

June 6, 2017

8685

Ms. Stephanie Bracci
City of San Diego
Transportation and Storm Water Department
2781 Caminito Chollas, MS 44
San Diego, California 92105

***Subject: 2017 Condition Verification for the Tijuana River Emergency Channel
Maintenance Wetland Mitigation Project, San Diego County, California***

Dear Ms. Bracci:

This letter report provides a description of the current site status and the required continued mitigation compliance of the Tijuana River Emergency Channel Maintenance Wetland Mitigation Project, which completed its five year maintenance and monitoring period in May 2001.

The mitigation site is located immediately south of the Tijuana River channel, within the City of San Diego immediately north of the U.S. border in the Tijuana River Valley, as shown in attached Figures 1 through 3. The site is located on USGS Imperial Beach 7.5 minute quad, north of Monument Road, west of Hollister Street, and immediately west of the Saturn Boulevard (19th Street) right-of-way. The site is within the City's Multiple Species Conservation Program's Multi-Habitat Planning Area and County of San Diego Tijuana River Valley Regional Park.

Construction of the emergency channel directly impacted jurisdictional southern willow scrub vegetation and historic nesting territories of the least Bell's vireo (LBVI). The City subsequently extended the emergency channel by 400 linear feet causing additional impacts of 0.17 acre to occupied habitat and 0.07 acre of unoccupied but suitable LBVI habitat. The mitigation site was also used to mitigate impacts for the Hollister Street Bailey Bridge replacement project. Ultimately, a total of 11.02 acres of wetland mitigation was installed at this mitigation site.

PERMITS

The City of San Diego performed work in the Tijuana River Valley under Emergency Procedures outlined in permits for this project that were issued by the U.S. Army Corps of Engineers (ACOE) (93-966- EW), U.S. Fish & Wildlife Service (USFWS) (Biological Opinion for ACOE permit), and California Department of Fish & Game (Wildlife) (CDFW) Streambed Alteration Agreement (5-683-93). Project permits are also shown in Table 1.

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Table 1
Project Permits

Agency	Permit Number
California Department of Fish and Wildlife (CDFW)	SAA 5-683-93
U.S. Army Corps of Engineers (ACOE)	93-966-EW
U.S. Fish and Wildlife Service (USFWS)	1-6-93-F-35

Per conditions of the Master Storm Water System Maintenance Program, additional mitigation need not be repeated for subsequent maintenance of the same footprint of a project which was previously impacted, so long as performance criteria continue to be met for the site.

In May of 2013, Dudek performed a comprehensive site review, which is outlined in the *Current Condition Verification Report for the Tijuana River Emergency Channel Maintenance Wetland Mitigation Program* (July 2013) report, as well as follow-up investigations on March 19, 2015, outlined in the *Current Condition Verification for the Tijuana River Emergency Channel Maintenance Wetland Mitigation Project, San Diego County, California* (May 2015) letter report, and on May 24, 2016, outlined in the *2016 Condition Verification for the Tijuana River Emergency Channel Maintenance Wetland Mitigation Project, San Diego County, California* (June 2016) letter report. On May 24, 2017 Dudek performed an additional walk-through to review current site conditions and confirm continued compliance with performance standards outlined in the U.S. Fish and Wildlife (USFWS) Biological Opinion (BO).

AGENCY APPROVED PERFORMANCE STANDARDS

The USFWS Biological Opinion defined the ultimate performance standards for establishment of LBVI quality habitat shown in Tables 2 through 4. Interim performance standards for vegetation establishment were not provided. Per USFWS BO No. 1-6-93-F-35, and as outlined in the agency approved conceptual mitigation plan, fulfillment of any one of the three standards in Table 2 indicate that the mitigation area has successfully achieved the intended functions and services which constitute the long-term goals of the mitigation project.

Table 2
USFWS LBVI Performance Standards

Establishment of suitable LBVI habitat has been achieved if one or more of the following criteria is met:		
Vegetation meets quantitative standards stated in USFWS Biological Opinion (Tables 3 and 4)	Vegetation passes a qualitative assessment by a representative of USFWS and the Project Biologist	Presence of LBVI territories

Table 3
Transect Data Performance Standards

Vegetation Strata Layer	Percent Native Coverage Goal	Acceptable Percent Coverage Range
Tree	50	40-60
Shrub	39	30-50
Herbaceous	4	2-9
Open	7	3-9

Table 4
Stacked Cube Performance Standards

Cube Height (Meters)	0-1	1-2	2-3	3-4	4-5	5-6	6-8	>8
Average Percent Cover	40	33	27	21	18	15	13	8
Standard Deviation	6.6	7.4	5.9	5.9	5.6	6.5	7.0	6.1
Target Range	30-50	20-45	15-40	10-35	10-25	5-25	5-20	0-20

SITE VEGETATION

Established vegetation remains consistent with what was observed during the 2013, 2015 and 2016 site evaluations, which consists of a mosaic of native riparian, wetland, and transitional vegetation communities throughout the project area. These native vegetation communities include herbaceous wetland, southern willow scrub, mulefat/southern willow scrub mix, mulefat scrub/ sandbar willow mix, mulefat scrub, and elderberry-cottonwood-willow woodland. Location and composition of observed vegetation communities is substantially consistent with the project design, exhibiting natural changes occurring over time as dictated by field and climatic conditions, favoring certain target native plant species over others. A detailed description of vegetation communities can be found in Section 2.1.1 of the *Current Condition Verification Report for the Tijuana River Emergency Channel Maintenance Wetland Mitigation Program* (July 2013).

In addition to native species, non-native species were noted as well, including salt cedar (*Tamarix ramosissima*), castor bean (*Ricinus communis*), eucalyptus (*Eucalyptus* spp.) and various other non-natives in lesser numbers (Figure 3). These species appear to have increased

slightly in area/ stature compared to the previous year's site visits, as no focused control has occurred. While they are not yet threatening the overall integrity of the site, it is recommended that a control effort is implemented to prevent continued spread of non-native plant species within the site.

POLYPHAGOUS SHOT HOLE BORER

Polyphagous Shot Hole Borer (PSHB) and Kuroshio Shot Hole Borer (KSHB) (*Euwallacea* sp.) are two morphologically indistinguishable invasive non-native ambrosia beetles (collectively known as SHBs), which are known to spread fungi that the beetles uses as a food source, including *Fusarium euwallaceae*, *Graphium euwallaceae*, and *Paracremonium pembeum*. These fungi species cause Fusarium Dieback (FD) by stopping the flow of water and nutrients. There are currently over 148 native and non-native tree species known to be susceptible to infestation, with additional species being observed periodically (Eskalen 2016). The primary indicators of SHB presence include entrance hole borings of approximately 0.85mm in diameter, staining of the wood surrounding the hole, as well as sugary exudate, or gum-like residue and possibly saw dust. Advanced FD presents as limbs and trunk sections dying and falling to the ground, and ultimate death of the entire tree.

In the fall of 2015, SHB was positively identified in the Tijuana River Valley by Dr. Akif Eskalen of the University of California Riverside (UCR), Department of Plant Pathology and Microbiology, in coordination with U.S. Fish and Wildlife Service (USFWS). A significant majority of the mature willows (*Salix* spp.) both upstream and downstream of Hollister Street bridge were observed to be dead or dying, with clear defoliation, standing snags, and an abundance of downed deadwood.

At the time of the 2017 mitigation site visit, the majority of the riparian canopy within the mitigation site appeared to be leafed-out and healthy, however towards the western end of the site (Figure 3) there were several stands recently dead willows, some of which were still standing snags, and some of which had fallen, blocking the equestrian trail. Dudek visually examined the trunks, and observed entrance holes and residue consistent with SHB presence. Dudek recommends that tissue samples are collected from these trees and submitted for laboratory analysis to determine if fungi species associated with SHB is present. It is also recommended that regular monitoring of the tree health within the mitigation site be conducted to detect any significant decline in tree health, and/or presence of SHB, so that appropriate management can begin as early as possible if warranted.

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It is currently recommended that no wood or other plant material be exported off-site in areas of SHB infestation. Instead, plant material cut for removal from the site should be chipped, appropriately stockpiled on site, and solarized for 4 to 6 months if intended to be exported off site at a later date. If the material is intended to stay on site, then chipping to minus one inch and spreading the chips thinly on the ground may be sufficient for up to a 99 percent kill of the target pathogens. Alternatively, plant material may be burned on-site if feasible. All tools and equipment that comes in contact with plant material suspected of being infested with SHB should be sterilized before leaving the site with 5 percent bleach solution, 70 percent ethanol (or isopropyl), or Lysol disinfectant spray. The knowledge base on SHB is continuing to evolve, and management guidance may change over time. It is recommended to consult with appropriate authorities to access current guidance in the future.

