (15Feb19-15Feb20)*	*Year 5 (15Feb20-15Feb21)*
Grow plant material	Prior to and after 15Sep15	--	--	--	--	--	--
Soil analysis	Prior to 15Sept15	--	--	--	--	--	--
Non-native eradication	15Sept15-15Nov15	--	--	--	--	--	--
Restoration/revegetation	15Feb16-15Apr16	--	--	--	--	--	--
Maintenance	--	15Feb16-14Aug16	Monthly	Monthly	Monthly	Monthly	Monthly
Monitoring	--	--	Monthly	Monthly	Bimonthly;	Quarterly	Quarterly
Reporting	--	--	Annual	Annual	Annual	Annual	Annual

8.0 Remediation Measures

8.1 Adaptive Management

Although actions proposed for this project are intended to improve the site and overall quality of the watershed, unforeseen events can occur that may be beneficial or detrimental to the project, since alteration of natural ecosystems can be unpredictable. The City shall respond to unforeseen scenarios at the proposed mitigation site through use of adaptive management. This technique allows for continuous evaluation of the project, so management decisions can be refined to ensure success. To facilitate decisions, a qualified City biologist familiar with the project design and goals will provide oversight to each phase of project implementation.

In the establishment stage of the proposed mitigation site, adaptive management will be used to adjust actions and procedures outlined for this project as necessary for maximum success of restoration and enhancement activities. For example, adjustments in planting arrangement, plant installation (containers versus seeds), and watering regime will be refined as the work progresses. Also, special status species occurrence at the proposed mitigation site would require additional avoidance measures or alterations to the work schedule for species protection. The City will assess each situation as it occurs, coordinate with regulatory agencies when appropriate, and determine the best course of action to successfully fulfill the goals and objectives of the mitigation project. The City will then be responsible for communicating any changes to onsite personnel and/or contractors.

Following establishment of the proposed mitigation site, adaptive management will be employed to provide for successful long-term maintenance. The potential need for adaptive management is typically more crucial during the initial stages of the project during clearing, grubbing, and replanting activities. Correcting problems as they arise during early stages should minimize potential issues as the project progresses further. The City biologist will be responsible for adjusting maintenance activities as needed to accommodate for site conditions or other issues, such as species use. It is expected that the restored site (following establishment) will attract additional species over time, so maintenance schedules and practices will be altered by the City biologist as needed for the benefit of those species.

9.0 Completion of Mitigation

9.1 Notification of Completion

Upon completion of the five-year maintenance period, the project biologist will complete the Final Annual Monitoring and Notice of Completion report to be submitted to the regulatory agencies (USACE, USFWS, CDFW, and RWQCB) and City for review and concurrence of project completion. The report will provide an evaluation of the overall success of the proposed mitigation site and outline how performance criteria have been achieved. If final success standards have not been met at the end of the five year period, the City will consult with the regulatory agencies to determine whether restoration efforts are acceptable to consider the project complete. Failure to achieve performance standards may result in further restoration and extension of maintenance and monitoring activities (beyond the five year period) until goals are met. The project will be considered complete once written concurrence is received from the resource agencies. The site will continued to be protected after project completion under the MSCP.

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Appendix A Preliminary Delineation of Waters of the U.S., Including Wetlands

Preliminary

Delineation of Waters of the United States, Including Wetlands

Stadium Wetland Mitigation Project (San Diego River)

March 6, 2015

Prepared for:
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Public Utilities Department
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Atkins Project No.: 100042255

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Abbreviations

CDFW	California Department of Fish and Wildlife
GPS	Global Positioning System
I	Interstate
OHWM	Ordinary High Water Mark
RWQCB	Regional Water Quality Control Board
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

1.0 Summary

On behalf of the City of San Diego Public Utilities Department, Atkins conducted a delineation of waters of the United States (U.S.), including wetlands, occurring within the biological study area related to the proposed Stadium Wetland Mitigation Project (San Diego River) located along the river between Interstate (I)-15 and I-805 in San Diego. Atkins' biologists systematically delineated the study area on February 19, 2014. Both wetland waters of the U.S. and non-wetland waters of the U.S. have been mapped within the study area. These features occupy a total of 40.4 acres of the study area. Jurisdictional waters of the State were also delineated in accordance with the California Department of Fish and Wildlife (CDFW) and Regional Water Quality Control Board (RWQCB) as described in the regulatory jurisdiction section (4.1) of this report. Waters of the State occupy a total of 55.9 acres of the study area.

This delineation of waters of the U.S., including wetlands, is subject to verification by the U.S. Army Corps of Engineers (USACE). Atkins advises all parties to treat the information contained herein as preliminary until the USACE provides written verification of the boundaries of their jurisdiction.

2.0 Project Location

2.1 General Location

The study area is located along the San Diego River situated between I-15 and I-805 south of Qualcomm Stadium within the City of San Diego, in San Diego County, California (Figure 1). This location corresponds to portions of Mission San Diego, Township 16 South, Range 2 West of the La Mesa and La Jolla U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (Figure 2).

2.2 Acreage of Study Area

The study area encompasses a total of approximately 57.0 acres. This includes the proposed mitigation areas on the north and south side of the San Diego River as well as Public Utilities' easements.

2.3 Proximity to Major Highways and Streets

The study area is located directly between I-15 to the east and I-805 to the west as well as north of I-8. Access to the study area is provided by Camino Del Rio North, which runs parallel to the southern border of the proposed mitigation site.

2.4 USGS Hydrological Unit

The study area is located within USGS Hydrological Map Unit Number 18070304 (U.S. Environmental Protection Agency 2014).

ATKINS

FIGURE 1
Regional Location Map

100038033

Stadium Wetland Mitigation Project (San Diego River)

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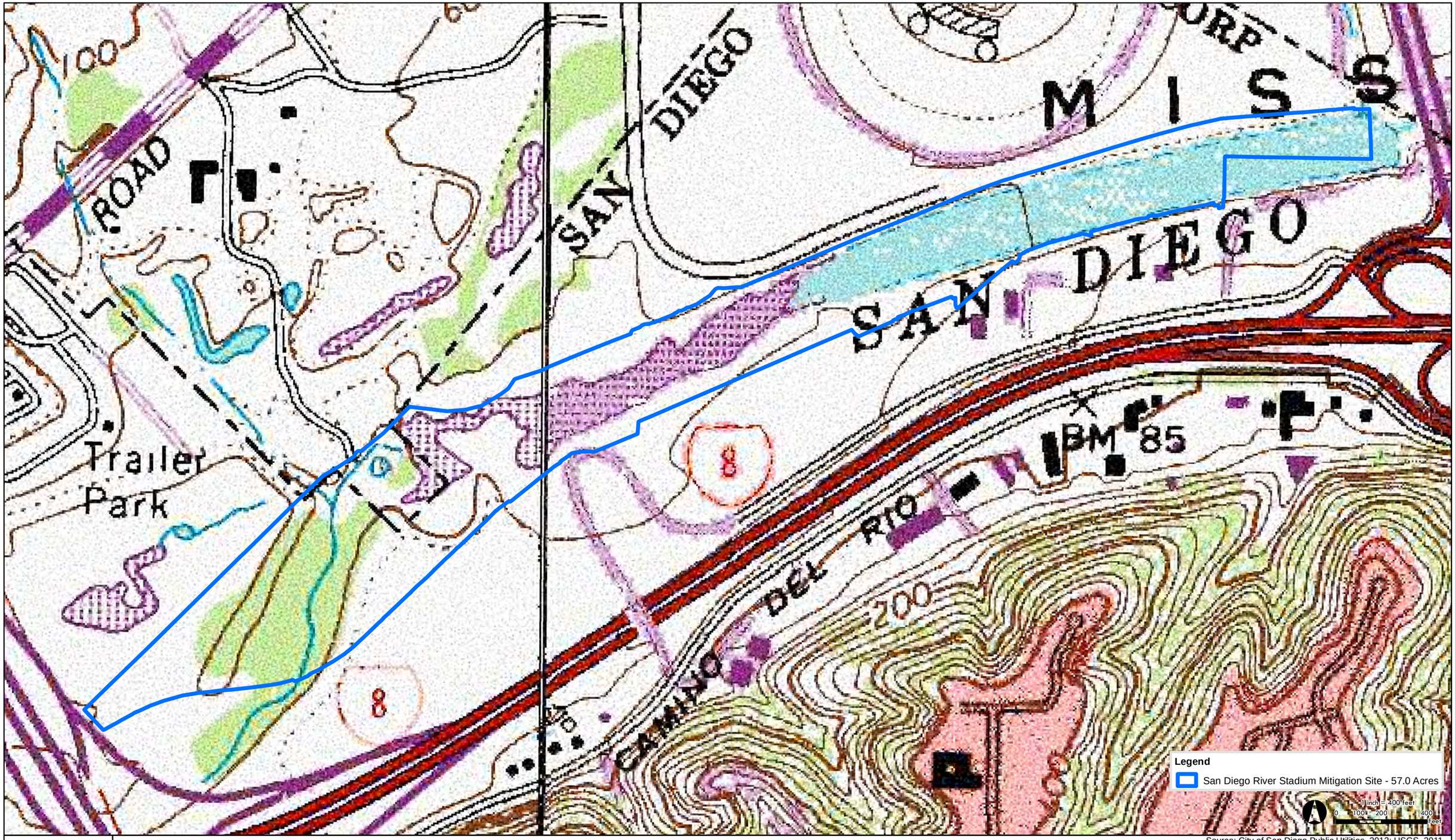

Source: City of San Diego Public Utilities, 2013; USGS, 2011

ATKINS

FIGURE 2
Project Vicintiy Map

100038033

Stadium Wetland Mitigation Project (San Diego River)

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3.0 Environmental Setting

3.1 Existing Land Uses

The study area currently consists of undeveloped land adjacent to a portion of the San Diego River. Surrounding lands are a combination of commercial and suburban areas. This location corresponds to the South Coast Subregion of the California Floristic Province (Hickman 1993). Habitat occurring within the study area includes coastal and valley freshwater marsh, non-native grassland, non-native riparian (with arundo-dominated riparian), and southern riparian woodland. The existing land use is open space along the San Diego River that provides recreation opportunities, such as hiking and bird-watching. Currently, the area also includes several (more than thirty documented) transient homesteads.

3.2 Elevation and Topography

The elevation of the study area is approximately 50 feet above mean sea level.

Topography in the vicinity of the study area is characterized as uplands and low hills that gently slope to the San Diego River system. Local terrain within the study area consists of generally flat to slightly sloping upland with steep concave relief along either side of the river channel, which occupies the lowest topographic position. Also, along either side (north and south) of the river are low, flat terraces or benches that comprise the floodplain situated directly above bankfull.

3.3 Climate

Type

San Diego County has a Mediterranean climate with cool, wet winters and warm, dry summers.

Precipitation

The average total precipitation on the Coastal Plains, where the project is located, is about 13 inches. Rainfall is the heaviest between November and April. Rain is infrequent during summer months, but humidity is fairly high due to fog along the coast (U.S. Department of Agriculture [USDA] 1973).

Air Temperature

The average annual temperature is approximately 54° to 58° Fahrenheit throughout the entire county. Moderate temperatures are typical of the coastal region (USDA 1973).

Growing Season

The growing season describes the period between the last freezing temperature in spring and the first in fall. The Coastal Plains of San Diego County have an average growing season between 280 to 360 days (USDA 1973).

3.4 Hydrology

The San Diego River flows approximately 52 miles west from its headwaters in the Volcan Mountains through San Diego County and the City of San Diego to the Pacific Ocean. The San Diego River watershed includes and area of approximately 440 square miles comprised of major tributaries, such as Boulder Creek and San Vicente Creek, as well as numerous smaller tributaries, such as Oak Creek and Murray Creek (606 Studio 2002). Drainage of the study area occurs primarily through surface runoff and irrigation practices from the surrounding urban areas. Water is conveyed to the study area through the main river channel and natural sloping topography. Flows through the study area are primarily through a single low-flow channel with few adjacent high-flow channels forming a very limited braided system. Downstream from the study area, the San Diego River flows approximately 7.8 miles to the Pacific Ocean.

3.5 Soils

The Web Soil Survey of San Diego County Area, California (USDA 2013) identifies four mapped soil units within the study area, including Riverwash (map unit Rm), made land (map unit Md), Tujunga sand, 0 to 5 percent slopes (map unit TuB), and Salinas clay loam, 2 to 9 percent slopes (map unit SbC). These soil units are described below; a soils map of the study area is presented as Figure 3.

Riverwash

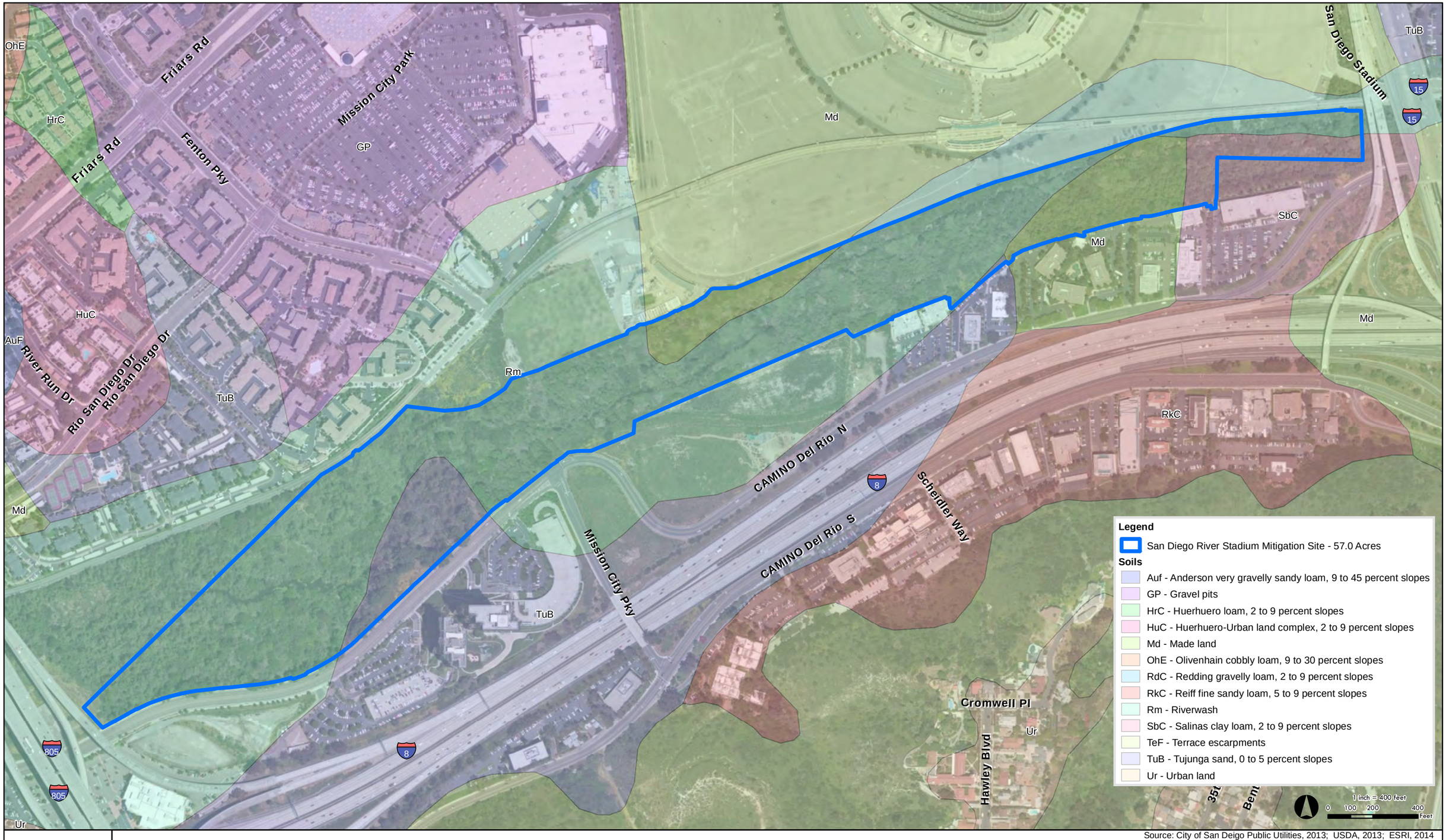
Riverwash is a miscellaneous area that describes drainageways with sandy, gravelly, or cobbly alluvium derived from mixed sources. This soil type typically occurs at 0 to 4 percent slope and is excessively drained with occasional flooding. Riverwash will typically meet one or more field indicators for hydric soil. A typical profile consists of 0 to 6 inches of gravelly coarse sand above 6 to 60 inches of stratified extremely gravelly coarse sand to gravelly sand (USDA 2013).

Made Land

Made land is a miscellaneous area that is not derived through natural processes. This soil unit typically does not show any characteristics of hydric soil. The soil profile of made land is variable (USDA 2013).

Tujunga Sand, 0 to 5 percent slopes

This soil type is found on floodplains and has a parent material of alluvium derived from granite. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained and water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low and there is no zone of water saturation within a depth of 72 inches. This soil is rarely flooded, not ponded, and does not meet hydric criteria (USDA 2013).



Source: City of San Deigo Public Utilities, 2013; USDA, 2013; ESRI, 2014

ATKINS

FIGURE 3
Soils

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Salinas Clay Loam, 2 to 9 percent slopes

This soil type is found on alluvial fans and has a parent material consisting of alluvium derived from mixed sources. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained and water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high and there is no zone of water saturation within a depth of 72 inches. This soil is not flooded or ponded, and does not meet hydric criteria (USDA 2013).

3.6 Vegetation Communities

The study area consists of four primary vegetation communities, including coastal and valley freshwater marsh, non-native grassland, non-native riparian (with arundo-dominated riparian), and southern riparian woodland. Figure 4 shows habitat within the study area and Figure 5 provides representative photos.

Coastal and Valley Freshwater Marsh

Coastal and valley freshwater marsh is described as,

> Dominated by perennial, emergent monocots to 4-5 meters tall. Often forming completely closed canopies. *Scirpus* and *Typha* dominated types and their environmental floristic distinctions require clarification (Oberbauer et al. 2008).

This habitat occurs in areas permanently flooded by freshwater that lack significant current. These conditions permit accumulation of deep, peaty soils. Characteristic species include members of the *Carex, Cyperus, Scirpus, and Typha* genera. Dense stands of California bulrush (*Scirpus californicus*) occur in small clusters along the San Diego River within the study area.

Non-Native Grassland

Non-native grassland, or annual grassland, is described as,

> A dense to sparse cover of annual grasses with flowering culms 0.2 to 0.5 meter high. Often associated with numerous species of showy-flowered, native annual forbs ("wildflowers"), especially in years of favorable rainfall. In San Diego County the presence of *Avena, Bromus, Erodium,* and *Brassica* are common indicators. In some areas, depending on past disturbance and annual rainfall, annual forbs may be dominant species; however, it is presumed that grasses will soon dominate. Germination occurs with the onset of the late fall rains; growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer-fall dry season, persisting as seeds. Remnant native species are variable. This can include grazed and even dry-farmed (i.e., disked) areas where irrigation is not present (Oberbauer et al. 2008).

This habitat occurs in the valleys and foothills throughout most of California, except for the north coastal and desert regions, on fine-textured, often clay soils that are moist or saturated during the winter and dry during the summer. Characteristic species observed within the study area include wild oat (*Avena fatua*), black mustard (*Brassica nigra*), filaree (*Erodium botrys*), Italian rye-grass (*Lolium multiflorum*),

phacelia (*Phacelia* sp.), and other grasses. The non-native grassland onsite was highly influenced by human activity and trending toward disturbed habitat.

Disturbed habitat is typically dominated by non-native species introduced and established through human action. Water is usually provided from precipitation and runoff, not through artificial irrigation. Characteristic species include invasive, non-native forbs and a limited number of grass species. Species commonly associated with disturbed habitat noted onsite, included Italian thistle (*Carduus pycnocephalus*), ice plant (*Carpobrotus edulis*), and Napa thistle (*Centaurea melitensis*).

Non-Native Riparian

Non-native riparian is described as,

> Densely vegetated riparian thickets dominated by non-native, invasive species. This designation should only be used where non-native, invasive species account for greater than 50 percent of the total vegetative cover within a mapping unit (Oberbauer et al. 2008).

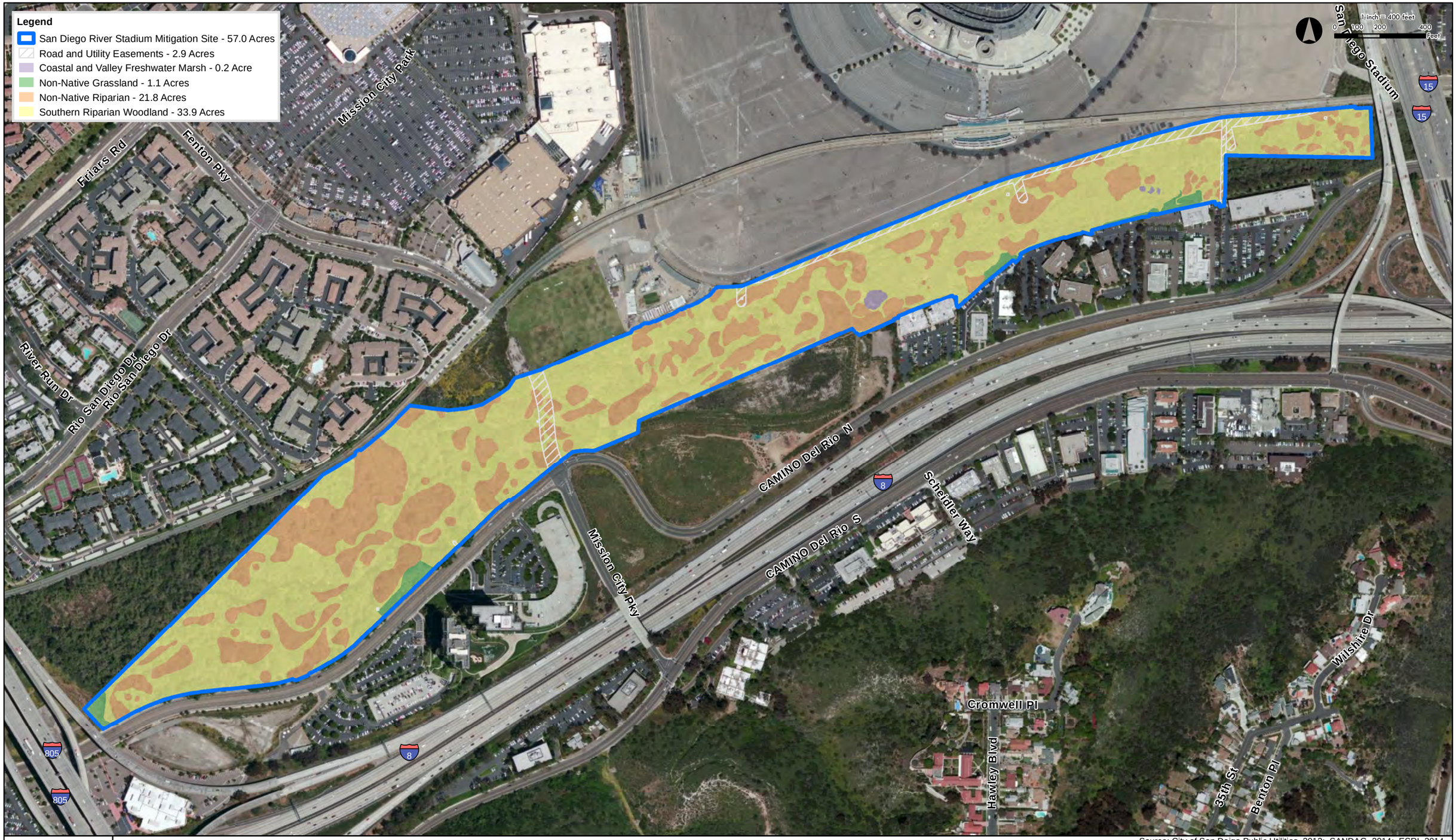
This habitat is extensive along major rivers in coastal southern California, including the San Diego River, and typically occurs in areas with human disturbance. Characteristic species seen within the study area include arundo (*Arundo donax*), cottonwood (*Populus* sp.), tamarisk (*Tamarix ramosissima*), and palms (*Phoenix canariensis* and *Washingtonia robusta*). The study area also includes arundo-dominated riparian habitat, which is a sub-classification within non-native riparian that applies to non-native areas where arundo accounts for greater than 50 percent of the total vegetative cover.

Southern Riparian Woodland

Southern riparian woodland is described as,

> Moderate-density riparian woodlands dominated by small trees or shrubs, with scattered taller riparian trees (Oberbauer et al. 2008).

This habitat is found throughout San Diego County along major river systems, such as the study area, where flood scour occurs. California sycamore, cottonwood, and various willows are typically co-dominant species associated with this habitat classification. Southern riparian woodland within the study area includes many invasive, non-native species although not quite to 50 percent vegetative cover when a classification of non-native riparian would apply. Species observed onsite within the southern riparian woodland include native species, such as white alder (*Alnus rhombifolia*), Fremont cottonwood, California scrub oak (*Quercus dumosa*), and arroyo willow (*Salix lasiolepis*) interspersed with non-native species, such as Brazillian pepper tree (*Schinus terebinthifolius*), tamarisk, and palms.



Source: City of San Deigo Public Utilities, 2013; SANDAG, 2014; ESRI, 2014

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FIGURE 4
Habitat within the Study Area

100038033

Stadium Wetland Mitigation Project (San Diego River)

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Photograph 1: Freshwater marsh along the San Diego River within the study area.

Photograph 2: Characteristic non-native grassland in the foreground of the photo; field efforts occurred in February during a dry year, so most plants were dead.

Figure 5 Photos of Habitat within the Study Area

Photograph 3: Characteristic non-native riparian habitat with arundo-dominated riparian in the background along the San Diego River.

Photograph 4: Southern riparian woodland within the study area.

Figure 5 Photos of Habitat within the Study Area

4.0 Delineation Methods

4.1 Regulatory Jurisdiction

The USACE, CDFW, and RWQCB have regulatory jurisdiction over waters of the U.S. as described below.

The USACE, under the Clean Water Act, has permitting authority over activities affecting waters of the U.S., which include: navigable waters and their tributaries; all interstate waters and their tributaries; natural lakes; all wetlands adjacent to other waters; and all impoundments of these waters. USACE jurisdiction typically includes lands below the ordinary high water mark (OHWM) and wetlands or similar areas above the OHWM with hydrologic connection or significant nexus to a navigable waterway. The purpose of this preliminary delineation is to determine the presence and extent of USACE jurisdictional features within the project area. These features are considered either wetland or non-wetland waters of the U.S. depending on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

The CDFW manages a Lake and Streambed Alteration Program, which requires notification of any proposed activity that may substantially modify a river, stream, or lake. The notification applies to any work undertaken in or near a river, stream, or lake that intermittently flows through a bed or channel, including ephemeral streams, desert washes, watercourses with a subsurface flow, and (at times) work undertaken within the floodplain of a body of water. These jurisdictional waters of the State are delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider.

Under the Clean Water Act and the California Porter-Cologne Water Quality Control Act, an activity which may result in a discharge into a water body must request state certification from the RWQCB that the proposed activity will not violate federal and state water quality standards. This generally includes all waters subject to the jurisdiction of the USACE and CDFW, including isolated waters excluded from USACE jurisdiction.

4.2 Technical Method

The routine onsite determination was based on field observations of soil, vegetation, and hydrologic characteristics as defined in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (USACE 2008). A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States (Lichvar and McColley 2008) was also consulted to more accurately depict and discuss perennial channel forms within the study area.

Minimum delineation standards require at least one set of paired data points for each feature. A pedestrian survey was conducted over the entire study area, to the maximum extent possible, with aerial imagery for reference to determine potential features requiring data points. Features observed within the study area were consistent (characteristics did not change) for the length of the section of river surveyed. An obvious river channel with adjacent floodplain exists below upland areas at grade with adjacent paved streets. The transition between the floodplain and upland is a distinct, steep

change in elevation that is clearly observable. A few stands of California bulrush were the only wetlands observed.

Six, three-parameter data points (sample pits) were collected to characterize and document features within the study area. Wetland determination data forms for these data points are presented in Appendix A. Additional reference locations (potential sample pits) were also assessed throughout the study area to ensure site conditions were consistent with data recorded at the official data points. No variations (from what is recorded in the data forms) were noted, so no additional data points/forms were completed. Also, no OHWM data forms were completed, because the study area did not include ephemeral or intermittent channel forms.

4.3 Date of Field Observations

The field observations for this delineation were conducted by Jessica A. Nadolski and Janelle Kassarjian on February 19, 2014.

4.4 Wetland Vegetation Indicator Status Reference

The USACE 2014 National Wetland Plant List website was used to determine the wetland indicator status for each plant species (Lichvar 2013 and USACE 2014). Status for the western mountains valleys and coast region was used.

4.5 Hydric Soil Method of Determination

A standard Munsell® soil color chart was used to determine soil matrix and mottle colors.

4.6 Wetland Hydrology Method of Determination

Indicators of depth and duration of soil saturation, ponding, drainage patterns, bankfull, and the OHWM were observed in the field. Figure 6 presents the OHWM zones.

4.7 Mapping Technique

The boundaries of each delineated feature and the location of three-parameter data points and reference locations were either mapped using a Trimble Global Positioning System (GPS) capable of sub-meter accuracy or mapped through remote sensing using recent (2014) aerial photography with onsite verification. These data were then overlain onto the aerial for calculating acreages of wetland features.

Source: City of San Deigo Public Utilities, 2013; SANDAG, 2014; ESRI, 2014

ATKINS

FIGURE 6
Ordinary High Water Mark

100038033

Stadium Wetland Mitigation Project (San Diego River)

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5.0 Delineation Results

5.1 Features Delineated

Wetland waters of the U.S. and non-wetland waters of the U.S. have both been mapped within the study area as USACE jurisdictional features. These features occupy a total of 40.4 acres. CDFW jurisdictional resources, including riparian woodland above the OHWM, occupy a total of 55.9 acres. Due to the proximity of the river, any activity in the study area would also be under the jurisdiction of the San Diego RWQCB. Table 1 below provides an acreage summary. Figure 7 presents the delineation map showing each delineated feature and sample pit locations.

Table 1 Acreage Summary

USACE JURISDICTIONAL RESOURCE	
Type	***Acreage***
Wetland Waters of the U.S.	0.2
Non-wetland Waters of the U.S.	40.2
Total Waters of the U.S. Acreage	**40.4**

CDFW JURISDICTIONAL RESOURCE	
Waters of the State Acreage	**55.9**

5.2 Characteristics of Delineated Features

Each delineated feature is described below and representative photographs are provided in Figure 8.

Wetland Waters of the U.S.

Approximately 0.2 acre of freshwater marsh dominated by California bulrush was mapped within the proposed mitigation site as wetland waters of the U.S. These dense stands are supported by flows in the San Diego River channel. This was the only area within the project site to meet all three parameters to be considered an USACE jurisdictional wetland.

Non-wetland Waters of the U.S.

Approximately 40.2 acres of non-wetland waters of the U.S. were mapped within the proposed mitigation site. Non-wetland waters of the U.S. include the San Diego River channel and the adjacent flood plain. The main channel of the San Diego River flows through the site varying in width from about 20 to 30 feet (6.1 to 9.1 meters) over 6,327 linear feet (1,928.5 meters). The adjacent floodplains are vegetated with a mixture of native and non-native species, but non-native species are the most abundant. Drift deposits in the form of branches and other vegetation debris occur closest to the river channel. Topography is generally flat with portions that include large cobble and undulating relief. The portions of the floodplain furthest from the river channel situated at the bottom of a steep grade below street level, trend toward upland characteristics in regards to plants and hydrology but maintain indications of hydric soil. It is expected that after completion of the mitigation project the riparian habitat would support the necessary vegetation to be considered a jurisdictional wetland.

Waters of the State

A total of 55.9 acres of CDFW jurisdictional resources were mapped within the proposed mitigation site, this includes 0.2 acres of freshwater marsh and 55.7 acres of riparian woodland. Riparian vegetation is composed of a mixture of native and non-native vegetation, but with non-native vegetation being the most dominant. The San Diego River channel flows through this riparian community supporting dense vegetative cover and creating a wide floodplain. Riparian vegetation extends out and above the floodplain to the edge of urban development throughout most of the proposed mitigation site.

USACE JURISDICTIONAL RESOURCE	
Type	*Acreage*
Wetland Waters of the U.S.	0.2
Non-wetland Waters of the U.S.	40.2
Total Waters of the U.S. Acreage	**40.4**

CDFW JURISDICTIONAL RESOURCE	
Waters of the State Acreage	**55.9**

Mission City Park
San Diego Stadium
Main Channel
Main Channel
Sample Pit 1
Sample Pit 2
Sample Pit 3
Sample Pit 4
Sample Pit 5
Sample Pit 6
River Run Dr
Rio San Diego Dr
Rio San Diego Dr
CAMINO Del Rio N
CAMINO Del Rio S
Scheidler Way
Mission City Pky
Cromwell Pl
Hawley Blvd
Wilshire Dr
15
8
805

Legend
- San Diego River Stadium Mitigation Site
- Freshwater Marsh
- Riparian Woodland (Wetland)
- Riparian Woodland (Buffer)
- Upland (City Jurisdiction Only)
- Freshwater (Estimated Position)

1 inch = 400 feet
0 100 200 400
Feet

Source: City of San Deigo Public Utilities, 2013; SANDAG, 2014; ESRI, 2014

ATKINS

FIGURE 7
Wetlands and Waters of the US Delineation Map

100038033

Stadium Wetland Mitigation Project (San Diego River)

P:\Projects - Biological Resources\100038033 San Diego River Stadium Mitigation Project\GIS\mxd\WetlandDelineationMxds\Fig7_DileneationMap.mxd

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5.3 Discussion of Results

Wetland and non-wetland waters of the U.S. features occur within the study area occupying a total of 40.4 acres and are subject to USACE jurisdiction. No discharge of dredged or fill material into waters of the U.S. is permitted unless authorized under a Department of the Army Permit. Additionally, a total of 55.9 acres of waters of the State occur within the study area. Therefore, no activity is allowed unless authorized by the CDFW. Furthermore, activities that may result in a discharge into jurisdictional waters (Federal or State) must request certification that water quality standards will be maintained from the San Diego RWQCB.

This delineation of waters of the U.S. is subject to verification by the USACE. Atkins advises all parties to treat the information contained herein as preliminary until the USACE provides written verification regarding the boundaries of their jurisdiction.