SUMMARY OF MITIGATION COMPLIANCE STATUS

During the site walk through, LBVI were detected through vocalization at the eastern end of the site as well as within the western-central portion of the site (Figure 3). Given that the site walk-through was performed during the nesting and breeding season for LBVI, it can be determined that the site is providing suitable functions and services to support forage, nesting and/or breeding. Based on the criteria outlined in Table 2, presence of LBVI constitutes compliance with final performance metrics.

Results of the monitoring compared with performance standards are shown in Table 5.

Table 5
2015 Monitoring Results Compared With Final Performance Standards

Performance Standard			
<i>Establishment of Suitable LBVI Habitat has been achieved one or more of the following criteria:</i>	Vegetation meets quantitative standards stated in USFWS Biological Opinion	Vegetation passes a qualitative assessment by a representative of USFWS and the Project Biologist	Presence of LBVI territories
<i>2017 Performance Results</i>	Not sampled.	Not evaluated by USFWS representative.	Yes. During the site walk-through, LBVI was detected vocalizing on site in two locations.

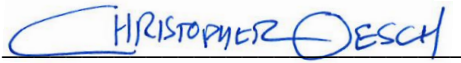
Based on these observations, and as shown in Table 5, it is determined that the mitigation site continues to meet performance criteria, and remains in compliance with permit conditions for its ultimate success, continuing to function as it was designed.

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For any questions or concerns, please contact me at 760.479.4268 or coesch@dudek.com.

Sincerely,

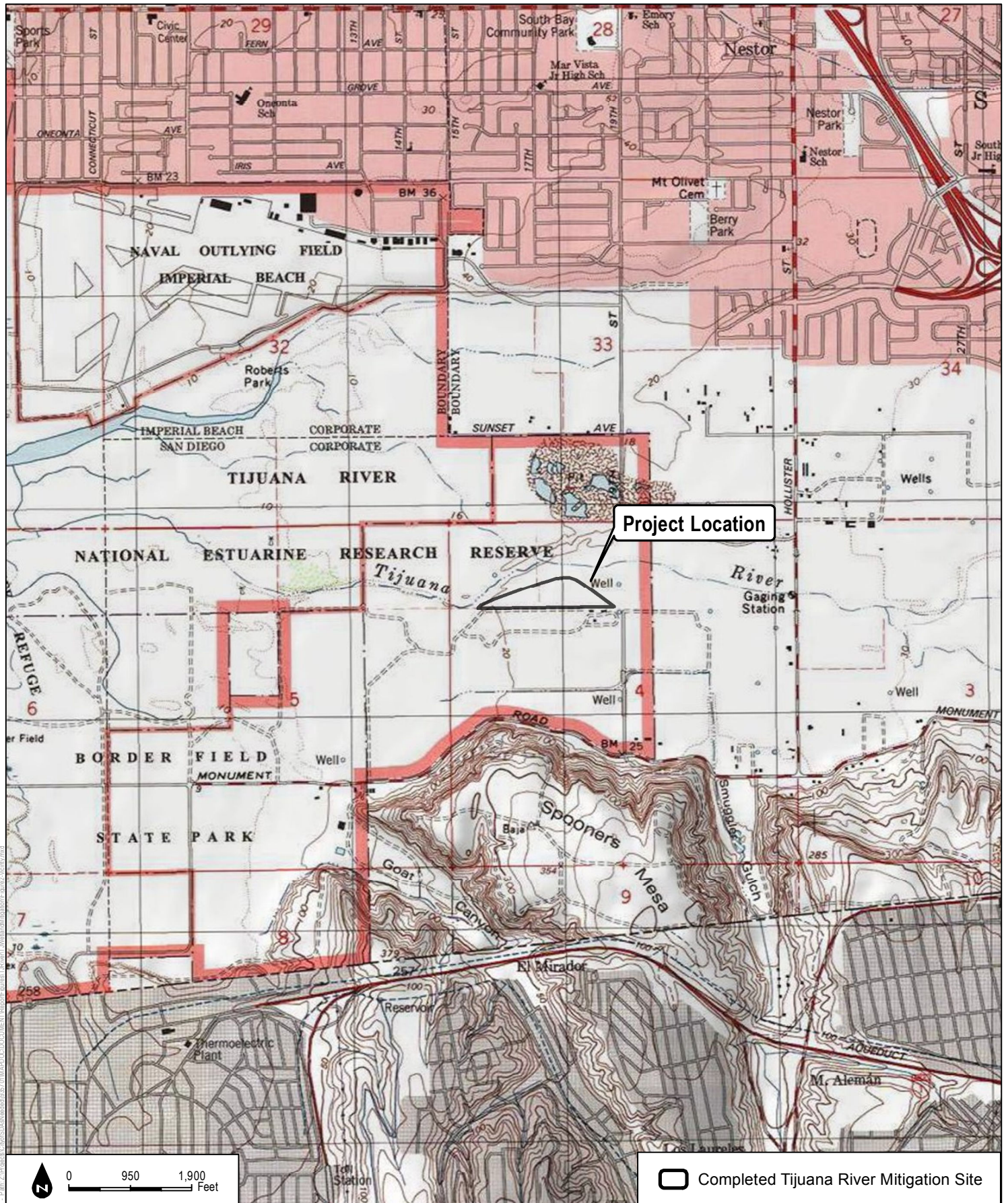


Christopher Oesch, Dudek
Project Manager/ Biologist

Att.: Figure 1, Regional Map
Figure 2, Vicinity Map
Figure 3, Site Reference

LITERATURE CITED

- Dudek. 2013. *Current Condition Verification Report for the Tijuana River Emergency Channel Maintenance Wetland Mitigation Program*, City of San Diego, California. Prepared for the City of San Diego, Storm Water Division. July.
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- Eskalen, A., 2015. *Public Presentation and Personal Communication*. Department of Plant Pathology and Microbiology. University of California, Riverside. <http://eskalenlab.ucr.edu/>
- Eskalen, A., 2016. Department of Plant Pathology and Microbiology. University of California, Riverside. Website: <http://eskalenlab.ucr.edu/>.



SOURCE: USGS 7.5 Minute Series - Imperial Beach Quadrangle

2017 Tijuana River Wetland Mitigation Project

FIGURE 2
Vicinity Map

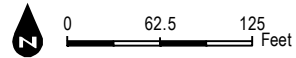


FIGURE 3
Site Reference

**FINAL WETLANDS
MITIGATION AND MONITORING PLAN
for the
TIJUANA RIVER VALLEY
CHANNEL MAINTENANCE PROJECT**

Prepared for

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FEBRUARY 2013

Final Wetlands Mitigation and Monitoring Plan for the Tijuana River Valley Channel Maintenance Project

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Final Wetlands Mitigation and Monitoring Plan for the Tijuana River Valley Channel Maintenance Project

1.0 INTRODUCTION

The purpose of this final mitigation plan is to outline appropriate measures for compliance with mitigation requirements for the Tijuana River Valley Channel Maintenance Project (Project). The Applicant for the Project is the City of San Diego Storm Water Division (City).

The Project consists of ongoing flood control maintenance within portions of two channels in the Tijuana River Valley. The City has successfully mitigated for the construction of these channels; however, current permits for ongoing maintenance of the channels require implementation of an exotic invasive species control program within and outside of the maintenance channels as additional mitigation for maintenance activities. This current Final Wetlands Mitigation and Monitoring Plan (WMMP) has been prepared to address mitigation requirements under regulatory agency permits and project documents shown in Table 1.

Table 1
Project Permits

Agency	Permit Number	Date
U.S. Army Corps of Engineers (ACOE)	SPL-2009-00719-RSS	October 31, 2012
California Department of Fish and Game (CDFG)	1600-2011-0271-R5	December 8, 2011
California Coastal Commission (CCC)	A-6-NOC-11-086	November 13, 2012
U.S. Fish and Wildlife Service (USFWS)	FWS-SDG-08B0600-10F0001	August 24, 2012
California Regional Water Quality Control Board (RWQCB)	09C-077	April 17, 2012
Master Storm Water System Maintenance Program- Program Environmental Impact Report (PEIR)	SCH. No. 2005101032, Project No. 42891	October 2011

As outlined in the ACOE, CDFG, and RWQCB permits, maintenance activities are authorized for a period of five years (permit expirations vary from Nov 30, 2016 to October 30, 2017), with additional maintenance potentially authorized through amendments/extensions thereafter. The mitigation proposed herein would restore riparian and riverine functions for the benefit of natural wetland habitat and sensitive wildlife species, enhance disturbed habitat, and improve water quality and flood control functions throughout the Project area. The mitigation adequately offsets the impacts of ongoing maintenance and it is expected that ongoing implementation of this Final WMMP will serve as mitigation for all ongoing impacts within the approved maintenance channels, including those beyond the current five-year permit authorization.