Photograph 1: Wetland waters of the U.S. and waters of the State

Photograph 2: Non-wetland waters of the U.S. and waters of the State

Figure 8 Photos of Delineated Features

Photograph 3: Non-wetland waters of the U.S. and waters of the State

Photograph 4: Waters of the State (near southern extent of jurisdiction)

Figure 8 Photos of Delineated Features

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APPENDIX A

Routine Wetland Determination Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Diego River Mitigation Site City/County: San Diego/San Diego Sampling Date: 19 Feb 14

Applicant/Owner: City of San Diego, Public Utilities Department State: CA Sampling Point: 1

Investigator(s): Jessica A Nadolski + Janelle Kassarjian Section, Township, Range: Mission San Diego, T16S, R2W

Landform (hillslope, terrace, etc.): river channel edge Local relief (concave, convex, none): concave Slope (%): ≈2%

Subregion (LRR): C - Mediterranean California Lat: 32.77876578 Long: -117.1211485 Datum: WGS1984

Soil Map Unit Name: Rm - Riverwash NWI classification: PFO/SSC

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? No Are "Normal Circumstances" present? Yes X No _____

Are Vegetation X, Soil _____, or Hydrology X naturally problematic?* (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 _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

*The project area consists of a riparian corridor along the San Diego River; riparian areas can be problematic due to the typical mosaic of vegetation. Hydrology may be problematic, because field efforts were performed during a severe drought.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 25m²)			
1. Scirpus californicus*	60	4	OBL
2. Arundo donax	20	4	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

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:

___ 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:

* Emergent wetlands bordering river channel. Also, Schoenoplectus californicus.

SOIL

Sampling Point: 1

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
0-1"	10YR 2/1						silt loam	- high silica content
1-6"	10YR 3/2	95	5YR 5/8	5	C	M	silt loam	
6-13"	10YR 4/1						sandy loam	- high sand content
(13" = bottom of pit)								

[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.)

- [X] 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)
- [X] 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: None

Depth (inches): _____

Hydric Soil Present? Yes [X] No [ ]

Remarks:
- decomposing leaf layer present
- many roots found in 1-6" layer

HYDROLOGY

Wetland Hydrology Indicators:

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

- [X] Surface Water (A1)
- [ ] High Water Table (A2)
- [X] 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)
- [X] 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 [X] No [ ] Depth (inches): 6"

Water Table Present? Yes [ ] No [X] Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes [X] No [ ] Depth (inches): 4"

Wetland Hydrology Present? Yes [X] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
- Aerial photos show the river channel consistent over the past 10 years

Remarks:
- sample pit taken about one foot from open water
- freshwater clams present

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Diego River Mitigation Site City/County: San Diego / San Diego Sampling Date: 19Feb14

Applicant/Owner: City of San Diego Public Utilities Department State: CA Sampling Point: 2

Investigator(s): Jessica A Nadolski + Arielle Kassirian Section, Township, Range: Mission San Diego, T16S, R2W

Landform (hillslope, terrace, etc.): Vegetated floodplain Local relief (concave, convex, none): none Slope (%): 0 %

Subregion (LRR): C-Mediterranean California Lat: 32.77875376 Long: -117.1211271 Datum: WGS84

Soil Map Unit Name: Rm - Riverwash NWI classification: PFO/SSC

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? No Are "Normal Circumstances" present? Yes X No _____

Are Vegetation X, Soil _____, or Hydrology X naturally problematic? (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	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

*The project area consists of a riparian corridor along the San Diego River, riparian areas can be problematic due to the typical mosaic of vegetation. Hydrology may be problematic, because field efforts were performed during a severe drought.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 25m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. Schinus terebinthifolius	95	Y	none
2.			
3.			
4.			
	95	= Total Cover	

Sapling/Shrub Stratum (Plot size: 25m²)			
1. Schinus terebinthifolius	5	N	none
2.			
3.			
4.			
5.			
	5	= Total Cover	

Herb Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	Ø	= Total Cover	

Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	Ø	= Total Cover	

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust Ø

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: Ø (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 X

Remarks:

- lots of trash
- medium and large size cobble at the surface
- area dominated by Brazilian pepper tree; no indicator status, so presumed upland

SOIL

Sampling Point: 2

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
0-3"	7.5YR 3/1						clay loam	- heavy roots
3-13"	5Y 4/1	92	7.5YR 5/8	8	C	M	silty clay	- almost no roots
(13" = bottom of pit)								

[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)

*None noted

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

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

- heavy leaf layer at the surface
- sample pit taken adjacent to steep slope below street level; soil possibly inundated during rare flood events

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**)*
- ___ 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:

- Aerial photos show the river channel similar to current conditions for the past 10yrs.

Remarks:

* Drift deposits consisting of remnant vegetation occur in Brazilian pepper at the edge of the floodplain nearest the river channel; at the sample pit location, no drift deposits were seen

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Diego River Mitigation Site City/County: San Diego/San Diego Sampling Date: 19 Feb 14

Applicant/Owner: City of San Diego, Public Utilities Department State: CA Sampling Point: 3

Investigator(s): Jessica Nadolski, Danielle Kassarjian Section, Township, Range: Mission San Diego, T16S, R2W

Landform (hillslope, terrace, etc.): hillslope, street level Local relief (concave, convex, none): concave Slope (%): ≈15%

Subregion (LRR): C- Mediterranean California Lat: 32.77862287 Long: -117.121312 Datum: WGS1984

Soil Map Unit Name: Rm - Riverwash NWI classification: PFO1/SSC

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? No Are "Normal Circumstances" present? Yes X No _____

Are Vegetation X, Soil _____, or Hydrology X naturally problematic?* (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	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
*The project area consists of a riparian corridor along the San Diego River; riparian areas can be problematic due to the typical mosaic of vegetation. Hydrology may be problematic, because field efforts were performed during a severe drought.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 25m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. Schinus terebinthifolius	70	Y	none
2.			
3.			
4.			
	70	= Total Cover	

Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	_____	= Total Cover	

Herb Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____	= Total Cover	

Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (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 X

Remarks:
- top of slope above floodplain
- soil extremely compacted and barren

SOIL

Sampling Point: 3

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
0-5"	10YR 5/3						loamy sand	
(5" = Bottom of Pit)								

[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)

~~None~~ None noted.

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

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

- soil very rocky
- too compacted to dig beyond 5" depth

HYDROLOGY

Wetland Hydrology Indicators: ~~None~~ None noted

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:

Historic aerial (10yrs) shows river channel and surround similar to current conditions.

Remarks:

- Expected sample pit to tend toward upland characteristics, as it was located above what appeared to be the natural, obvious floodplain

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Diego River Mitigation Site City/County: San Diego/San Diego Sampling Date: 19 Feb 14
Applicant/Owner: City of San Diego, Public Utilities Department State: CA Sampling Point: 4
Investigator(s): Jessica A. Nadolski & Jaielle Kasserjian Section, Township, Range: Mission San Diego, T16S, R2W
Landform (hillslope, terrace, etc.): river channel edge Local relief (concave, convex, none): concave Slope (%): ~2%
Subregion (LRR): C-Mediterranean California Lat: 32.77594785 Long: -117.12796005 Datum: WGS 1984
Soil Map Unit Name: TuB-Tujunga sand, 0 to 5 percent slopes NWI classification: PFO/SSC
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? No Are "Normal Circumstances" present? Yes X No ____
Are Vegetation X, Soil ____, or Hydrology X naturally problematic? * (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 ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
*The project area consists of a riparian corridor along the San Diego River; riparian areas can be problematic due to the typical mosaic of vegetation. Hydrology may be problematic, because field efforts were performed during a severe drought.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 25m²)			
1. Arundo donax	60	Y	FACW
2. Cortaderia jubata	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	70	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (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 X No ____

Remarks:
River channel bordered by Arundo with pampas grass on the floodplain an encroaching on the riverbank.

SOIL

Sampling Point: 4

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
0-6"	10YR 3/2	95	5YR 5/8	5	C	M	silt loam	
6-13"	10YR 4/1						sandy loam - high sand content	
(13" = bottom of pit)								

[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.)

- [X] 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)
- [X] 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: None

Depth (inches): _____

Hydric Soil Present? Yes [X] No [ ]

Remarks:

- leaf layer on surface (sparse)

HYDROLOGY

Wetland Hydrology Indicators:

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

- [X] **Surface Water (A1)**
- [ ] High Water Table (A2)
- [X] 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)
- [X] 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 [X] No [ ] Depth (inches): ≈ 8'

Water Table Present? Yes [ ] No [X] Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes [X] No [ ] Depth (inches): ≈ 4"

Wetland Hydrology Present? Yes [X] No [ ]

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

- Aerial photos show the river channel consistent over the past 100 years

Remarks:

- Sample pit taken adjacent to open water

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Diego River Mitigation Site City/County: San Diego / San Diego Sampling Date: 9Feb14
Applicant/Owner: City of San Diego, Public Utilities Department State: CA Sampling Point: 5
Investigator(s): Jessica A Nadolski + Janelle Kassanjian Section, Township, Range: Mission San Diego, T16S, R2W
Landform (hillslope, terrace, etc.): Vegetated Floodplain Local relief (concave, convex, none): none Slope (%): Ø%
Subregion (LRR): C-Mediterranean California at: 32.77569928 Long: -117.1288Ø895 Datum: WGS 1984
Soil Map Unit Name: TuB - Tujunga sand, Ø to 5 percent slopes NWI classification: PFO/SSC
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? NO Are "Normal Circumstances" present? Yes X No _____
Are Vegetation X, Soil _____, or Hydrology X naturally problematic? * (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	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: *The project area consists of a riparian corridor along the San Diego River; riparian areas can be problematic due to the typical mosaic of vegetation, Hydrology may be problematic, because field efforts were performed during a severe drought.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 25m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rhombifolia	5	N	FACW
2.			
3.			
4.			
	5	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	Ø	= Total Cover	
Herb Stratum (Plot size: 25m²)			
1. Cortaderia jubata	80	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	Ø	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust Ø

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: Ø (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: Ø (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 X

Remarks:
- lots of trash + signs of human disturbance
- medium and large size cobble at surface

SOIL

Sampling Point: 5

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
0-3"	7.5YR 3/1						clay loam	- lots of roots
3-13"	5Y 4/1	92	7.5YR 5/8	8	C	M	silty clay	- less roots
(13" = Bottom of Pit)								

[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)

* None noted

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

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

- heavy leaf layer at surface
- sample pit taken below street level at apparent edge of floodplain; soil possibly inundated during rare flood events

HYDROLOGY

Wetland Hydrology Indicators: None noted

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:

- Aerial photos show the river channel similar to current conditions for the past 10 yrs

Remarks:

None

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Diego River Mitigation Site City/County: San Diego / San Diego Sampling Date: 19Feb14
Applicant/Owner: City of San Diego Public Utilities Department State: CA Sampling Point: 6
Investigator(s): Jessica A. Nodolski + Sukelle Kassaliou Section, Township, Range: Mission San Diego, T16S, R2W
Landform (hillslope, terrace, etc.): hillslope, street level Local relief (concave, convex, none): Concave Slope (%): 1/150%
Subregion (LRR): C-Mediterranean California Lat: 32.77548323 Long: -117.1278882 Datum: WGS84
Soil Map Unit Name: TuB-Tujunga sand, Ø to 5 percent slopes NWI classification: PFO/SSC
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? No Are "Normal Circumstances" present? Yes X No _____
Are Vegetation X, Soil _____, or Hydrology X naturally problematic? * (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	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: * The project area consists of a riparian corridor along the San Diego River; riparian areas can be problematic due to the typical mosaic of vegetation. Hydrology may be problematic, because field efforts were performed during a severe drought.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	Ø = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	Ø = Total Cover		
Herb Stratum (Plot size: 25m²)			
1. Bromus sp.	80	4	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	Ø = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust Ø

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: Ø (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: Ø (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 X

Remarks:
- top of slope above floodplain at street level
- grasses unable to be identified to species due to the time of year
- assumed to be FACU, as most common Bromus sp. are ranked

SOIL

Sampling Point: 6

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
0-5"	10YR 5/3						loamy sand	
(5" = Bottom of Pit)								

[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)

*None noted

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

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

- soil too compacted to dig deeper
- obvious human intrusion and pathways

HYDROLOGY

Wetland Hydrology Indicators: None noted

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:

Historic aerial (10yrs) shows river channel and surround similar to current conditions

Remarks:

- Expected sample pit to show upland characteristics, as it was located at street level above the floodplain

Appendix B Site Photographs

Source: City of San Deigo Public Utilities, 2013; ESRI, 2014

ATKINS

APPENDIX B
Field Photos

100038033

Stadium Wetland Mitigation Project (San Diego River)

P:\Projects - Biological Resources\100038033 San Diego River Stadium Mitigation Project\GIS\mxd\AppendixB_FieldPhotos.mxd

Photograph 1. Western boundary of the proposed mitigation site, facing northwest

Photograph 2. Proposed mitigation site, facing north

Photograph 3. Portion of the CRAM location, facing northeast

Photograph 4. San Diego River at CRAM location, facing northwest

Photograph 5. Portion of the CRAM location, facing east

Photograph 6. San Diego River at CRAM location, facing northwest

Photograph 7. Proposed mitigation site, facing northeast

Photograph 8. Proposed mitigation site, facing north

Photograph 9. Proposed mitigation site (businesses on opposite side of river in the background), facing northwest

Photograph 10. Floodplain near delineation pit locations, facing northeast

Photograph 11. Invasive vegetation near delineation pits, facing northeast

Photograph 12. Proposed mitigation site near Qualcomm Stadium (tram on opposite side of river seen in the background), facing north

Photograph 13. Invasive vegetation and trash near the south bank of the San Diego River, facing north

Photograph 14. Steep slope leading to the south bank of the San Diego River, facing north

Photograph 15. Proposed mitigation site, facing north

Photograph 16. Eastern boundary of the proposed mitigation site, facing north

Appendix C Species Observed Onsite

Appendix C – Plant and Wildlife Species Observed During Field Efforts Associated with the San Diego River Stadium Wetland Mitigation Project*

Plants

Scientific Name	Common Name	Scientific Name	Common Name
Alnus rhombifolia	white alder	*Nerium oleander*	oleander**
Apiastrum angustifolium	wild celery	*Oxalis albicans*	California woodsorrel
Arundo donax	arundo**	*Phoenix canariensis*	Canary Island date palm**
Asclepias fascicularis	Mexican whorled milkweed	*Polypogon monspeliensis*	annual rabbitsfoot grass**
Brassica nigra	black mustard**	*Populus freemontii*	Freemont cottonwood
Bromus sp.	various bromes**	*Quercus dumosa*	California scrub oak
Carduus pycnocephalus	Italian thistle**	*Ranunculus californicus*	California buttercup
Carpobrotus edulis	ice plant**	*Raphanus sativus*	wild radish**
Ceanothus sp.	California lilac	*Ricinus communis*	castor bean**
Centaurea melitensis	Napa thistle**	*Salix lasiolepis*	arroyo willow
Conium maculatum	poison hemlock**	*Salvia mellifera*	black sage
Cortaderia jubata	jubata grass**	*Scandix pectens-veneris*	Shepherd's needle**
Cortaderia selloana	pampas grass**	*Schinus molle*	Peruvian pepper tree**
Delairea odorata	cape ivy**	*Schinus terebinthifolius*	Brazilian pepper tree**
Eucalyptus camaldulensis	red gum**	*Scirpus californicus*	California bulrush
Ficus carica	edible fig**	*Solanum douglasii*	Douglas' nightshade
Foeniculum vulgare	sweet fennel**	*Tamarix aphylla*	athel tamarisk**
Myoporum laetum	Ngaio tree**	*Tamarix parviflora*	smallflower tamarisk**
Lepidium latifolium	perennial pepperweed**	*Tamarix ramosissima*	saltcedar**
Lolium multiflorum	Italian ryegrass**	*Washingtonia robusta*	Mexican fan palm**
Malosma laurina	Laurel sumac	*Xanthium strumarium*	cocklebur

Wildlife

Scientific Name	Common Name	Scientific Name	Common Name
BIRDS			
Anas platyrhynchos	mallard	*Falco sparverius*	American kestrel
Buteo jamaicensis	red-tailed hawk	*Melospiza melodia*	song sparrow
Calypte anna	Anna's hummingbird	*Mimus polyglottus*	northern mockingbird
Carduelis tristis	American goldfinch	*Passer domesticus*	house sparrow
Carpodacus mexicanus	house finch	*Sayornis nigricans*	black phoebe
Columba livia	rock dove	*Turdus migratorius*	American robin
Elanus leucurus	white-tailed kite	*Zenaida macroura*	mourning dove
Euphagus cyanocephalus	Brewer's blackbird		

Scientific Name	Common Name	Scientific Name	Common Name
INVERTEBRATES			
Unionoida sp.	freshwater mussel		
FISH			
Cyprinus carpio	common carp		
MAMMALS			
Felis catus	domastic (feral) cat	*Procyon lotor*	common raccoon

*These observations were made February 18 through February 20, 2014. For the duration of field efforts, local conditions were sunny with daily highs averaging 65 degrees Fahrenheit. Illegal encampments were prevalent throughout the survey area, which is thought to have reduced the number of wildlife species that would typically occur within a riparian area.
**Introduced or invasive species

Appendix D California Rapid Assessment Method (CRAM)

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
Suite 200
La Mesa, CA 91942
619.462.1515 **tel**
619.462.0552 **fax**
www.**helixepi**.com

December 3, 2014

Mr. Sean Paver
City of San Diego
Public Utilities Department
9192 Topaz Way, MS 901A
San Diego, CA 92123

Subject: Stadium Mitigation Site Pre-mitigation California Rapid Assessment Method (CRAM) Assessment Report

Dear Mr. Paver:

HELIX Environmental Planning, Inc. (HELIX) conducted a California Rapid Assessment Method (CRAM) assessment for the City of San Diego Public Utility Department's proposed stadium mitigation site along the San Diego River, immediately south of Qualcomm Stadium. HELIX's CRAM assessment is being provided to supplement the previous CRAM assessment completed by ATKINS in February 2014. This letter provides a summary of the existing conditions, HELIX's CRAM methods and results, and the projected target CRAM scores at the end of the 5-year restoration program.