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1.1 Project Site Location and Description

The Project site is located in the City of San Diego, San Diego County, California. The Project involves the maintenance of interrelated components including: the Tijuana River Pilot Channel, Smuggler's Gulch, gabion mattress, erodible berm, Staging Areas B and D, and multiple access roads situated on the U.S. Geological Survey 7.5-minute Imperial Beach quadrangle, Section 4, Township 19 South, Range 2 West (Figures 1 and 2). The Project is within the City of San Diego on properties owned by the County of San Diego and the City.

The Project entails specific maintenance activities to maintain existing flood control facilities to alleviate immediate flooding risks on homes, ranches, and other businesses in the Tijuana River Valley. The Project footprint as it is currently defined contains a maximum of 4.31 acres of jurisdictional area which includes maintained channels, access areas, and equipment turnarounds. These areas are collectively referred to as the **In-Channel** mitigation area and will be maintained free of exotic invasive species under this Final WMMP.

In addition, a 4.31-acre area will be established adjacent to the maintenance channels as an additional enhancement area where exotic invasive species will be removed and maintained free of these exotic invasive species during the maintenance and monitoring period. This additional area is referred to as the **Out-of-Channel** mitigation area.

Within both mitigation areas, three invasive plant species will be the primary target of control and eradication efforts: giant reed (*Arundo donax*), castor bean (*Ricinus communis*) and salt cedar (*Tamarix ramosissima*). These species are targeted for eradication based on their prevalence within the Tijuana River Valley and the need for control of these invasive exotic species, as recommended by the Southwest Wetlands Interpretive Association (SWIA).



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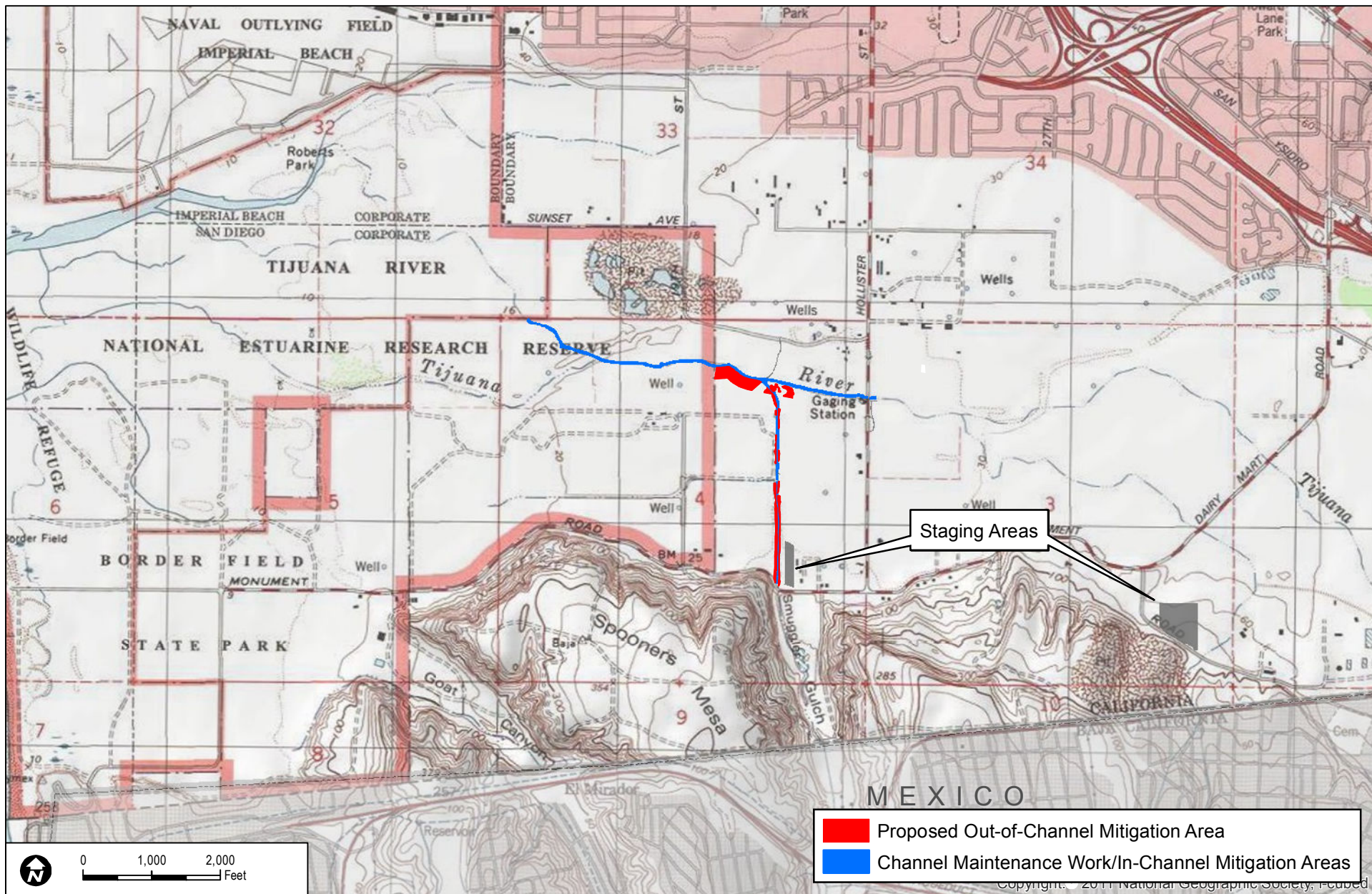
FINAL WETLANDS MITIGATION AND MONITORING PLAN

FIGURE 1
Regional Map

TIJUANA RIVER VALLEY CHANNEL MAINTENANCE PROJECT

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2.0 MITIGATION SITES

2.1 In-Channel Mitigation Area

Within the In-Channel mitigation area, the three targeted invasive plant species: giant reed, castor bean, and salt cedar will be controlled through a combination of channel maintenance (i.e., sediment removal and as-needed exotic species treatment/control). The 4.31-acre channel maintenance area (In-Channel mitigation) shall receive weed control during the maintenance and monitoring period regardless of whether dredging activities occur. The control of target invasive species within the In-Channel mitigation area will be monitored and maintained, as-needed, in accordance with the Final WMMP. The In-Channel mitigation location is shown on Figure 2 and includes the Pilot Channel, Smuggler's Gulch, and equipment turnaround areas.