EXISTING CONDITIONS

Currently, the stadium mitigation site is a mixture of native riparian and non-native vegetation. Native riparian vegetation consists mainly of willow trees (*Salix* spp.) and mule fat (*Baccharis salicifolia*), with California bulrush (*Schoenoplectus californicus*) located within wetter areas such as the main and secondary channels (where present). Other native species are present in low numbers scattered throughout the proposed mitigation site. Non-native vegetation within the mitigation site is abundant and consists mainly of large stands of giant reed (*Arundo donax*) and patches of castor bean (*Ricinus communis*) that include large tree-like individuals. There are numerous other non-native species scattered throughout the mitigation site varying in size from trees, such as fig (*Ficus carica*) and pepper tree (*Schinus* spp.), to annuals, such as nasturtium (*Tropaeolum majus*).

METHODS

On February 19, 2014, two practitioners from ATKINS conducted one CRAM assessment within the western portion of the proposed mitigation site (Figures 1 and 2). Given that this assessment was conducted during the 2013-2014 rainy season, the main river channel was not wadeable and ATKINS staff conducted a one-sided CRAM on the south side of the flowing channel. Comments on this assessment were provided by the U.S. Army Corps of Engineers (USACE; Meris Bantilan-Smith on September 26, 2014). Comments included the need to conduct more CRAM assessments to comply with Appendix D of the Technical Bulletin.

Based on the USACE comments, ATKINS updated the data sheets for Assessment Area (AA)-1. In addition, two HELIX CRAM-trained practitioners (Sally Trnka and George Aldridge) conducted 2 additional CRAM assessments within the proposed mitigation site on October 24, 2014 (Figures 1, 3 and 4). These assessments were conducted according to the *California Rapid Assessment Method for Wetlands Riverine Wetlands Field Book ver. 6.1* (January 2013). Both the Riverine Wetlands Field Book and data sheets used to record data are available on the CRAM web site (http://www.cramwetlands.org/documents#field+books+and+sops). The final number of CRAM AA-s assessed for the Stadium Wetland Mitigation Project was based on Table 3.8 of the CRAM User's Manual version 6.1 (April 2013), which states that 3 areas should be assessed if the wetland is at least 3 times as large as the preferred size of the AA (100-200m). If the score of the third AA is more than 15 percent different from the average of the first 2 AA's, then a fourth AA should be conducted. This should be repeated for additional AA's until the score of the latest AA is no more than 15 percent different than the average of all previous AA's.

Although conducted after the start of the 2014-2015 rainy season, there had been little rain and the main river was wadeable; therefore, a 2-sided assessment was conducted in AA-2 and AA-3. AA-3 was located between AAs 1 and 2, immediately downstream of a double 36-inch concrete storm drain outfall. AA-2 and AA-3 were confined to where the mitigation site spanned the full width of the San Diego River. Also, as much as possible, road/utility easements (Figure 1) were avoided because (1) easements don't count towards mitigation credit and (2) although non-native vegetation will be removed in these areas, they will not be planted or seeded and therefore will not accurately capture the change in the CRAM score provided by the restoration effort. Although the majority of the riparian corridor width was walked within AA-3, the main channel could not be accessed due to the presence of dense vegetation consisting mainly of native willow trees. Both the Buffer and Landscape Context Attribute and Biotic Structure Attribute could be assessed for AA-3 (the latter based on field observations combined with exotics mapping presented in the project mitigation plan[1]). The Hydrology and Physical Structure Attribute scores were based partially on field observations and, where access to the stream was required but not possible, on the conditions observed upstream and downstream in AA-1 and AA-2. All but one metric score for the Hydrology and Physical Structure attributes were identical in AA-1 and AA-2 and, based on the proximity of AA-3 to these areas and generally similar conditions observed, presumed to be the same in AA-3 as well.

[1] ATKINS. 2014. Stadium Wetland Mitigation Project. (San Diego River) June 30.

RESULTS

Maps showing the locations of all 3 CRAM Assessment Areas are included as Figures 2, 3, and 4. Photos of the 3 CRAM Assessment areas are included as Attachment A and data sheets are included as Attachment B. The average CRAM score from the 3 AA's was 68, with individual scores varying between 65 and 70. Since the score of the third AA (70) varied by less than 15 percent from the average of the first two scores (67), a fourth AA was not conducted.

Table 1
CRAM DATA SUMMARY

CRAM ATTRIBUTES	METRICS	PRE-RESTORATION SCORES				YEAR 5 TARGET MEAN
		AA-1	AA-2	AA-3	Mean	
Buffer and Landscape Context	Stream Corridor Continuity	12	12	12	12	12
	Buffer Sub-metrics:					
	- Percent of Assessment Area with Buffer	12	6	6	8	8
	- Average Buffer Width	3	3	6	4	4
	- Buffer Condition	6	3	6	5	5
	Attribute Score (Raw/Final)	**18.0/75.0**	**15.6/65.0**	**18/75.0**	**17.3/72.1**	**17.3/72.1**
Hydrology	Water Source	6	6	6	6	6
	Channel Stability	9	12	12	11	11
	Hydrologic Connectivity	12	12	12	12	12
	Attribute Score (Raw/Final)	**27/75**	**30/83**	**30/83**	**29/81**	**29/81**
Physical Structure	Structural Patch Richness	6	6	6	6	6
	Topographic Complexity	9	9	9	9	9
	Attribute Score (Raw/Final)	**15/62.5**	**15/62.5**	**15/62.5**	**15/62.5**	**15/62.5**
Biotic Structure	Plant Community Composition Sub-					
	- Number of Plant Layers	9	9	6	8	9
	- Number of Co-dominant species	3	6	3	4	6
	- Percent Invasion	3	3	9	5	12
	Horizontal Interspersion	9	6	6	7	6
	Vertical Biotic Structure	9	6	9	8	9
	Attribute Score (Raw/Final)	**24/63.9**	**18/50.0**	**21/58.3**	**20.7/57.5**	**24/66.7**
	Overall AA Score	**69**	**65**	**70**	**68**	**71**

DISCUSSION

No change is expected in the scores for the Buffer and Landscape Context, Hydrology, or Physical Structure Attributes because the restoration of the mitigation site, consisting mainly of the removal of existing non-native vegetation and planting/seeding of native vegetation, would not affect these attributes. No new breaks in Stream Corridor Continuity are anticipated and the size and condition of the buffer is expected to remain unchanged. The water source would

remain unchanged and the hydrology within the AA's would not be altered; therefore, the channel stability, bankfull widths, and floodprone widths are also not expected to change. Structural patch types are not expected to be altered by the removal of non-native vegetation or installation of native plantings and seed, and the overall topographic complexity of the floodplain cross section also should remain the same.

The biggest potential change in CRAM scores following restoration of the mitigation site is expected in the Biotic Structure Attribute score. The final, maximum score for each metric within this Attribute is discussed in more detail below:

Number of Plant Layers – It is expected that 3 plant layers would exist at the mitigation site following restoration – medium, tall, and very tall. The tall and very tall categories are already present and contain abundant native vegetation. The medium height category (between 0.5 and 1.5 meters [m] in height) is also expected as native plants establish from seed and/or container plantings following restoration. Vegetation in the floating layer or short layer (for plants shorter than 0.5 m) is not expected to make up at least 5 percent of the vegetated portion of the AA following restoration. Three plant layers in a non-confined system results in a score of B for 9 points.

Number of Co-dominant Species – Given that some of the existing non-native co-dominant species will be removed as part of the restoration effort, it may still be a challenge to get at least 6 co-dominant species within the AA's. No more than 8 total native co-dominant species are expected to occur within the mitigation site at the end of Year 5. Between 6 and 8 co-dominant species is a score of C for 6 points.

Percent Invasion – Given that the restoration effort will consist of removal of non-native vegetation, it is expected that there will be great improvement in this metric, with no more than 15 percent invasion between the co-dominant species at the end of Year 5. This translates into a score of A or 12 points for this metric.

Horizontal Interspersion – This metric measures the variety of vegetative patch types within an AA. Currently, patches of giant reed and openings in the canopy with herbaceous weeds comprise much of the horizontal interspersion observed within the proposed mitigation site. Following restoration, these areas should resemble adjacent native habitat, thereby creating more uniform native riparian vegetation throughout the site. Given this projected change, a maximum score of C or 6 points is expected for this metric.

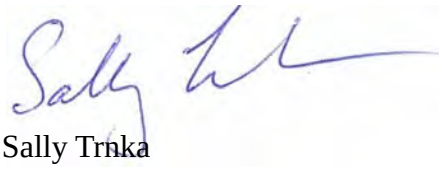
Vertical Biotic Structure – Since restoration is likely to increase native vegetation in the understory, it is reasonable to expect at least 50 percent overlap of at least 2 canopy layers. It is not likely that more than 50 percent of the AA would support abundant overlap of at least 3 layers; therefore, the maximum anticipated score for this metric is B for 9 points.

It is important to note that CRAM is intended to be a rapid assessment of the overall health of a wetland system. The pre-mitigation CRAM scores demonstrate that the San Diego River is a relatively healthy system with mature vegetation and stable hydrology with the ability of the low

flow channel to migrate within a larger floodplain. The removal of non-native vegetation and increase in cover by native vegetation is not necessarily going to result in a large increase in the CRAM score but will provide higher quality habitat for wildlife, which is the ultimate goal of the restoration effort. Other sampling methods, such as vegetation transects, can be used in addition to CRAM to determine the overall success of a mitigation site.

If you have any questions regarding this letter, please do not hesitate to contact Shelby Howard or me at (619) 462-1515.

Sincerely,



Sally Trnka
Senior Scientist

Enclosures:
Figure 1 CRAM Assessment Areas
Figure 2 CRAM Assessment Area 1 – Landscape Connectivity and Buffers
Figure 3 CRAM Assessment Area 2 – Landscape Connectivity and Buffers
Figure 4 CRAM Assessment Area 3 – Landscape Connectivity and Buffers
Attachment A CRAM Assessment Photos
Attachment B CRAM Data Sheets

Mitigation Site Boundary
Assessment Area
Road and Utility Easements

Vegetation (ATKINS Mapping)

Coastal and Valley Freshwater Marsh
Southern Riparian Woodland
Non-Native Riparian
Non-Native Grassland
Disturbed Habitat

Assessment Area 1
Assessment Area 2
Assessment Area 3

Friars Road
Fenton Parkway
Rio San Diego Drive
Camino del Rio North
Camino del Rio South
Scheider Way
Mission City Parkway
Boulevard
Street
Place
Wilshire Drive
15
8
805

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CRAM Assessment Areas

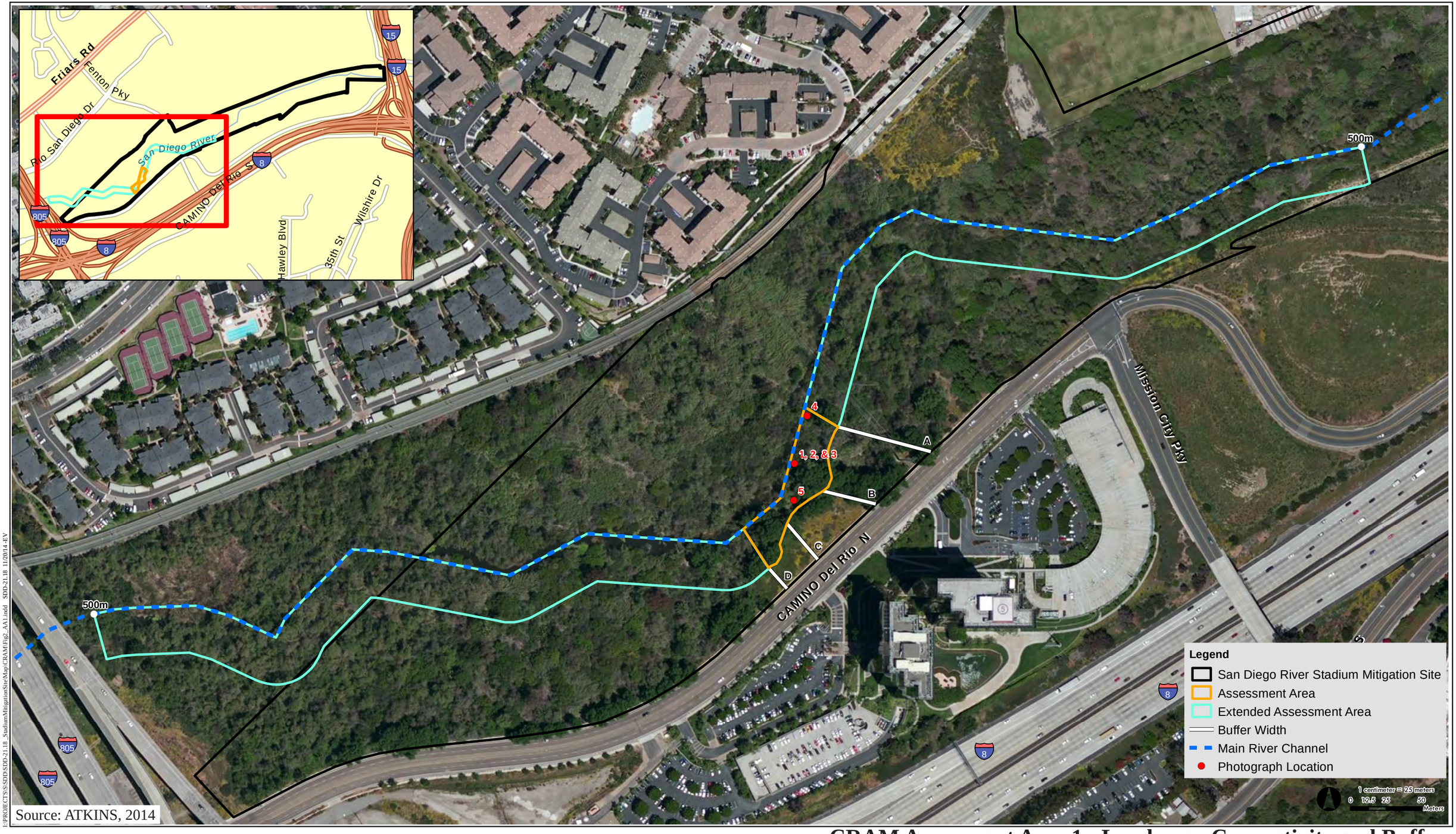
STADIUM MITIGATION SITE

HELIX Environmental Planning

N

0 400 Feet

Figure 1



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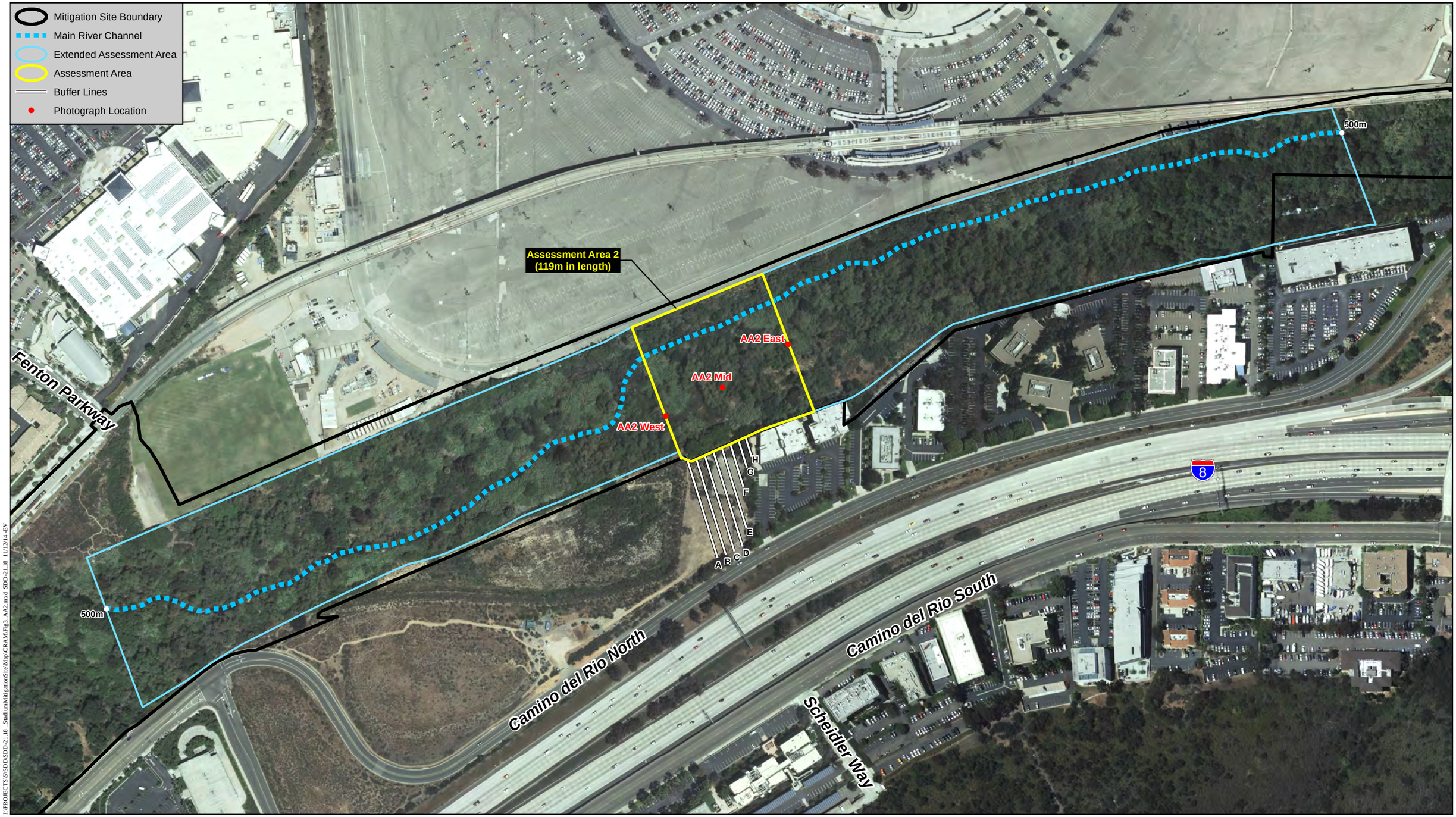
CRAM Assessment Area 1 - Landscape Connectivity and Buffers

STADIUM MITIGATION SITE

HELIX Environmental Planning

Figure 2



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CRAM Assessment Area 2 - Landscape Connectivity and Buffers

STADIUM MITIGATION SITE

HELIX Environmental Planning

0 250 Feet

Figure 3

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CRAM Assessment Area 3 - Landscape Connectivity and Buffers

STADIUM MITIGATION SITE

HELIX Environmental Planning

N 0 300 Feet

Figure 4

AA-1 Photo 1. Middle portion of the assessment area, looking upstream.

AA-1 Photo 2. South bank of the middle portion of assessment area, looking east.

AA-1 Photo 3. Middle portion of assessment area, looking north.

AA-1 Photo 4. East portion of assessment area, looking downstream.

AA-1 Photo 5. Panoramic view of assessment area.

AA-2 West - facing upstream.

AA-2 Mid- facing south.

AA-2 Mid - facing north.

AA-2 East - facing downstream.

AA-3 Stormdrain outfall.

AA-3 West- facing upstream.

AA-3 Mid - facing south.

AA-3 Mid - facing north.

AA-3 East- facing downstream.

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: San Diego River Assessment Area	
Project Name: San Diego River Mitigation Site	
Assessment Area ID #: SDRMOSH-1	
Project ID #: 100038033	**Date:** 19Feb14
Assessment Team Members for This AA: Jessica A Nadolski and Jarelle Kassarjian (Atkins staff)	
Average Bankfull Width: 9.1 meters (m)	
Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100m	
Upstream Point Latitude: 32°46'34.49"N **Longitude:** 117°07'40.85"W	
Downstream Point Latitude: 32°46'31.52"N **Longitude:** 117°07'42.51"W	

Wetland Sub-type:

☐ Confined ☒ Non-confined

AA Category:

☐ Restoration ☐ Mitigation ☐ Impacted ☒ Ambient ☐ Reference ☐ Training

☐ Other: 1-Pre-project assessment

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	1	Upstream	32°46'33.63"N	117°07'40.89"W	WGS84
2	2	Middle Left	32°46'34.67"N	117°07'40.25"W	WGS 84
3	3	Middle Right	32°46'32.24"N	117°07'41.61"W	WGS 84
4	4	Downstream	32°46'34.23"N	117°07'40.97"W	WGS 84
5	5	Overall landscape	32°46'32.35"N	117°07'40.75"W	WGS 84
6					
7					
8					
9					
10					

Site Location Description:

Assessment Area (AA) is situated halfway between the intersections of Missian City Parkway and Camino Del Rio N and Interstate 805 and Camino Del Rio N. See Figure 1 for site location.

Comments:

River edge can be accessed for entire assessment area, which contributed to the site being chosen as the AA. This area is characteristic of conditions throughout the mitigation site.

Scoring Sheet: Riverine Wetlands

AA Name: San Diego River AA			Date: 19Feb14
Attribute 1: Buffer and Landscape Context (pp. 11-19)			**Comments**
Stream Corridor Continuity (D)	Alpha. A	Numeric 12	There is much trash and numerous transient encampments affecting the area. River is CI non-wadeable,
Buffer:			
Buffer submetric A: Percent of AA with Buffer	A	12	
Buffer submetric B: Average Buffer Width	D	3	
Buffer submetric C: Buffer Condition	C	6	
Raw Attribute Score = D+[C x (A x B)$^{1/4}$]$^{1/4}$		18	**Final Attribute Score = (Raw Score/24) x 100** 75.0
Attribute 2: Hydrology (pp. 20-26)			The mouth of the river
	Alpha.	Numeric	
Water Source	C	6	to the Pacific is not far
Channel Stability	B	9	downstream, water flow
Hydrologic Connectivity	A	12	is slow and poor quality
Raw Attribute Score = sum of numeric scores		27	**Final Attribute Score = (Raw Score/36) x 100** 75.0
Attribute 3: Physical Structure (pp. 27-33)			
	Alpha.	Numeric	
Structural Patch Richness	C	6	
Topographic Complexity	B	9	B2 Field Book example
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)			Invasive species dominate
Plant Community Composition (based on sub-metrics A-C)			the landscape. Potential
	Alpha.	Numeric	wildlife presence is
Plant Community submetric A: Number of plant layers	B	9	severely hindered by
Plant Community submetric B: Number of Co-dominant species	D	3	human presence (camps)
Plant Community submetric C: Percent Invasion	D	3	
Plant Community Composition Metric *(numeric average of submetrics A-C)*		5	
Horizontal Interspersion	B	9	
Vertical Biotic Structure	B	9	
Raw Attribute Score = sum of numeric scores		23	**Final Attribute Score = (Raw Score/36) x 100** 63.9
Overall AA Score (average of four final Attribute Scores)			69.1 ≈ 69

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	Ø	1	Ø
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	Ø - A	Downstream Total Length	Ø - A

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.

*Also see aerial imagery for assessment (Attachment 3)

Percent of AA with Buffer: 100 % - All areas adjacent to the AA include lands covers consisted with buffers,

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	60
B	50
C	50
D	40
E	
F	
G	
H	
Average Buffer Width *Round to the nearest integer*	50 m

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. In Meters

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.	9.1	9.1	9.1
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).	2.7	2.7	2.7
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	5.4	5.4	5.4
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.	100	85	120
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	10.99	9.34	13.19
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.			11.17 A

River structure was consistent throughout AA. Measurements were taken by extending a stadia rod and estimating widths when necessary. River depth at the time of the assessment made it nonwadeable.

Structural Patch Type Worksheet for Riverine wetlands

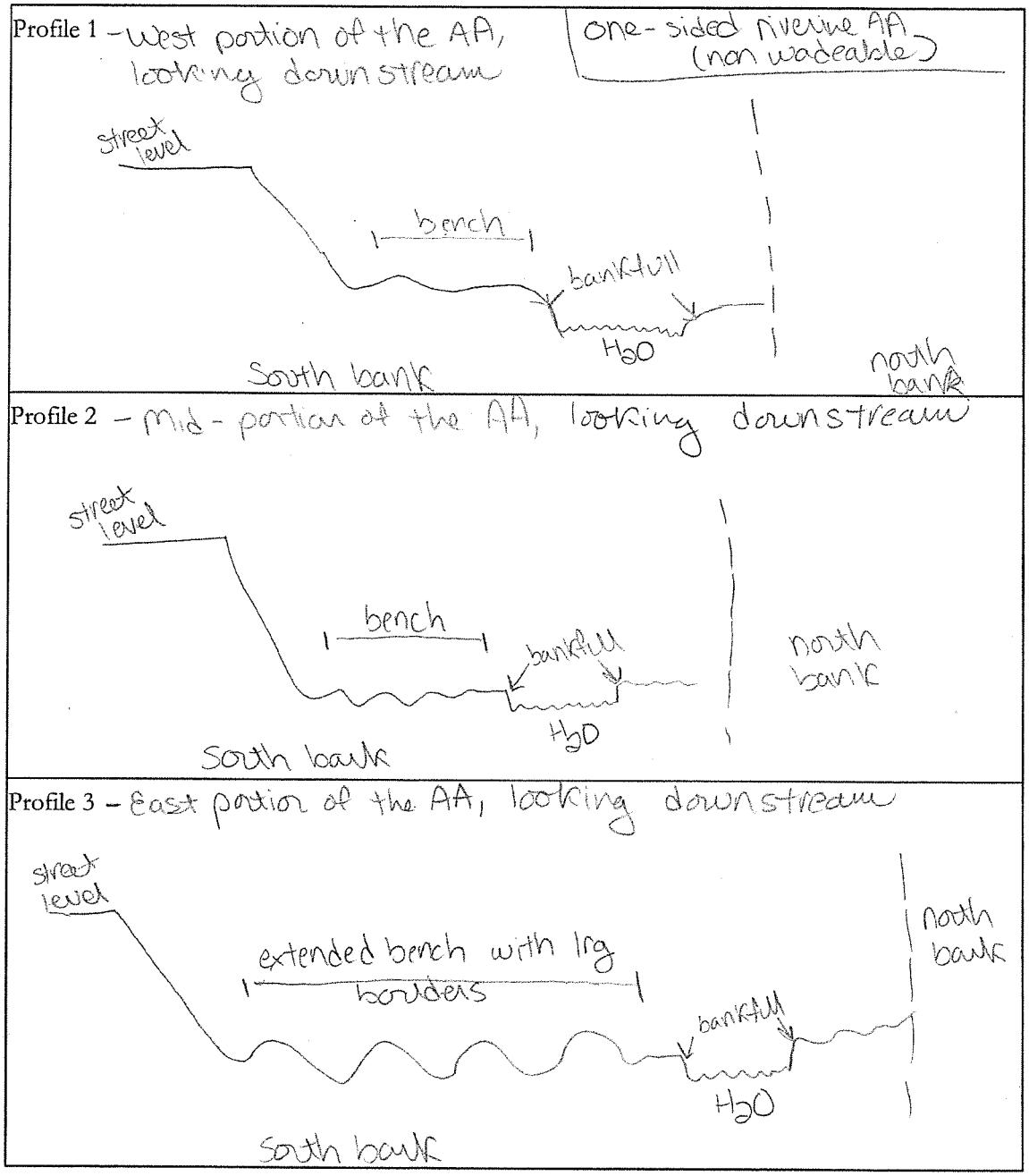
Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" 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.



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.*

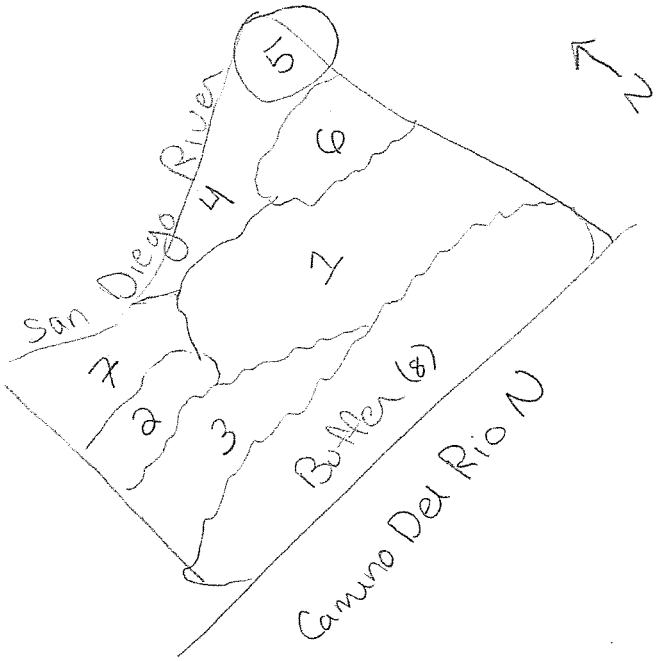
D = Dominant Species

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
none observed		none observed	
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
California bulrush - D		pampas grass - D	X
Ngaio Tree	X	Ngaio tree - D	X
		California bulrush	
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	5
Brazilian pepper tree - D	X		
Arundo - D	X		
Fremont cottonwood		**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	4/5 = 80%
white alder ?			
Mexican fan palm	X		

California bulrush (Scirpus californicus)
Ngaio tree (Myoporum laetum)
Arundo (Arundo donax)
Brazilian pepper tree (Schinus terebinthifolius)
Fremont cottonwood (Populus fremontii)
white alder (Alnus rhombifolia) - bark only
Mexican fan palm (Washingtonia robusta)
pampas grass (Cortaderia jubata)

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) pampas grass/Agave tree
2) Mexican fan palm
3) White alder
4) California bulrush
5) Arundo
6) Brazilian pepper tree

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland? - 1	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	

1- No signs of natural disturbance visible, but lots of anthropogenic issues.

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	X
Flow diversions or unnatural inflows		
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		
Comments		
-Urban runoff likely a significant attribute of hydrology due to the proximity of commercial areas		

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	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		
Nutrient impaired (PS or Non-PS pollution)	X	X
Heavy metal impaired (PS or Non-PS pollution) unkown but possible		
Pesticides or trace organics impaired (PS or Non-PS pollution)	X	X
Bacteria and pathogens impaired (PS or Non-PS pollution)	X	X
Trash or refuse	X	X
Comments		
There are over 30 known transient encampments within the mitigation site that degrade the area. Nearby commercial landscape practices likely affect site. Also, there are known water quality issues in the area.		

1- the San Diego River Conservancy attempts to manage invasive species along the river, but the site maintains a high presence of these species.

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation	X	X
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)	X	
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	X	X
Lack of treatment of invasive plants adjacent to AA or buffer	X	X
Comments		
In addition to transient camps, people were seen walking dogs in the general area.		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial	X	X
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor	X	
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)	X-1	
Passive recreation (bird-watching, hiking, etc.)	X	
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		
1- Qualcom Stadium is just north of the site.		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA-2 - Riparian Forest - Southern Willow

Project Name: Stadium Mitigation Site

Assessment Area ID #: AA-2

Project ID #: SDD-21.18 **Date:** 10/24/14

Assessment Team Members for This AA:

Sally Trnka

George Aldridge

Average Bankfull Width: 4.3 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 119 m

Upstream Point Latitude: 32.779391 **Longitude:** -117.120492

Downstream Point Latitude: 32.778835 **Longitude:** -117.121591

Wetland Sub-type:

☐ Confined ☒ Non-confined

AA Category:

☐ Restoration ☒ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

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:

facing downstream

	Photo ID No.	Description	Latitude	Longitude	Datum
1	1	Upstream	32.779391	-117.120492	WGS84
2	3	Middle Left	32.779056	-117.121083	"
3	2	Middle Right			"
4	4	Downstream	32.778835	-117.121591	"
5					
6					
7					
8					
9					
10					

Site Location Description:

San Diego River

Comments:

Abundant exotic vegetation

Scoring Sheet: Riverine Wetlands

AA Name: AA-2				Date: 10/24/14
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**
Stream Corridor Continuity (D)	Alpha. A	Numeric 12		there are no non-buffer areas
Buffer:				
Buffer submetric A: Percent of AA with Buffer	Alpha. C	Numeric 6		25% of AA has buffer
Buffer submetric B: Average Buffer Width	D	3		avg. is 60m
Buffer submetric C: Buffer Condition	D	3		mostly barren compacted growth with some weeds
Raw Attribute Score = D+[C x (A x B)$^{1/2}$]$^{1/2}$		15.6		**Final Attribute Score = (Raw Score/24) x 100** 65
Attribute 2: Hydrology (pp. 20-26)				
Water Source	Alpha. C	Numeric 6		primarily urban runoff during dry season
Channel Stability	A	12		equilibrium
Hydrologic Connectivity	A	12		>2.2
Raw Attribute Score = sum of numeric scores		30		**Final Attribute Score = (Raw Score/36) x 100** 83
Attribute 3: Physical Structure (pp. 27-33)				
Structural Patch Richness	Alpha. C	Numeric 6		8 patch types
Topographic Complexity	B	9		B2 - 1 bench w/microtopo
Raw Attribute Score = sum of numeric scores		15		**Final Attribute Score = (Raw Score/24) x 100** 63
Attribute 4: Biotic Structure (pp. 34-41)				
Plant Community Composition (based on sub-metrics A-C)				
Plant Community submetric A: Number of plant layers	Alpha. B	Numeric 9		3 layers
Plant Community submetric B: Number of Co-dominant species	C	6		6 co-dominants
Plant Community submetric C: Percent Invasion	D	3		50% invasion
Plant Community Composition Metric *(numeric average of submetrics A-C)*		6		
Horizontal Interspersion	C	6		low degree of interspersion
Vertical Biotic Structure	C	6		25-50% moderate overlap of 3 layers
Raw Attribute Score = sum of numeric scores		18		**Final Attribute Score = (Raw Score/36) x 100** 50
Overall AA Score (average of four final Attribute Scores)				65

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	0	1	0
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	0	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.

Percent of AA with Buffer: 25 %

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	86
B	84
C	84
D	83
E	70
F	37
G	23
H	16
Average Buffer Width ***Round to the nearest integer***	60

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.	8m	2.0 ~~2.6~~ m	3.0 ~~2.5~~ m
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).	0.5m	0.6 m	0.5 3m
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	1.0m	1.2m	1.0 m
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.	outside AA 122m	AA width 122	AA width 122
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	>2.2	>2.2	>2.2
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.			>2.2

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.

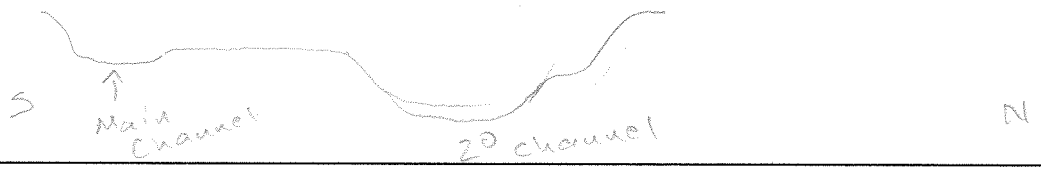
**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

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	

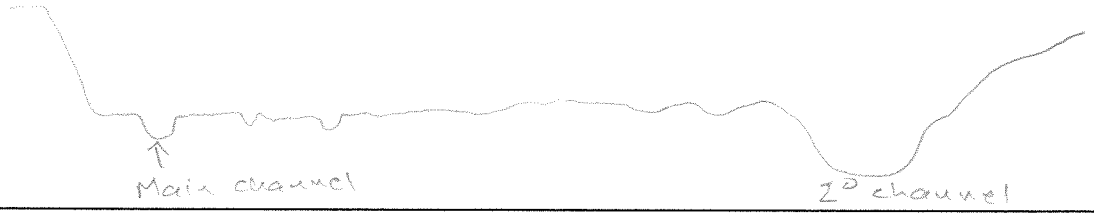
Worksheet for AA Topographic Complexity

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.