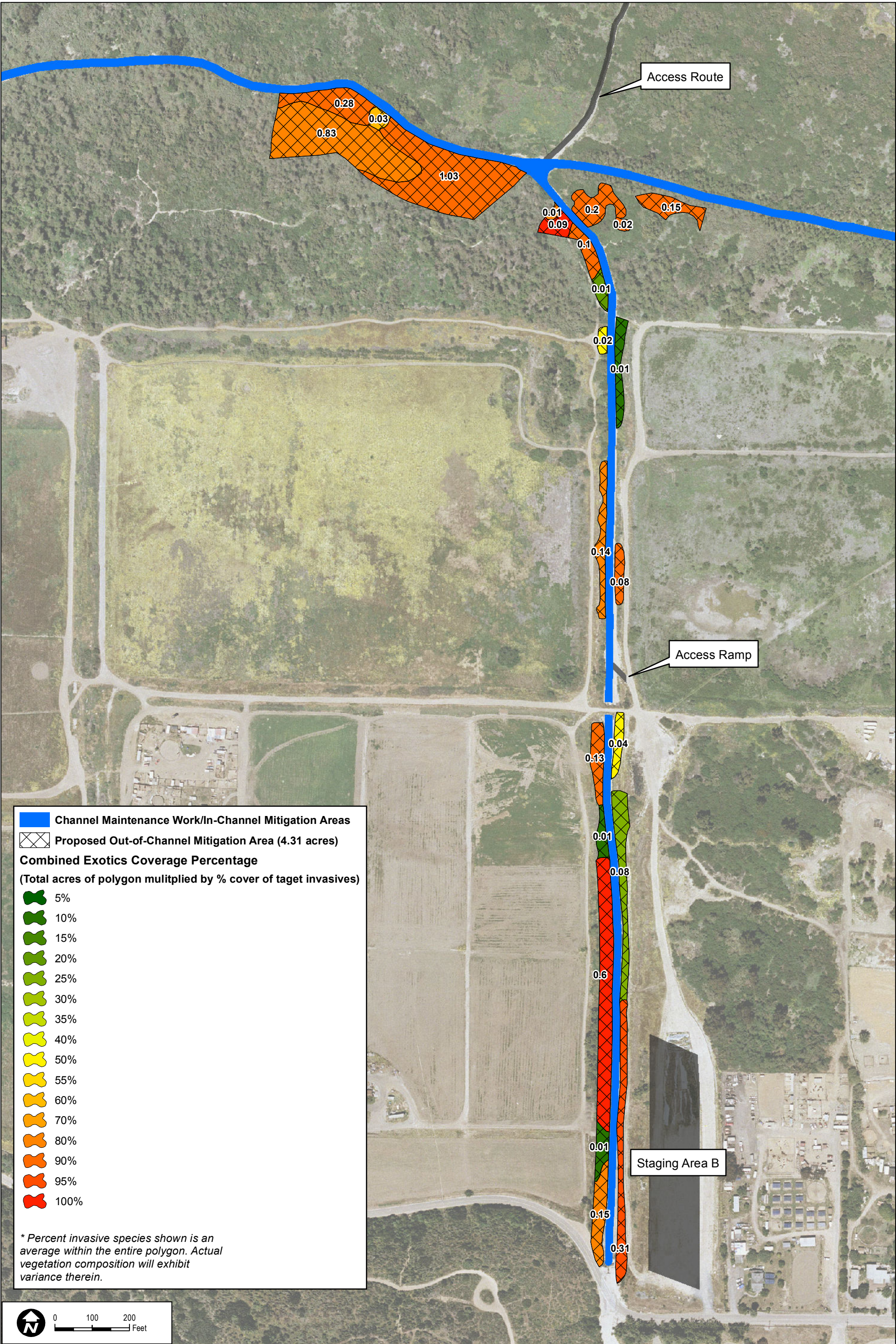
2.2 Out-of-Channel Mitigation Area

The Out-of-Channel mitigation involves the control of three target, invasive plant species: giant reed, castor bean, and salt cedar. The Project mitigation areas outside the channel have been mapped based on conditions observed in 2012 investigations conducted by SWIA and Dudek for the Project. Most recently, Dudek performed an invasive mapping effort in November 2012 to identify the approximate percent cover of giant reed, castor bean and salt cedar within areas adjacent to the channel maintenance areas. A total of 4.31 acres of enhancement credit (i.e., estimated area of occupied by invasive exotic species based on percent cover mapping) has been identified in locations offering the best accessibility and the highest levels of exotic invasive species (Figure 3).

There may be some deviations from these initially mapped areas as determined in the field at the time of implementation. The decision to modify the Out-of-Channel mitigation areas will be influenced by which sites are accessible at the time of implementation and conditions observed at the time of implementation (including actual extent of exotic invasive species). The Out-of-Channel mitigation sites will total 4.31 acres of actual exotic invasive species control, the locations of which will be documented on As-Built plans required for the mitigation (see Section 5).

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3.0 IMPLEMENTATION

The In-Channel and Out-of-Channel mitigation areas will be implemented separately but many of the applicable permits, survey requirements, invasive plant control methods, and monitoring and reporting requirements are the same for both mitigation areas. It is expected that trash and sediment maintenance will occur, in accordance to permit conditions, on an annual basis within the maintenance channels (which are also the In-Channel) mitigation areas. These activities are generally started on September 15th and continue as weather and other conditions permit, until maintenance is completed or until March 15th, when the onset of the bird breeding season restrict further maintenance activities. Due to the degree of sediment removal necessary within the Pilot Channel and Smuggler's Gulch, implementation of the In-Channel trash and sediment maintenance will fulfill most of the annual requirements for In-Channel mitigation (i.e., exotic plant removal) through the mechanized removal sediment bearing the entire root system of any plant species within the channels.

Channel maintenance will also allow the best possible access conditions for implantation of the Out-of-Channel mitigation areas. Exotic invasive species treatment and control activities will be implemented within the Out-of-Channel mitigation areas during the same September 15 - March 15 period. However, if In-Channel trash and sediment maintenance do not occur, both In-Channel and Out-of-Channel mitigation will be implemented to the extent feasible.

3.1 Permits

Implementation of both In-Channel and Out-of-Channel mitigation is fully permitted under permits listed in Table 1. The mitigation areas are within parcels owned by the City of San Diego and County of San Diego and are all located within the Tijuana River Valley Regional Park. The City has a current Right of Entry agreement with the County of San Diego dated October 22, 2012. Applicable conditions from the various permits are summarized below as they pertain to each stage of implementation; however, any and all applicable permits should be maintained at the Project site during implementation activities and all applicable permit conditions shall be adhered to.

3.2 Pre-Activity Surveys and Notifications

The following pre-activity surveys are required both for In-Channel and Out-of-Channel mitigation activities.

Within 7 days prior to the initial use of mechanized equipment within the Pilot Channel each season, a qualified biologist shall conduct at least three pre-construction presence/absence surveys for clapper rail. Results of the survey shall be provided to ACOE at least 24 hours prior to project implementation. The Project Biologist shall notify ACOE, USFWS, and CDFG immediately if clapper rail is detected.

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Any project activities that may disturb nesting birds between January 1 and March 15 shall only occur after a nesting bird survey confirms that birds are actively nesting within 200' of the activity area (500' for listed species and raptors).

The City is required to notify County Parks and Recreation Supervising Park Ranger approximately one week prior to entering the area and to notify RWQCB at least five days prior to the start of mitigation activities.

The Project Biologist shall provide environmental training for all personnel working on the project at a "tail-gate" meeting prior to implementation. This will include environmental constraints and permit conditions associated with this project. Copies of applicable environmental permits shall be kept onsite during work activities.

The limits of work will be delineated with appropriate construction fencing, flagging and/or silt fences as appropriate.

3.3 Invasive Plant Control

It is the City's intention to provide initial invasive plant control for the In-Channel mitigation area through implementation of the Tijuana River Valley Channel Maintenance Project including trash and sediment removal within the channel maintenance areas (Pilot Channel and Smuggler's Gulch). Any necessary follow up treatments within the In-Channel mitigation areas would follow the methods described below. If sediment maintenance does not occur within the channels, the methods outlined below may be used to both initially treat invasive plants as well as to provide follow up treatments, to the extent feasible.

Out-of-Channel mitigation areas will be initially treated according to the methods described below. These methods will also be used for necessary follow up treatments.

3.3.1 Chemical Treatment

Herbicide treatments will be conducted appropriately for each of the three target species in the following manner:

- **Arundo:** initial treatment of foliar spray with Ranger Pro (10% solution; glyphosate) or equivalent, retreatment may use 5% Polaris (imazapyr);
- **Castor bean:** foliar spray with Ranger Pro (4% solution; glyphosate) or equivalent; and
- **Tamarisk:** cut-stump sprayed with Garlon 4 (triclopyr) or equivalent.

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Only the above-ground biomass will be treated, soils will not be disturbed. Every effort will be made to prevent the drift of herbicide onto native vegetation. Where necessary the treatment areas shall be prepared beforehand by “trampling” (i.e., binding arundo branches into a clump and pulling branches away from willows, etc.), and ladders shall be used during herbicide application on particularly tall or dense stands. Herbicides will be applied only when wind speed is below 5 mph. Low pressure applicators may be used to minimize over-spray onto adjacent native vegetation.

All chemical treatments on-site will follow all federal and state laws, regulations, labeled directions, and safety precautions. Only water-safe herbicides shall be used in wet areas or near open water as approved by applicable regulatory agencies (including US Environmental Protection Agency). Some legally registered herbicides may pose a threat to avian species; thus, for all herbicides used on site the label will be reviewed prior to treatment for information on proper timing and application rates. No mixing or preparation of chemicals shall occur within the riparian corridor or within or directly adjacent to drainages or waterways.

3.3.2 Mechanized Removal

Mechanized removal of invasive plant species may be conducted utilizing large construction machinery equipment (e.g., backhoe, loader, dozer, and excavator) and/or small landscaping equipment (e.g., string trimmers, chainsaws, hedge trimmers, etc.). The use of large construction machinery will generally be used within the Pilot and Smuggler’s Gulch Channels (In-Channel mitigation) and, based on direction from the Project Biologist, in select portions of the Out-of-Channel mitigation area directly adjacent to the channel maintenance areas. Smaller landscaping equipment will generally be used in the Out-of-Channel mitigation areas which are not immediately adjacent the maintenance channels.

Any mechanical removal of non-native plants associated with the Project will occur strictly within the authorized work limits and will be enforced by the Project monitoring biologist. No mechanical removal of any form will be permitted between March 15th through September 15th for avoidance measures to nesting special-status birds potentially on-site (i.e., least Bell’s vireo, light-footed clapper rail, and southwestern willow flycatcher). If vegetation removal is scheduled to occur between Jan 1st and March 15th, nesting bird surveys and nest avoidance is required permit the CDFG permit.

For areas where soil disturbance occurs due to root mass removal or other, silt fencing and/or other appropriate erosion control BMP’s should be deployed as directed by the Project Biologist.

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3.3.3 Hand Removal

Hand removal or physical extraction of invasives/weeds may be used around desirable native species or clusters to be preserved, where other control methods are impractical, or would cause damage to the native species. Special care will be taken not to trample adjacent native vegetation while hand removing target invasive species. The labor crew's ability to identify and distinguish between target invasives and native species as seedlings is required to limit impacts on adjacent native habitat. Crews will be assisted by the Project biologist in plant species identification.

Physical removal of non-native plants, including the roots, is the best method for species whose root ball can readily be pulled out with the aboveground portions of the plant. These species will be physically removed before seed-set. If hand removal is possible only after seed-set, then seed heads will be cut off, bagged, and removed from the site prior to the weed removal.

3.3.4 Biomass Disposal

Exotic invasive plant species removal may entail chipping the standing dead biomass (following treatment with chemical herbicide) into dumpsters and disposing of the material at a landfill. Some standing dead biomass may be chipped and placed as mulch in sites outside the treatment area, where needed. Mulch cuts down on the germination and growth of weeds.

3.3.5 Additional Required Measures

The following additional measures will be implemented as required by various permit conditions.

No impacts are allowed outside of the permitted limit of work. Stockpiling of material and staging activities (fueling, vehicle maintenance, etc.) are only permitted to occur within the upland locations (existing parking lots, Staging Area B, and Staging Area D). No vehicle maintenance, fueling or stockpiling shall take place within the channels. Appropriate BMPs shall be employed to prevent the discharge of hazardous materials.

Prior to precipitation events, work areas shall be secured by stabilizing areas of exposed soil, including stockpiles. Equipment and other associated materials shall be removed from flood-prone areas.

Dust control should occur as needed to prevent airborne pollution during earthwork.

A qualified biological monitor, approved by the Resource Agencies, will be present during vegetation removal and during the use of mechanized equipment. On days where these activities are planned, the Project Biologist will walk the project site each morning, before the work

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begins, to determine presence/absence of clapper rail. If clapper rail is detected, the Project Biologist shall stop work and notify ACOE, USFWS, and CDFG immediately.

No pets are permitted within the work areas; no work will be conducted at night.

Fire equipment sufficient to suppress small brush fires (such as from vehicle ignition) shall be maintained onsite during all activities.

3.4 Implementation Schedule

Mitigation activities associated with the In-Channel mitigation areas will occur primarily during annual channel maintenance permit (September 15 through March 15, annually) over the next five years (i.e., 2013–2017). Mitigation activities pertaining to the additional 4.31-acre Out-of-Channel mitigation area shall begin concurrent and/or following completion of channel maintenance activities and shall be completed (i.e., initial treatment of all 8.62 acres of required mitigation) no later than nine months following initiation of impacts authorized under the permits listed in Table 1. Out-of-Channel mitigation activities are also restricted to the period between September 15 and March 15, annually.

It is expected that implementation of mitigation (invasive exotic plant treatments) will be closely coordinated with channel maintenance (trash and sediment removal) activities each year. In general, it is expected that channel maintenance activities would be initiated and would provide access to Out-of-Channel mitigation areas. These Out-of-Channel mitigation areas would be chemically treated and left in place for a period of approximately 2-3 months to allow for maximum herbicide effectiveness. After this period, weather and access conditions permitting, biomass will be cut, chipped, and removed.

During follow up seasons, resprouts may be cut, chipped, and removed at the onset of the maintenance period (e.g. in late September or October). If trash and sediment maintenance is not performed, this follow up treatment would occur in both the In-Channel and Out-of-Channel mitigation areas.

Monitoring of the site will occur continuously from the project start date until the project sign-off.

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4.0 MONITORING

All of the Project mitigation areas (i.e., In-Channel and Out-of-Channel) will be visited and evaluated for invasive plant species control quarterly following completion of initial control, subject to accessibility (i.e., inundated areas are generally not accessible due to high levels of contamination in the water).

4.1 Monitoring Duties

During each of the quarterly monitoring visits mentioned above, a qualified biologist will survey all of the mitigation areas. Data of native vegetation coverage, weed presence, and site progress will be collected during monitoring visits to be used in the annual monitoring report. Qualitative monitoring will be conducted to assess native container plant vigor and development, seedling recruitment from native hydroseed and natural sources, soil moisture content, presence/absence of plant pests or diseases, erosion and/or drainage conditions on site, presence/absence of non-native or invasive plant species, trash or debris accumulation, wildlife presence/absence, and project fencing. All qualitative monitoring visits to the project site will be documented with a monitoring report, which will be forwarded to the City and/or maintenance contractor. Any project deficiencies will be noted in the monitoring report, with accompanying recommendations for maintenance or remedial actions.

The methodology for determining total native species cover and composition, total non-native species cover and composition will be determined by the Project Biologist. The methods shall follow standard industry practice, be repeatable and objective. USFWS conditions require a stratified-random sampling for all quantitative monitoring.

The following performance standards are required to be met for each year of the five year maintenance phase of the project. If mitigation efforts fail to meet the performance standards in any one year, the Project Biologist will recommend remedial actions to be implemented the following winter season that will enhance the project to a level of conformance with the original standard.

4.2 Performance Standards

The following performance standards are taken from past mitigation efforts in the Tijuana River Valley Regional Park and would be used for both In-Channel and Out-of-Channel mitigation:

- Year 1: 75% of the target invasive plants have clearly been treated at least once;
- Year 2: 100% of the target invasive plants have clearly been treated at least once;
- Year 3: Fewer than 50% of the initially-treated target invasive plants are alive (have resprouts);

Final Wetlands Mitigation and Monitoring Plan for the Tijuana River Valley Channel Maintenance Project

- Year 4: Fewer than 10% of the initially-treated target invasive plants are alive (have resprouts); and
- Year 5: Complete kill of initially-treated target invasive plants.

These standards will guide the project and will provide the City and the Resource Agencies with a way to measure the success of the project.

In addition, per ACOE and RWQCB permit conditions in addition to the aforementioned performance standards the California Rapid Assessment Method (CRAM), or other accepted functional assessment method, shall be used to establish and evaluate annual performance criteria, where appropriate. Prior to mitigation implementation, a baseline functional assessment shall be performed. Given the fixed parameters for an official CRAM assessment, it is possible that performance standards will be modified from a strict, traditional CRAM assessment to more accurately detect measurable changes, from within the mitigation sites specifically, from year to year. Results from the baseline functional assessment shall be used to determine realistic and appropriate annual functional metric goals.

Functional assessments will then be performed annually at the same time of the year during years one through five of the mitigation and monitoring period, with the project continuing until final functional assessment success criteria is obtained.

The RWQCB permit specifies water quality and benthic macroinvertebrate (BMI) per the California Stream Bioassessment Procedure (CSBP) methodology to occur prior to the project and annually during the five year maintenance and monitoring period. These water quality assessments are not addressed herein, but are addressed in a separate Receiving Waters Monitoring Plan (RWMP).

Final Wetlands Mitigation and Monitoring Plan for the Tijuana River Valley Channel Maintenance Project

5.0 REPORTING

As stated earlier, a one-time as-built drawing of all of the mitigation areas (both In-Channel and Out-of-Channel), including topography maps, will be submitted to the ACOE, RWQCB, CDFG, USFWS, CCC, and City of San Diego Development Services Department (DSD) in the form of a Final Monitoring Report within 60 days of completion of the first year of mitigation activities.