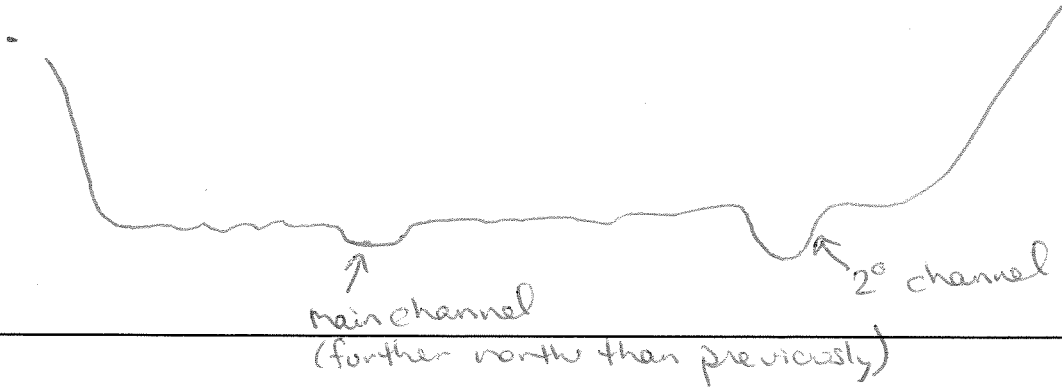
Profile 1



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.*

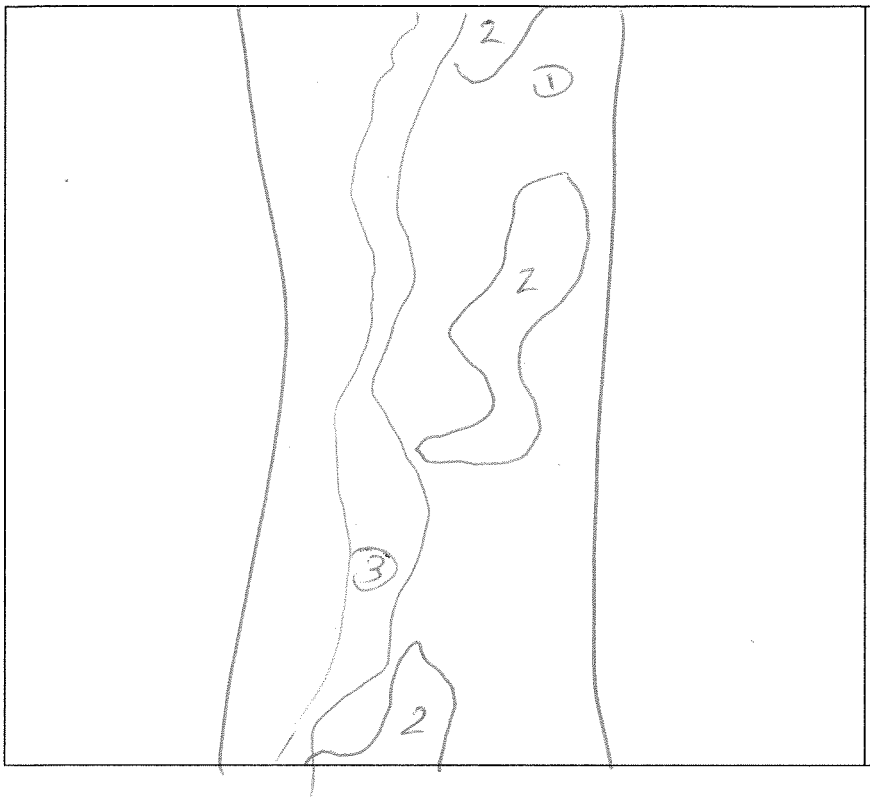
Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		Rixiaus communis	Y
		Apium graveolens	Y
NA			

Medium (0.5-1.5 m)	Invasive?	Tall (1.5-3.0 m)	Invasive?
		Schoenoplectus cal.	
NA			

Very Tall (>3.0 m)	Invasive?		
Salix goodingii		Total number of co-dominant species for all layers combined (enter here and use in Table 18)	6
Salix lasiolepis			
Arundo donax	X	Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	3/6 = 50%
Schoenoplectus calif.			

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) SWRF

2) ADR

3) FWM

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	

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)	✓	
Flow diversions or unnatural inflows		
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		
Comments		

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	✓	
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		
Comments		
Large amount of paved surface area w/in 50 m upstream		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
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	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		✓
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
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.)	✓	
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		
Indirect negative effect due to a lack of a native buffer		
I-8 - noise/activity/fumes		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: Southern Willow Riparian Forest

Project Name: Stadium Mitigation

Assessment Area ID #: 3

Project ID #: SDD-21.18 **Date:** 10/24/14

Assessment Team Members for This AA:

Sally Tuska

George Aldridge

Average Bankfull Width: NA (not observed)

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 124m

Upstream Point Latitude: 32.778347 **Longitude:** -117.124639

Downstream Point Latitude: 32.777707 **Longitude:** -117.125739

Wetland Sub-type:

☐ Confined ☒ Non-confined

AA Category:

☐ Restoration ☒ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

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	6	Upstream	32.775347	-117.124639	WGS84
2	7	Middle Left	Middle Center looking left	32.777979	-117.125351 " "
3	8	Middle Right	" Rt		
4	9	Downstream	32.777707	-117.125739	
5					
6					
7					
8					
9					
10					

Site Location Description:

Comments:

Photo 5 started upstream end by double 36" concrete storm drain

main channel could not be reached due to dense, mostly native willow, vegetation. Several scores for metrics were presumed due to conditions observed in the upstream & downstream assessment areas & high likelihood of similar conditions (e.g. hydrology) being present within this AA. Also, the exotics mapping within this area documented in the mitigation plan, combined with field observations made within this AA were used to estimate non-native cover in non-accessible portions.

Scoring Sheet: Riverine Wetlands

AA Name: AA-3				Date: 10/24/14
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**
Stream Corridor Continuity (D)		Alpha. A	Numeric 12	no 'non-buffer' areas
Buffer:				
Buffer submetric A: Percent of AA with Buffer	Alpha. C	Numeric 6		35%
Buffer submetric B: Average Buffer Width	C	6		106 m
Buffer submetric C: Buffer Condition	C	6		>75% non-native cover, evidence of soil disturbance, trail
Raw Attribute Score = $D+[C \times (A \times B)^{1/2}]^{1/2}$			18	**Final Attribute Score = (Raw Score/24) x 100** 75
Attribute 2: Hydrology (pp. 20-26)				
Water Source		Alpha. C	Numeric 6	primarily urban runoff during dry season
Channel Stability		A	12	presumed due to score in AA-2
Hydrologic Connectivity		A	12	presumed due to this score both up & downstream
Raw Attribute Score = sum of numeric scores			30	**Final Attribute Score = (Raw Score/36) x 100** 83
Attribute 3: Physical Structure (pp. 27-33)				
Structural Patch Richness		Alpha. C	Numeric 6	presumed due to same score both up & downstream
Topographic Complexity		B	9	presumed due to up & downstream score being same & mapping of 1 main channel in this area
Raw Attribute Score = sum of numeric scores			15	**Final Attribute Score = (Raw Score/24) x 100** 63
Attribute 4: Biotic Structure (pp. 34-41)				
Plant Community Composition (based on sub-metrics A-C)				
Plant Community submetric A: Number of plant layers	Alpha. C	Numeric 6		1 & 2 layers
Plant Community submetric B: Number of Co-dominant species	D	3		4 species
Plant Community submetric C: Percent Invasion	B	9		25% invasion
Plant Community Composition Metric *(numeric average of submetrics A-C)*			6	
Horizontal Interspersion		C	6	low degree of plan view interspersion
Vertical Biotic Structure		B	9	more than 50% overlap of 2 layers
Raw Attribute Score = sum of numeric scores			21	**Final Attribute Score = (Raw Score/36) x 100** 58
Overall AA Score (average of four final Attribute Scores)				70

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	0	1	0
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	0	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.

Percent of AA with Buffer: 35 %

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	18 m
B	30
C	54
D	129
E	145
F	154
G	158
H	158
Average Buffer Width *Round to the nearest integer*	106

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.			
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).			
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.			
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.	118 m	118 m	118 m
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).			
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.			

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)		

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)

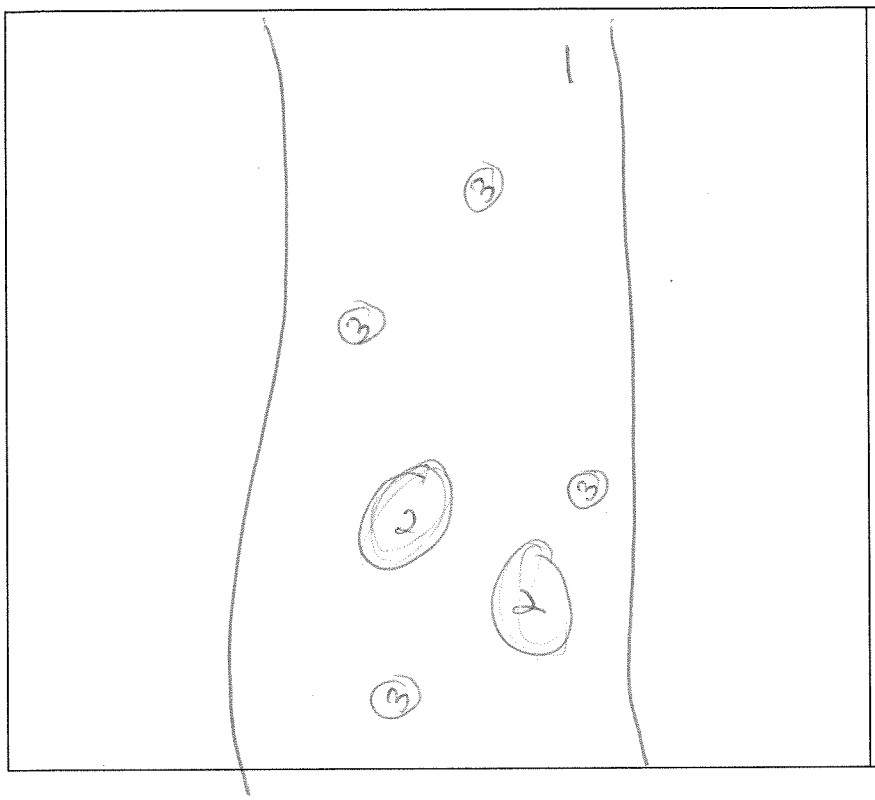
Special Note:

* *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?
		N/A	
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
Cyperus eragrostis		N/A	
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 lasiolepis			
Ricinus communis	Y		
Salix goodingii		**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	1/4 = 25%

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) willows / ricinos
2) very tall Salix good.
3) herbaceous plants
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	

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)	✓	
Flow diversions or unnatural inflows		
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		
Comments		

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	✓	
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		
Comments		
Large amount of paved surface area.		
Cowabsy field - fertilizer input.		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
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	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential	✓	
Industrial/commercial		✓
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
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.)	✓	
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		
Indirect negative effect due to a lack of a native buffer		
I-5 - noise/activity/fumes		

CRAM Data Sheets from the San Diego River Reference Site

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: San Diego River, Mission Trails Park	
Project Name:	
Assessment Area ID #: SD-002	
Project ID #:	**Date: 5/6/14**
Assessment Team Members for This AA: Sarah Pearce, Lindsay Teunis	
Average Bankfull Width: 10.5m	
Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**: 100m**	
Upstream Point Latitude: 32.82118	**Longitude:: 117.062822 Datum:WGS84**
Downstream Point Latitude: 32.820884	**Longitude: 117.06716**

Wetland Sub-type:

□ Confined ☑ Non-confined

AA Category:

□ Restoration □ Mitigation □ Impacted □ Ambient □ Reference ☑ Training

□ Other:

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			
2		Middle Left			
3		Middle Right			
4		Downstream			
5					
6					
7					
8					
9					
10					

Site Location Description:

The San Diego River Assessment Area is located in Mission Trails Park, one of the largest urban parks in America. The San Diego River originates in the Cuyamaca Mountains northwest of the town of Julian, and then flows to the southwest until it reaches the El Capitan Reservoir, the largest reservoir in the river's watershed at 112,800 acre feet (139,100,000 m3).). Below El Capitan Dam, the river runs west through the cities of Santee and San Diego. While passing through Tierrasanta it goes through Mission Trails Regional Park. The river discharges into the Pacific Ocean near the entrance to Mission Bay, forming an estuary. The AA is at an elevation of approximately 160 feet above mean sea level and 30 kilometer downstream of El Capitan Reservoir.

The San Diego River Watershed (SDRW) is the second largest watershed (440 square miles) in San Diego County and has the greatest population base (approximately 509,000 people). Water resources in the watershed include the San Diego River main stem, numerous tributaries, 22 steams, five water supply reservoirs (El Capitan, San Vicente, Lake Jennings, Lake Murray, and Cuyamaca Reservoirs), a large groundwater aquifer, extensive riparian habitat, coastal wetlands, and tidepools. The watershed area upstream of the AA is approximately 380 square miles (86 percent of the entire SDRW area).

Comments:

Downstream end of AA is at the dot; upstream end is just 5m short of the boulder cascasde/grade control. Laterally, the AA includes all of the vegetation on the inset floodplain, and the vegetation on the slopes that overhangs the floodplain.

Scoring Sheet: Riverine Wetlands

AA Name: San Diego River				Date: 5/6/14	
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**	
Stream Corridor Continuity (D)		Alpha. A	Numeric 12	0 breaks US and DS	
Buffer:					
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12		100% with buffer	
Buffer submetric B: Average Buffer Width	A	12		250 m	
Buffer submetric C: Buffer Condition	B	9		Natives, but some soil disturb And human visitation	
Raw Attribute Score = D+[C x (A x B)^{½}]^{½}			22.39	**Final Attribute Score = (Raw Score/24) x 100**	**93.30**
Attribute 2: Hydrology (pp. 20-26)					
Water Source		Alpha. B	Numeric 9	Just over 20% urban	
Channel Stability		A	12	Equilibrium	
Hydrologic Connectivity		A	12	3.07	
Raw Attribute Score = sum of numeric scores			33	**Final Attribute Score = (Raw Score/36) x 100**	**91.66**
Attribute 3: Physical Structure (pp. 27-33)					
Structural Patch Richness		Alpha. B	Numeric 9	10 patches	
Topographic Complexity		B	9	1 bench with micro	
Raw Attribute Score = sum of numeric scores			18	**Final Attribute Score = (Raw Score/24) x 100**	**75.00**
Attribute 4: Biotic Structure (pp. 34-41)					
Plant Community Composition (based on sub-metrics A-C)					
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12		4 layers	
Plant Community submetric B: Number of Co-dominant species	B	9		9 co-doms	
Plant Community submetric C: Percent Invasion	A	12		0% invasion	
Plant Community Composition Metric *(numeric average of submetrics A-C)*			11		
Horizontal Interspersion		A	12		
Vertical Biotic Structure		B	9	>50% with 2 layers	
Raw Attribute Score = sum of numeric scores			32	**Final Attribute Score = (Raw Score/36) x 100**	**88.88**
Overall AA Score (average of four final Attribute Scores)				87	

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	0	1	**0**
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	**0**	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.

Percent of AA with Buffer: 100 %

Worksheet for calculating average buffer width of AA

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

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.	**10**	**12**	**10.20**
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).	**0.9**	**1.2**	**0.95**
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	**1.8**	**2.4**	**1.90**
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.	**26**	**37**	**36.0**
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	**2.60**	**3.08**	**3.53**
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.			**3.07**

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.

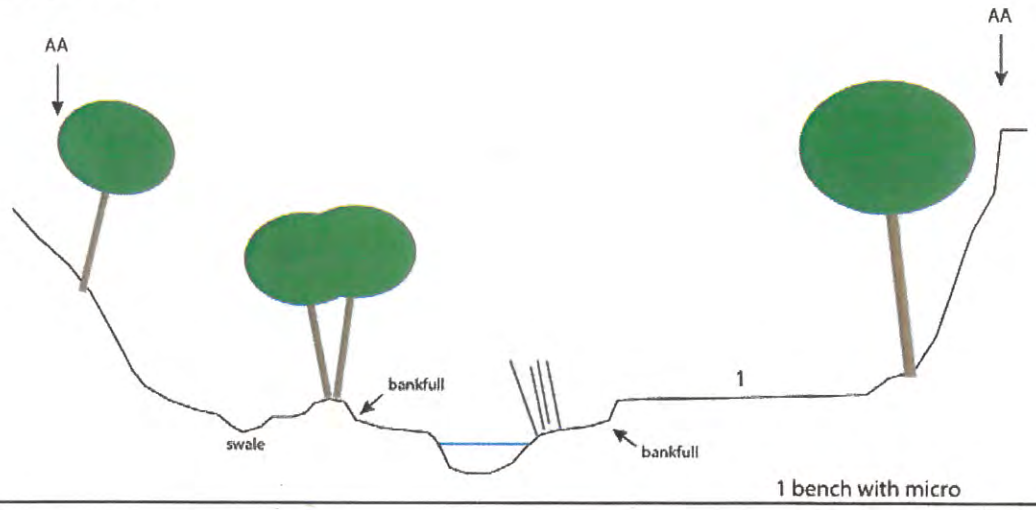
Please refer to the CRAM Photo Dictionary at** www.cramwetlands.org **for photos of each of the following patch types.