Annual reports will be submitted to ACOE, RWQCB, USFWS, CDFG, CCC, City DSD by December 1st of each year following the authorized maintenance activities associated with the Project. The annual report will describe the mitigation areas, the current conditions, and outline the results of the vegetation control program monitoring. The current site conditions will be derived from qualitative field observations. The report will provide a comparison of performance criteria with field conditions, identify any shortcomings of the invasive species control, Project implementation, etc., and recommend remedial measures necessary for the successful completion of the Project. The annual report will provide a summary of the accumulated data and will also include the following:

- A list of names, qualifications, and affiliations of all persons who prepared the content of the annual report and participated in monitoring activities
- Qualitative comparisons of current conditions and previous monitoring results
- Maps identifying the monitoring areas and any invasive/weed removal applications implemented
- Date of initiation of mitigation installation and date mitigation installation was completed
- Mitigation as-builts (including GIS files and survey report of mitigation boundaries)
- Tables presenting the raw data collected in the field
- Description of the topographic complexity characteristics at each mitigation site
- Description of the source of hydrology
- Width of native vegetation buffer around the entire mitigation site
- Copies of photos from reference points in the mitigation areas following stream photodocumentation protocols of the RWQCB
- Results of the annual BMI monitoring effort.
- Results of the water quality monitoring.

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6.0 MITIGATION COMPLETION

Upon successful completion of the final (year five) performance criteria, the permittee will solicit final mitigation project sign-off from permitting regulatory agencies. Upon receiving final project acceptance, mitigation requirements shall be considered fulfilled.

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7.0 SITE MANAGEMENT FOLLOWING MITIGATION COMPLETION AND SIGN-OFF

Following final mitigation project sign-off, long-term management of the Out-of-Channel mitigation area shall be transitioned to the County of San Diego for maintenance and management responsibilities. The City and County currently operate under a Memorandum of Understanding (MOU) that designates the County as the management agency for the Tijuana River Valley Regional Park, of which the mitigation site is a part. Management is currently provided in accordance with the Tijuana River Valley Area Specific Management Directive (ASMD) (County of San Diego 2007). The In-Channel mitigation area is expected to continue to require sediment removal and exotic invasive species control. Based on the current MOU, these activities will be carried out by the City.

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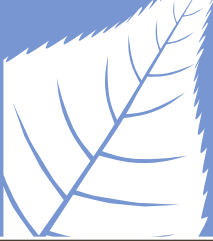
Final Wetlands Mitigation and Monitoring Plan for the Tijuana River Valley Channel Maintenance Project

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- County of San Diego. 2007. *Tijuana River Valley Regional Park Area Specific Management Directives*, County of San Diego, California. June 22. Web location: http://www.sdcounty.ca.gov/reusable_components/images/parks/doc/Final_TJ_ASMD_6_22_07.pdf
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Tijuana River Valley Channel Maintenance Mitigation Project



DECEMBER 2016

LEAD AGENCY:

City of San Diego
Storm Water Division
2781 Caminito Chollas, MS 44
San Diego, CA 92105
Contact: Jamie Kennedy

PREPARED BY:

DUDEK

605 Third Street
Encinitas, CA 92024

Contacts:

*Christopher Oesch, Habitat Restoration Biologist
Bryn Evans, Project Manager*

**THIRD ANNUAL MITIGATION
MONITORING REPORT
for the
TIJUANA RIVER VALLEY
CHANNEL MAINTENANCE MITIGATION PROJECT**

Prepared for:

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DECEMBER 2016

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APPENDIX

A Site Photo Points

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1 PROJECT INFORMATION

1.1 Permit Holder

City of San Diego

Transportation & Storm Water Department

2781 Caminito Chollas, MS 44

San Diego, California 92105

Contact: Ms. Jamie Kennedy

1.2 Permit Numbers

Regulatory agency permits for this project are presented in Table 1.

Table 1
Project Permits

Agency	Permit Number	Date
U.S. Army Corps of Engineers (ACOE)	SPL-2009-00719-RRS	October 31, 2012
California Department of Fish and Wildlife (CDFW)	1600-2011-0271-R5	December 8, 2011
California Coastal Commission (CCC)	A-6-NOC-11-086	November 13, 2012
U.S. Fish and Wildlife Service (USFWS)	FWS-SDG-08B0600-10F0001	August 24, 2012
California Regional Water Quality Control Board (RWQCB)	09C-077	April 17, 2012
Master Storm Water System Maintenance Program- Program Environmental Impact Report (PEIR)	SCH. No. 2004101032, Project No. 42891	October 2011

1.3 Project Location

The Tijuana River Valley Channel Maintenance Mitigation Project (Project) site is located in the City of San Diego, San Diego County, California (Figures 1 and 2). The Project involves the maintenance of interrelated components including: the Tijuana River Pilot Channel, Smuggler's Gulch, gabion mattress, Staging Areas B and D, and multiple access roads situated on the U.S. Geological Survey 7.5-minute Imperial Beach quadrangle, Section 4, Township 19 South, and Range 2 West. The Project is within the City of San Diego on properties owned by the County of San Diego and the City of San Diego (City). This report specifically addresses the out-of-channel mitigation, which is located along the banks of Smuggler's Gulch, to the confluence with the main Pilot Channel, as well as any in-channel mitigation activities other than the actual dredge action itself. Dredge activities occurring during 2016 will be documented in a separate report scheduled for spring of 2017. The largest contiguous mitigation area is located southwest of the confluence. Figure 3 shows the out-of-channel site footprint and the Appendix A: Photo Point Reference Map shows an overlay of the channel maintenance areas and photo point locations.

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1.4 Project Description

The maintenance action associated with the mitigation effort described herein consists of ongoing flood control maintenance within portions of two channels in the Tijuana River Valley (Smuggler's Gulch and the main Tijuana River Pilot Channel).

Full mitigation at a 3:1 ratio, in the form of establishment (then referred to as "creation"), was implemented for impacts from both the initial maintenance dredging, as well as subsequent reoccurring maintenance within the same footprint was implemented as described in the *Conceptual Riparian Habitat Revegetation Plan, Tijuana River Emergency Channel, San Diego California* (Dudek 1993). Construction of the mitigation project began in fall 1994 with grading of the site. Installation of the temporary irrigation system, and planting was completed by Fall 1996. The five-year maintenance and monitoring period began in Spring 1997, and completed its five-year maintenance and monitoring period in May of 2001. The site was also used to mitigate impacts for the Hollister Street Bailey Bridge replacement project. Ultimately, a total of 11.05 acres of wetland mitigation was installed (established) at this mitigation site.

This mitigation site is located immediately south of the Tijuana River channel, within the City of San Diego immediately north of the U.S. border in the Tijuana River Valley. The site is located on USGS Imperial Beach 7.5 minute quad, north of Monument Road, west of Hollister Street, and immediately west of the Saturn Boulevard (19th Street) right-of-way (See Figures 2 and 3). The site is within the City's Multiple Species Conservation Program's Multi-Habitat Planning Area and County of San Diego Tijuana River Valley Regional Park.

While the City has successfully mitigated for the construction of these channels as outlined above, current permits for ongoing maintenance of the channels require implementation of an exotic invasive species control program. This includes the control of target non-native plant species both within, and outside of the maintenance channels. Impacts and mitigation are summarized in Table 2.

Table 2
Jurisdictional Impacts and Mitigation

Channel Maintenance Jurisdictional Impact	Mitigation Ratio	In-Channel Mitigation	Out-of-Channel Mitigation
4.31 acres	2:1	4.31 acres	4.31 acres



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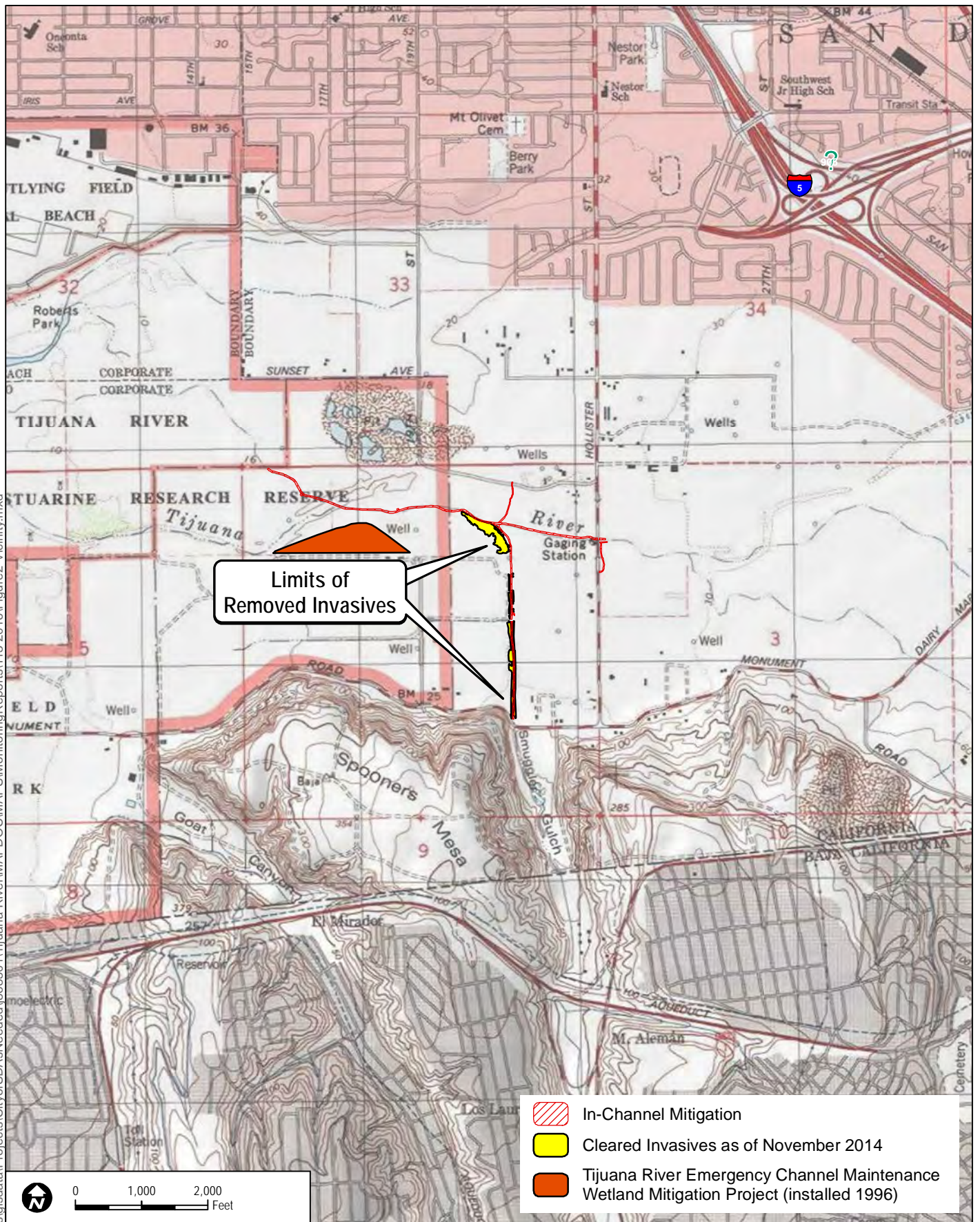
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FIGURE 1
Regional Map

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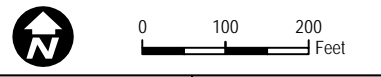
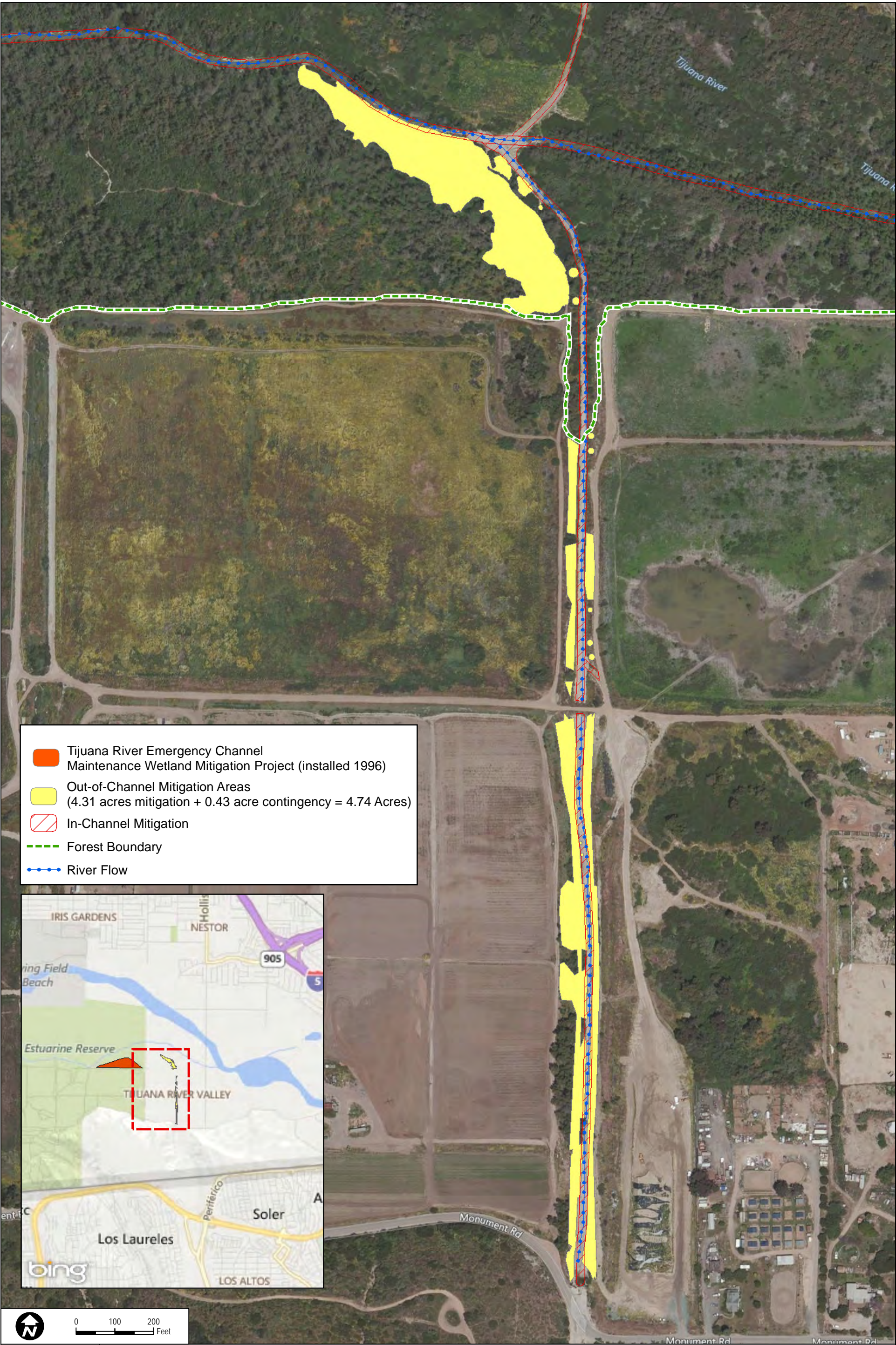
SOURCE: USGS 7.5-Minute Series Imperial Beach Quadrangle.

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FIGURE 2
Vicinity Map

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SOURCE: City of San Diego 2014; Bing Maps 2014

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FIGURE 3
Final As-Built Plan

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Within both mitigation areas, three invasive plant species are the primary target of control efforts: giant reed (*Arundo donax*), castor bean (*Ricinus communis*) and salt cedar (*Tamarix ramosissima [chinensis]*). These species are targeted for control as defined in the September 2013 work plan that was prepared by the Southwest Wetlands Interpretive Association (SWIA).

The *Final Wetlands Mitigation and Monitoring Plan (WMMP) for the Tijuana River Valley Channel Maintenance Project* (Dudek 2013), provides a detailed account of the specifics pertaining to the mitigation plan.

The dredging action entails specific maintenance activities to help reduce flood risk from flows originating in Mexico that flow through the Tijuana River Valley within the Pilot Channel and Smugglers Gulch channels. The maintenance footprint as it is currently defined contains a maximum of 4.31 acres of jurisdictional area which includes maintained channels, access areas, and equipment turnarounds. These areas are collectively referred to as the **In-Channel** mitigation area and will be maintained free of target exotic invasive species.

In addition, 4.31 acres are required to be enhanced outside and adjacent to the maintenance channels where exotic invasive species were removed and are being controlled during the maintenance and monitoring period. This area is referred to as the **Out-of-Channel** mitigation area. An extra 0.43 acre has been treated, totaling 4.74 acres. This extra area is expected to be treated throughout the five year monitoring period as a contingency measure to ensure the minimum acreage requirement is met. Pre-project conditions of the out-of-channel areas included a dominance of target invasive species, with giant reed being the most dominant by spatial coverage, followed by castor bean and salt cedar respectively. This can be seen in the Appendix A site photos depicting near-monotypic stands of giant reed in some locations.