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	**Y**	**1**
Bank slumps or undercut banks in channels or along shoreline	**n**	**1**
Cobbles and/or Boulders	**Y**	**1**
Debris jams	**n**	**1**
Filamentous macroalgae or algal mats	**Y**	**1**
Large woody debris	**Y**	**1**
Pannes or pools on floodplain	**Y**	**N/A**
Plant hummocks and/or sediment mounds	**n**	**1**
Point bars and in-channel bars	**Y**	**1**
Pools or depressions in channels (wet or dry channels)	**Y**	**1**
Riffles or rapids (wet or dry channels)	**Y**	**1**
Secondary channels on floodplains or along shorelines	**n**	**N/A**
Standing snags (at least 3 m tall)	**n**	**1**
Submerged vegetation	**n**	**N/A**
Swales on floodplain or along shoreline	**Y**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**Y**	**1**
Vegetated islands (mostly above high-water)	**n**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)	**10**	

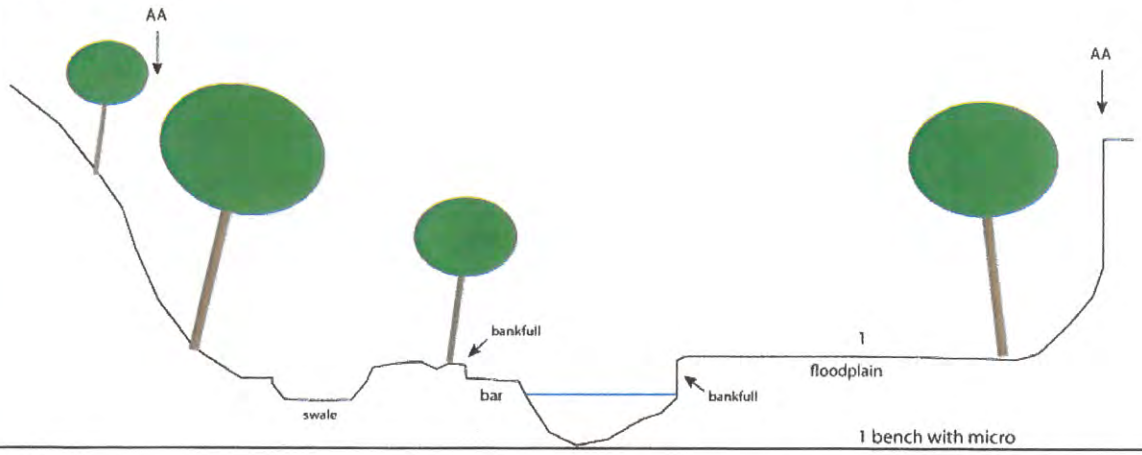
Worksheet for AA Topographic Complexity

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 (upstream)



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?
		Anemopsis californica	
		Schoenoplectus americanus	
		Eliocharis sp.	
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
Schoenoplectus americanus		Baccharis salicifolia	
		Salix laevigata	
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	9
Salix laevigata			
Salix lasiolepis			
Salix gooddingii		**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	0%
Platanus racemosa			
Populus fremontii			

Short

Pennywort
Eliocharis
Celery
Unknown (occidentalis "tall skinny")

Medium

Juncus acutus
Mugwort
Poison oak
Typha

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) Red and Black willows

2) Cottonwood and Sycamore

3) Eliocharis and pennywort

4) Anemopsis, mulefat, schoenoplectus

5) Schoenoplectus

6) Arroyo willow

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	Bar-built estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

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)		
Flow diversions or unnatural inflows		
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)	X	
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		
Riprap cascade at upstream end		

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		
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		
Comments		
None		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
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		
Comments		
None		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
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.)		
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		
Walking/hiking, biking, maintenance road		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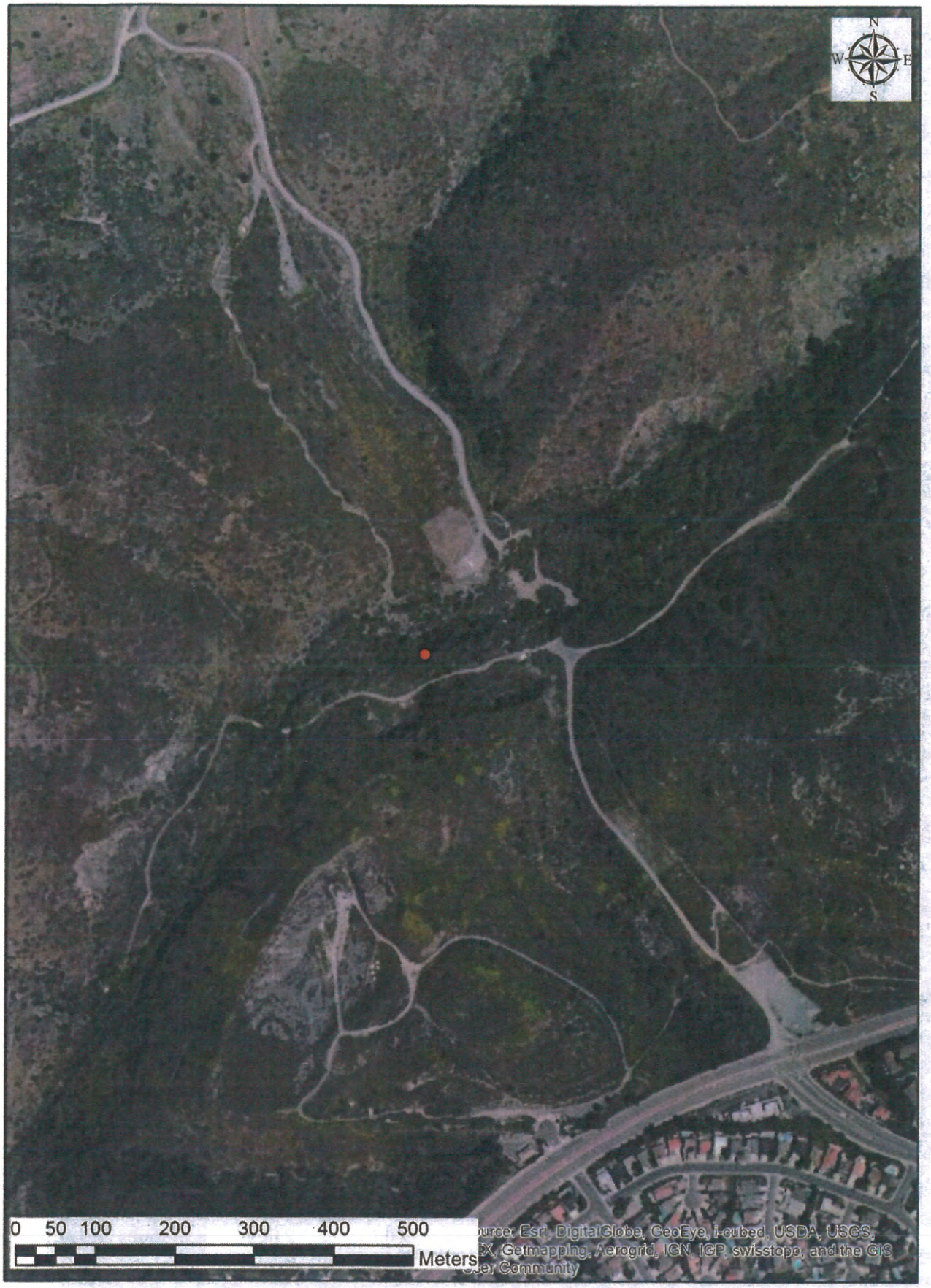
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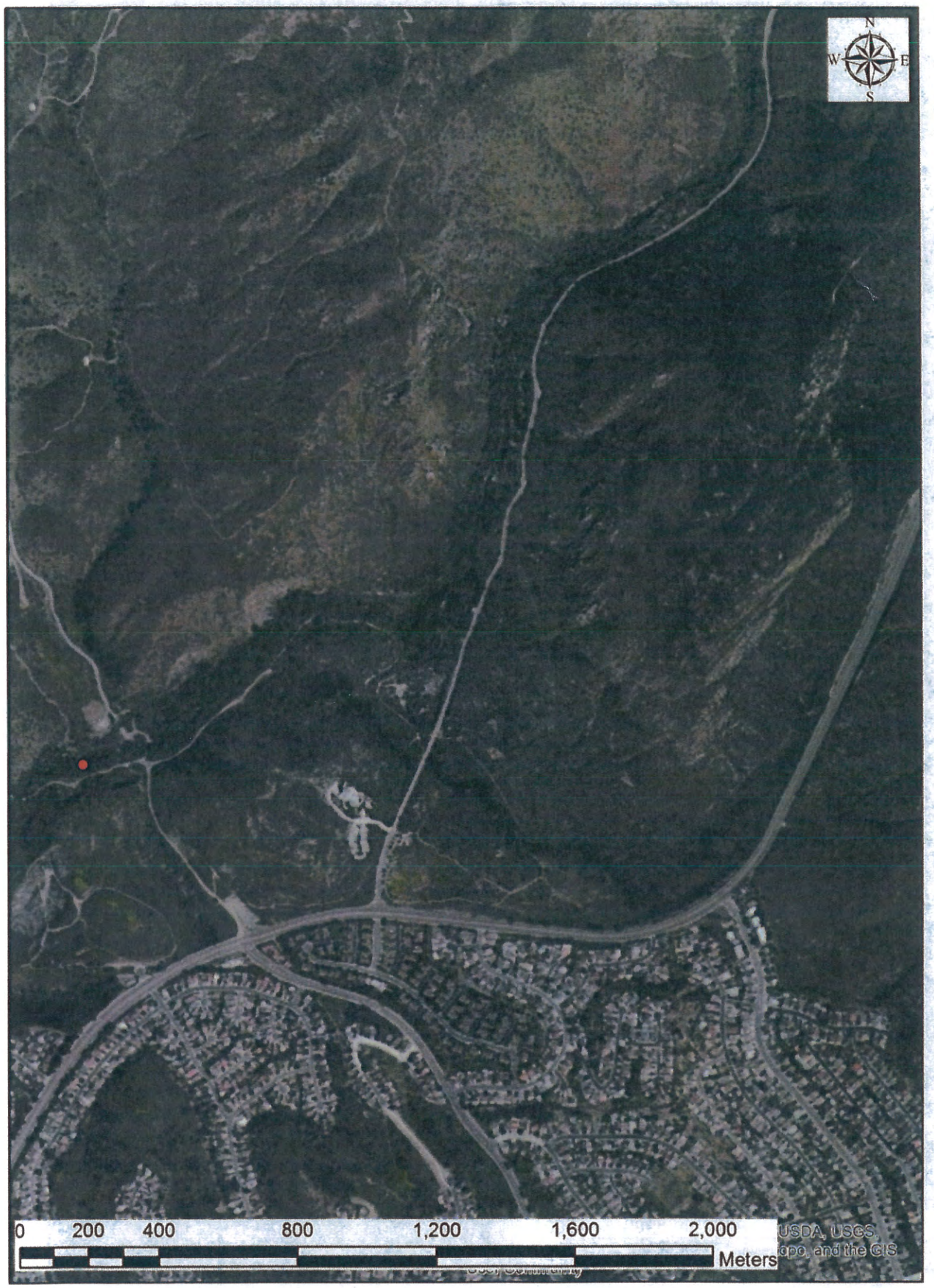
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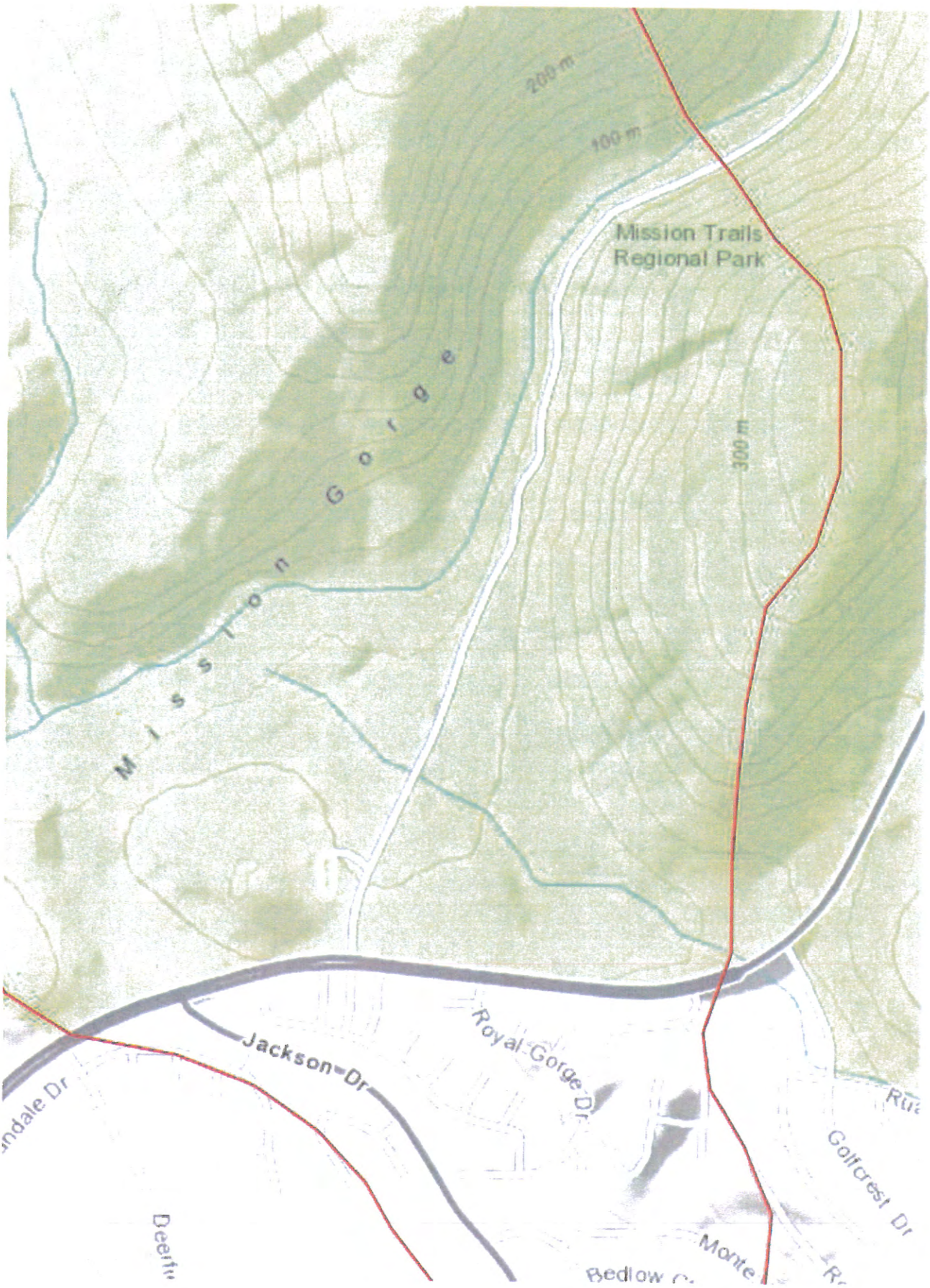
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Royal Gorge Dr
Golfcrest Dr
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Appendix E Listed and Sensitive Plant Species Potentially Occurring in the Vicinity of the Proposed Mitigation Site

Appendix E – Listed and Sensitive Plant Species Potentially Occurring in the Vicinity of the Proposed Mitigation Site

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	Lifeform, General Habitat Description (elevation)	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
red sand-verbena	*Abronia maritima*	--/--/4.2	Perennial herb; coastal dunes (0-100 meters) Blooms: February to November	Unlikely	No
San Diego thorn-mint	*Acanthomintha ilicifolia*	FT/CE/1B.1	Annual herb; chaparral, coastal scrub, valley and foothill grassland, vernal pools; endemic to active vertisol clay soils of mesas and valleys, usually on clay lenses within grassland or chaparral communities (10-960 meters) Blooms: April to June	Unlikely	Yes
California adolphia	*Adolphia californica*	--/--/2B.1	Perennial deciduous shrub; chaparral, coastal scrub, valley and foothill grassland; clay soils (45-740 meters) Blooms: December to May	Unlikely	No
aphanisma	*Aphanisma blitoides*	--/--/1B1.2	Annual herb; coastal bluff scrub, coastal dunes, and coastal scrub; sandy soils (1-305 meters) Blooms: March to June	Unlikely	Yes
singlewhorl burrobrush	*Ambrosia monogyra*	--/--/2B.2	Perennial shrub; chaparral and Sonoran desert scrub; sandy soils (10-500 meters) Blooms: August to November	Unlikely	No
San Diego ambrosia	*Ambrosia pumila*	FE/--/1B.1	Perennial rhizomatous herb; chaparral, coastal scrub, valley and foothill grassland, vernal pools; sandy loam or clay soil, often in disturbed areas, sometimes alkaline (20-415 meters) Blooms: April to October	**Possible**; previously identified within the proposed mitigation site	Yes
south coast saltscale	*Atriplex pacifica*	--/--/1B.2	Annual herb; coastal bluff scrub, coastal dunes, and coastal scrub, and playas (0-130 meters) Blooms: March to October	Unlikely	No
San Diego goldenstar	*Bloomeria clevelandii*	--/--/1B.1	Perennial bulbiferous herb; chaparral, coastal scrub, valley and foothill grassland, vernal pools (50-465 meters) Blooms: April to May	Unlikely	No
Orcutt's brodiaea	*Brodiaea orcuttii*	--/--/1B.1	Perennial bulbiferous herb; Closed-cone coniferous forest, chaparral, cismontane woodland meadows and seeps, valley and foothill grassland, vernal pools; mesic, clay, sometimes serpentine soils (30-1692 meters) Blooms: May to July	Unlikely	Yes

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	Lifeform, General Habitat Description (elevation)	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
wart-stemmed ceanothus	*Ceanothus verrucosus*	--/--/2B.2	Perennial shrub; chaparral (1-380 meters) Blooms: December to May	**Possible**	Yes
long-spined spineflower	*Chorizanthe polygonoides var. longispina*	--/--/1B.1	Annual herb; chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools; often clay soils (30-1530 meters) Blooms: April to July	Unlikely	No
summer holly	*Comarostaphylis diversifolia ssp. diversifolia*	--/--/1B.2	Perennial evergreen shrub; chaparral and cismontane woodland (30-790 meters) Blooms: April to June	Unlikely	No
snake cholla	*Cylindropuntia californica var. californica*	--/--/1B.1	Perennial stem succulent; chaparral and coastal scrub (30-150 meters) Blooms: April to May	Unlikely	No
variegated dudleya	*Dudleya variegata*	--/--/1B.2	Perennial herb; chaparral, coastal scrub, valley and foothill grassland, cismontane woodland, vernal pools; (3-580 meters) Blooms: April to June	Unlikely	Yes
Palmer's goldenbush	*Ericameria palmeri var. palmeri*	--/--/1B.1	Perennial evergreen shrub; mesic soils; chaparral, coastal scrub (30-600 meters) Blooms: July to November	Unlikely	Yes
San Diego button-celery	*Eryngium aristulatum var. parishii*	FE/CE/1B.1	Annual or perennial herb; mesic soils; coastal scrub, valley and foothill grassland, vernal pools (20-620 meters) Blooms: April to June	Unlikely	Yes
San Diego barrel cactus	*Ferocactus viridescens*	--/--/2B.1	Perennial stem succulent; coastal scrub, valley and foothill grassland, vernal pools (3-45 meters) Blooms: May to June	Unlikely	Yes
Campbell's liverwort	*Geothallus tuberosus*	--/--/1B.1	Ephemeral liverwort; coastal scrub and vernal pools; mesic soils; (10-600 meters) Blooms: not applicable	Unlikely	No
Palmer's grapplinghook	*Harpagonella palmeri*	--/--/4.2	Annual herb; chaparral, coastal scrub, valley and foothill grassland; clay soils (20-950 meters) Blooms: March to May	Unlikely	No
beach goldenaster	*Heterotheca sessiliflora ssp. sessiliflora*	--/--/1B.1	Perennial herb; coastal chaparral, coastal dunes, coastal shrub (0-1225 meters) Blooms: March to December	Unlikely	No

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	Lifeform, General Habitat Description (elevation)	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
decumbent goldenbush	*Isocoma menziesii var. decumbens*	--/--/1B.2	Perennial shrub; chaparral, coastal shrub; often disturbed areas (10-135 meters) Blooms: April to November	Unlikely	No
Coulter's goldfields	*Lasthenia glabrata ssp. coulteri*	--/--/1B.1	Annual herb; marshes and swamps (coastal salt), playas, vernal pools (1-1220 meters) Blooms: February to June	Unlikely	No
Robinson's peppergrass	*Lepidium virginicum var. robinsonii*	--/--/4.3	Annual herb; chaparral and coastal scrub (1-885 meters) Blooms: January to July	Unlikely	No
light gray lichen	*Mobergia calculiformis*	--/--/3	Coastal scrub; abundant on cobbles in right habitat, only known from one site in Baja one in San Diego area Blooms: not applicable	Unlikely	No
willowy mondarella	*Monardella viminea*	FE/CE/1B.1	Perennial herb; alluvial ephemeral washes; chaparral, coastal scrub, riparian scrub, riparian forest, riparian woodland, coastal dunes, (50-225 meters) Blooms: June to August	Unlikely	Yes
little mousetail	*Myosurus minimus ssp. apus*	--/--/3.1	Annual herb; valley grassland; alkaline vernal pools (20-640 meters) Blooms: March to June	Unlikely	No
spreading navarretia	*Navarretia fossalis*	FT/--/1B.1	Annual herb; chenopod scrub, marshes and swamps, playas and vernal pools (30-655 meters) Blooms: April to June	Unlikely	Yes
prostrate vernal pool navarretia	*Navarretia prostrata*	--/--/1B.1	Annual herb; mesic soils; coastal scrub, valley and foothill grassland, meadows and seeps, vernal pools (15-1210 meters) Blooms: April to July	Unlikely	No
coast woolly-heads	*Nemacaulis denudata var. denudata*	--/--/1B.2	Annual herb; coastal dunes (0-100 meters) April to September	Unlikely	No
California orcutt grass	*Orcuttia californica*	FE/CE/1B.1	Annual herb; vernal pools (15-660 meters) Blooms: April to August	Unlikely	Yes
Brand's star phacelia	*Phacelia stellaris*	--/--/1B.1	Annual herb; coastal dunes, coastal scrub (1-400 meters) Blooms: March to June	Unlikely	No
San Diego mesa mint	*Pogogyne abramsii*	FE/CE/1B.1	Annual herb; vernal pools (90-200 meters) Blooms: March to July	Unlikely	Yes

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	Lifeform, General Habitat Description (elevation)	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
Otay Mesa mint	*Pogogyne nudiuscula*	FE/CE/1B.1	Annual herb; vernal pools (90-250 meters) Blooms: May to July	Unlikely	Yes
chaparral ragwort	*Senecio aphanactis*	--/--/2B.2	Annual herb; chaparral, cismontane woodland, coastal scrub (15-800 meters) Blooms: January to April	Unlikely	No
bottle liverwort	*Sphaerocarpos drewei*	--/--/1B.1	Ephemeral liverwort; chaparral, coastal scrub (90-600 meters) Blooms: not applicable	Unlikely	No
purple stemodia	*Stemodia durantifolia*	--/--/2B.1	Perennial herb; Sonoran desert scrub; mesic or sandy soils	Unlikely	No
oil neststraw	*Stylocline citroleum*	--/--/1B.1	Annual herb; chenopod scrub, coastal scrub and valley foothill grasslands; clay soils (50-400 meters) Blooms: March to April	**Possible**; previously identified within the proposed mitigation site	No
Estuary seabite	*Suaeda esteroa*	--/--/1B.2	Perennial herb; saltwater marshes and swamps (0-5 meters) Blooms: May to January	Unlikely	No
woven-spored lichen	*Texosporium sancti-jacobi*	--/--/3	Crustose lichen (terricolous); chaparral; grows on soil, small mammal pellets, dead twigs, and on *Selaginella* spp. Blooms: not applicable	Unlikely	No

Notes:

--	No status to date
1A	Presumed Extirpated in California and either Rare or Extinct Elsewhere
1B.1	Rare, Threatened, or Endangered in California and elsewhere; seriously threatened in California
1B.2	Rare, Threatened, or Endangered in California and elsewhere; moderately threatened in California
1B.3	Rare, Threatened, or Endangered in California and elsewhere; not very threatened in California
2B.2	Rare, Threatened, or Endangered in California, but more common elsewhere; moderately threatened in California
3	More information is needed to assign another rank; a review list of plants
4.2	Limited distribution, a watch list of plants; moderately threatened in California
4.3	Limited distribution, a watch list of plants; not very threatened in California

CDFW	California Department of Fish and Wildlife
CNPS	California Native Plant Society
CD	California delisted or removed from listing
CE	Listed as endangered in California
CEQA	California Environmental Quality Act
CT	Listed as threatened in California
FC	Candidate for federal listing
FD	Federally delisted or removed from listing
FE	Federally listed as endangered
FP	CDFW Fully Protected Species
FT	Federally listed as threatened
MSCP	Multiple Species Conservation Program
SSC	CDFW Species of Special Concern
X	Critical Habitat designated for this species

Appendix F Listed and Sensitive Wildlife Species Potentially Occurring in the Vicinity of the Proposed Mitigation Site

Appendix F – Listed and Sensitive Wildlife Species Potentially Occurring in the Vicinity of the Proposed Mitigation Site

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	General Habitat Description	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
INVERTEBRATES					
San Diego fairy shrimp	*Branchinecta sandiegonensis*	FE/--/--	Vernal pools and occasionally seasonal wetlands and seasonal wetland swales in coastal southern California and northern Mexico	Unlikely	Yes
western tidal-flat tiger beetle	*Cicindela gabbii*	--/--/--	Estuaries and mudflats along southern California coast	Unlikely	No
western beach tiger beetle	*Cicindela latesignata latesignata*	--/--/--	Mudflats and beaches along southern California coast	Unlikely	No
monarch butterfly	*Danaus plexippus*	--/--/--	Winter roosts in wind-protected tree groves (*Eucalyptus* spp., Monterey pine, cypress) with nearby nectar source	**Possible**	No
Quino checkerspot butterfly	*Euphydryas editha quino (=e. e. wrighti)*	FE/--/--	Found in San Diego and Riverside Counties, also northern Mexico; occurs habitats consisting of shrubs scrubland and small trees with open areas of several meters landscapes, swales with areas of nearby dense brush habitat; primary larval host plant is California plantain (*Plantago erecta*)	Unlikely	No
Riverside fairy shrimp	*Streptocephalus woottoni*	FE/--/--	Typically occurs in large vernal pools in grassland habitat between elevations of 100 and 750 feet in coastal areas of San Diego County; also in pools in chaparral habitat of San Diego and Otay mesas	Unlikely	Yes
FISH					
southern steelhead – southern California distinct population segment	*Oncorhynchus mykiss irideus*	FE/--/SSC	Federal listing refers to populations from Santa Maria River south to the southern extent of range (San Mateo Creek in San Diego County); southern steelhead likely have greater physiological tolerances to warmer water and more variable conditions	**Possible**	No
AMPHIBIANS AND REPTILES					
arroyo toad	*Anaxyrus californicus*	FE/--/SSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc; rivers with sandy banks, willows (*Salix* sp.), cottonwoods (*Populus* sp.), and sycamores (*Platanus* sp.) with loose, gravelly areas of streams in drier parts of range	**Possible**	Yes

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	General Habitat Description	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
orange-throated whiptail	*Aspidoscelis hyperythra*	--/--/SSC	Occurs in low elevation coastal scrub, chaparral, and valley-foothill hardwood forest habitats	Unlikely	Yes
western pond turtle	*Emys marmorata*	--/--/SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches, usually within aquatic vegetation; needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 kilometers from water for egg laying	**Possible**	Yes; for Emys marmorata pallida
coast horned lizard	*Phrynosoma blainvillii*	--/--/SSC	Found in a wide variety of habitats although most frequently in lowlands along sandy washes; requires patches of loose, sandy soil for burrowing, low bushes for cover, open areas for sunning, and abundant supply of ants and other insects	Unlikely	Yes
Coronado Island skink	*Plestiodon skiltonianus interparietalis*	--/--/SSC	Occurs primarily in grassland, chaparral, juniper-sage and piñon-juniper woodlands, pine-oak, and pine forests; prefers early successional stages or open areas often on dry hillsides or rocky areas close to streams	Unlikely	No
western spadefoot	*Spea hammondii*	--/--/SSC	Occurs primarily in grassland habitats and valley foothill woodlands; requires vernal pools, seasonal wetlands, stock ponds or other intermittent waters for breeding	Unlikely	No
two-striped garter snake	*Thamnophis hammondii*	--/--/SSC	Highly aquatic; occurs in or near permanent fresh water; often along streams with riparian growth and rocky areas	**Likely**	No
BIRDS					
southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	--/--/WL	Resident in southern California coastal sage scrub and sparse mixed chaparral; frequents relatively steep, often rocky hillsides with grass and forb patches	Unlikely	Yes
burrowing owl	*Athene cunicularia*	--/--/SSC	Occurs in open dry annual or perennial grasslands, scrublands and deserts with low vegetation; subterranean nester mostly dependent on mammal burrows for nest sites	Unlikely	Yes
Swainson's hawk	*Buteo swainsoni*	--/CT/--	Breeds in grasslands with scattered trees, riparian corridors, juniper-sage flats, agricultural and ranchlands with trees; forages in nearby grasslands, grain and alfalfa fields supporting abundant rodent populations	**Possible**	Yes
coastal cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	--/--/SSC	Southern California coastal sage scrub; requires tall *Optunia* cactus for nesting and roosting.	Unlikely	Yes

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	General Habitat Description	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
western snowy plover	*Charadrius nivosus ssp. nivosus*	FT/--/SSC	Sandy beaches, salt pond levees, shore of large alkali lakes; requires sandy, gravelly, or friable soils for nesting	Unlikely	Yes
yellow-billed cuckoo, western DPS	*Coccyzus americanus occidentalis*	FT/CE/--	Riparian forest nester along the broad, lower flood-bottoms of larger river systems; nests in riparian jungles of willow (*Salix* sp.), often mixed with cottonwoods (*Populus* sp.), with a lower story of blackberry (*Rubus ursinus*), nettles (*Urtica dioica*), or wild grape (*Vitus californica*)	**Possible**	No
southwestern willow flycatcher	*Empidonax traillii extimus*	FE/CE/--	Spring and summer resident in southern California; breeding sites requires dense riparian habitats with abundant vegetation such as cottonwood (*Populus* sp.), willow (*Salix* sp.) and tamarisk (*Tamarix* sp.)	**Possible**	Yes
prairie falcon	*Falco mexicanus*	--/--/WL	Breeding sites on cliffs; forages in open areas, often far from breeding sites	**Possible;** previously identified within the proposed mitigation site	No
American peregrine falcon	*Falco peregrinus anatum*	FD/--/FP	Breeding sites on cliff ledges, river or stream banks, dunes, buildings in open areas; forages in open areas often near water	**Possible**	Yes
coastal California gnatcatcher	*Polioptila californica californica*	FT/--/SCC	Obligate permanent resident of coastal sage scrub in Southern California; primarily in arid washes and on mesas and slopes	Unlikely	Yes
light-footed clapper rail	*Rallus longirostris levipes*	FT/CE/--	Resident of southern California salt marshes from Ventura to the Mexican border; typically nests in dense cordgrass near hide tide line	Unlikely	Yes
California least tern	*Sterna antillarum browni*	FE/CE/--	Breeding areas along California coast from San Francisco Bay to Mexican border, also in northern Baja California; nests in open areas on ground such as beaches, alkali flats, paved areas, and landfills; forages in estuaries and shallow portions of bays	Unlikely	Yes
least Bell's vireo	*Vireo bellii pusillus*	FE/CE/--	Summer resident in southern California; occurs in low riparian habitat near water or dry river bottoms; usually nests in willows, coyote brush, or mesquite	**Likely;** previously identified within the proposed mitigation site	Yes
MAMMALS					
Mexican long-tongued bat	*Choeronycteris mexicana*	--/--/SSC	Occasionally found in San Diego County; roosts in well-lit caves; feeds primarily on nectar and pollen from night blooming succulent plants	Unlikely	No

Common Name	Scientific Name	Status (Federal/ State/ CNPS, CDFW, or Critical Habitat)	General Habitat Description	Species' Presence Onsite (Likely; Possible; Unlikely)	MSCP Covered Species
western mastiff bat	*Eumops perotis californicus*	--/--/SSC	Roosts in cliff crevices, cracks and orifices in tall buildings, tunnels, and trees; forages in arid or semi-arid habits including grasslands, coastal sage scrub, chaparral, and forest clearings	**Possible;** previously identified within the proposed mitigation site	No
silver-haired bat	*Lasionycteris noctivagans*	--/--/--	Roosts in tree hollows, woodpecker holes and under exfoliating bark, and rarely under rocks; forages over or near ponds, streams, and rivers' typically in coastal or montane habitats	**Possible**	No
hoary bat	*Lasiurus cinereus*	--/--/--	Roosts in dense foliage consisting of medium to large trees near water sources; forages in open areas of habitat mosaics mainly along edges of vegetative cover consisting of trees and shrubs	**Possible**	No
western yellow bat	*Lasiurus xanthinus*	--/--/SSC	Roosts in trees, particularly palms; forages in valley foothill riparian, arid washes, and palm oasis habitats	**Likely**	No
Yuma myotis	*Myotis yumanensis*	--/--/--	Roosts in maternal colonies in caves, crevices, mines, and buildings; forages in forest and woodland habitat near or over water	**Possible (foraging)**	No
pocketed free-tailed bat	*Nyctinomops femorosaccus*	--/--/SSC	Roosts in rocky areas of high cliffs; occurs in a variety of arid habitats in southern California including: desert riparian, desert scrub, desert wash, pine-juniper woodland, and palm oasis	Unlikely	No
big free-tailed bat	*Nyctinomops macrotis*	--/--/SSC	Roosts in rocky areas of high cliffs; forages in low-lying areas of southern California	Unlikely	No
Pacific pocket mouse	*Perognathus longimembris pacificus*	FE/--/SSC	Occurs within 2.5 miles of the Pacific Ocean; two known populations in San Diego County; in the vicinity of San Mateo Creek and the Santa Margarita River estuaries; requires sandy or gravelly soils	Unlikely	No

Notes:

--	No status to date
CDFW	California Department of Fish and Wildlife
CE	Listed as endangered in California
CT	Listed as threatened in California
DPS	Distinct population segment
FD	Federally delisted or removed from listing
FE	Federally listed as endangered
FP	CDFW Fully Protected Species
FT	Federally listed as threatened
MSCP	Multiple Species Conservation Program
SSC	CDFW Species of Special Concern
WL	CDFW Watch List

Appendix G Example Ledger

Stadium Wetland Mitigation Site: Credit Ledger							
	Rehabilitation		**Enhancement**			**Restoration**	
Credit Type	Riparian Woodland (USACOE Wetland)	Riparian Woodland (USACOE Buffer)	Riparian Woodland (USACOE Wetland)	Freshwater Marsh (USACOE Wetland)	Riparian Woodland (USACOE Buffer)	Diegan Coastal Sage Scrub	Total
Total Credits (Acres)	15.3	5.5	24.0	0.2	8.0	1.1	54.1
Projects							
Murphy Canyon Channel Maintenance 12/2014 RWQCB: R9-2013-0124 USACOE: CADFW:1600-2010-0269-R5	0.370	0.893	1.670	-	1.350	-	4.283
Balance							
Credits Available (Acres)	14.930	4.607	22.330	0.2	6.650	1.1	49.817