1.5 Mitigation Schedule

Year	J	F	M	A	M	J	J	A	S	O	N	D
2013									S, IN, EB, QM			QM
2014			SB, QM		AB	QM			EB, QM		IC	R, QM
2015			SB, QM			QM			EB, QM			R, QM
2016			SB, QM			QM			EB, QM			R, QM
2017			SB, QM			QM			EB, QM			R, QM
2018			SB, QM			QM			EB, QM			R
2019	T											

IN = Initiation of "Installation" (biomass removal)

IC = Installation complete

S = Start of both out and in-channel mitigation

SB = Start of bird breeding season (15th)

EB = End of bird breeding season (15th)

QM = Scheduled Quarterly Monitoring Visits

R = Report due

IR = Interim Report

AB = As-Built (Survey Report) Submittal

T = Scheduled termination of the Five Year maintenance and monitoring period

= Work completed to date

Third Annual Mitigation Monitoring Report for the Tijuana River Valley Channel Maintenance Mitigation Project

1.6 Biological Consultants

Dudek

605 Third Street
Encinitas, California 92024
Contact: Christopher Oesch 760.479.4268 or coesch@dudek.com

Rincon (2015- June 2016)

5135 Avenida Encinas, Suite A
Carlsbad, California 92008
Contact: Jennifer Kendrick 760.918.9444 EXT 205 or jkendrick@rinconconsultants.com

Balk Biological Inc. (June 2016- Present)

322 Encinitas Boulevard, Suite 290
Encinitas, California 92023
Contact: Shelley Lawrence 760.607.2715 or slawrence@balkbiological.com

1.7 Mitigation Implementation and Maintenance Contractors

RECON Environmental, Inc. (September 2014 through present)

1927 Fifth Avenue
San Diego, California 92101
Contact: Jeannine Ross 619.308.9333 or jross@reconenvironmental.com

1.8 Report Preparers

This report was prepared by the project biologist, Christopher Oesch of Dudek. Publications assistance was provided by Dudek Publications department, and graphics were prepared by the Dudek GIS department.

Third Annual Mitigation Monitoring Report for the Tijuana River Valley Channel Maintenance Mitigation Project

2 ANNUAL MONITORING CONDUCTED DURING YEAR THREE

Mitigation monitoring observations during Year Three (2016) for In-Channel and Out-of-Channel mitigation activities are discussed in Sections 2.1 and 2.2, respectively. During Year Three, Dudek, Rincon and Balk Biological Inc. provided biological and compliance monitoring for implementation of the In-Channel invasive species removal (maintenance dredge action), In-Channel herbicide application, Out-of-Channel biomass removal, and Out-of-Channel herbicide treatment.

Biological monitoring during Year Three included the following pre-activity surveys which were permit requirements both for In-Channel and Out-of-Channel mitigation activities:

1. Within 7 days prior to the initial use of mechanized equipment within the Pilot Channel each season, a qualified biologist conducted at least three pre-construction presence/absence surveys for Ridgway's rail (*Rallus obsoletus*, formerly known as light-footed clapper rail). Results of the survey were provided to ACOE at least 24 hours prior to project implementation. No Ridgway's rails were detected; therefore, no agency reporting was required.
2. The majority of the In-Channel and Out-of-Channel mitigation maintenance activities conducted during 2016 were conducted prior to March 15 and after September 15, outside of the nesting bird season; however, permission was granted from USFWS to continue work during the nesting season under supervision of the Project Biologist to ensure that impacts to nesting bird activities were avoided.
3. Prior to In-Channel and Out-of-Channel mitigation establishment and maintenance activities occurring from January 1 through September 15, nesting bird surveys were performed, per permit requirements, and through coordination with USFWS.
4. The Project Biologist provided environmental training for all personnel working on the project at "tail-gate" meetings prior to implementation of their specified tasks for maintenance during year three. This included environmental constraints and permit conditions associated with the project. Copies of applicable environmental permits were kept on site during work activities.
5. The limits of work were appropriately delineated by the City of San Diego and Dudek prior to implementation of maintenance during year three.

In addition to biological and compliance monitoring during active In-Channel and Out-of-Channel mitigation site establishment activities, quarterly monitoring was also conducted year-

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round to observe the condition of the site, and to make recommendations to the City regarding follow-up weed treatment and other maintenance needs.

In addition to monitoring related to specific listed performance metrics, the sites were also visually monitored for signs of polyphagous shot hole borer (*Euwallacea* sp.; PSHB) presence, which is an invasive beetle known to be present in Orange and San Diego Counties. PSHB spreads fungi that the beetle uses as a food source, including *Fusarium euwallaceae*, *Graphium euwallaceae*, and *Paracremonium pembeum* species. These fungi species cause Fusarium Dieback (FD) by stopping the flow of water and nutrients within the cambium layer of trees. There are currently over 137 native and non-native tree species known to be susceptible to PSHB infestation, with additional species being observed periodically (Eskalen 2015). Susceptible trees include common native riparian trees such as willows (*Salix* spp.), cottonwood (*Populus* spp.), and western sycamore (*Platanus racemosa*). The primary indicators of PSHB include entrance hole borings of approximately 0.85 millimeters in diameter, staining of the wood surrounding the hole, as well as sugary exudate, or gum-like residue. Advanced FD presents as limbs and trunk sections dying and falling to the ground, and ultimately death of the entire tree.

In the fall of 2015, PSHB was positively identified in the Tijuana River Valley by Dr. Akif Eskalen of the University of California-Riverside, Department of Plant Pathology and Microbiology, in coordination with USFWS. The most extensive die off zone appears to be between where the Tijuana River crosses the border in to the United States to downstream of the Hollister Street bridge. Within this reach, the majority of the native riparian trees have been killed, leaving standing snags and an abundance of downed deadwood. In place of the riparian cover, castor bean and giant reed have become the dominant species in many locations, forming dense monotypic stands.

While individual willow trees within the out-of-channel polygons have been identified to possess bore holes and limb dieback consistent with PSHB, no significant infestation or die off has occurred on par with upstream conditions. Visual observation of tree health will continue throughout the monitoring period, with tree tissue samples collected for positive identification if warranted.

2.1 In-Channel Mitigation Activities During Year Three

The In-Channel mitigation consists of removal and subsequent control of target non-native invasive species within the Smugglers Gulch and Pilot Channel dredge areas. Removal of invasive species within the channel occurs as a byproduct of the maintenance dredge action itself. Therefore, the project impact action, and In-Channel mitigation occur simultaneously. The previous dredge action was conducted in 2013 and 2014 and is discussed in further detail

Third Annual Mitigation Monitoring Report for the Tijuana River Valley Channel Maintenance Mitigation Project

in the *Final Monitoring Report for the Tijuana River Valley Channel Maintenance Project, 2013-2014* (Dudek 2014).

A current dredge activity is ongoing, beginning in 2015-2016 maintenance period and continuing through the 2016-2017 maintenance season at the time of this report. During this time, the full channel extent of Smuggler's Gulch has undergone vegetation removal associated with maintenance activities and vegetation has been removed in the Pilot Channel from Station 4+00 to the western extent (Station 56+50). If the entirety of the 4.31 acre maintenance footprint is not dredged during this current action due to adverse site conditions such as inundation, target non-native plant species control of the remaining In-Channel areas shall be conducted through herbicide application and physical removal throughout Year four as part of the In-Channel mitigation maintenance program.

2.2 Out-of-Channel Mitigation Activities During Year Three

The Out-of-Channel mitigation site was maintained during year three (2016) from January through the remainder of the 2016 working season, with permission for the project to continue through the bird breeding season by USFWS, CDFW, CCC, RWQCB, ACOE, and City of San Diego.

Maintenance of the Out-of-Channel site involved control and removal of the target species giant reed, castor bean and salt cedar utilizing cutting, hand removal and herbicide treatment within the Out-of-Channel site boundary, which was initially delineated in the *Tijuana River Valley Channel Maintenance Project: Out-of-Channel Mitigation Interim As-Built Submittal, San Diego County, California* (Dudek 2014), with a final project footprint being presented in the *First Annual Mitigation Monitoring Report for the Tijuana River Valley Channel Maintenance Mitigation Project* (Dudek 2014). The approach for 2016 focused on frequent enough treatments with herbicide while target plants were still small enough for control without removal of biomass, to reduce the potential transmission of polyphagous shot hole borer (PSHB) and/ or fusarium fungal species, should they be present in the target species. The Out-of-Channel mitigation site includes the minimum required 4.31 acres of out-of-channel mitigation, plus an extra 0.43 acres has been treated as a contingency to ensure the mitigation requirements for minimum acreage is met, totaling 4.74 acres, as shown in Figure 3 herein.

Maintenance has continued through the fall of 2016. Maintenance follow up treatments are scheduled to occur during the remainder of 2016, continuing into 2017, and will conclude for the summer prior to March 15, unless permission is granted by USFWS, CDFW, CCC, RWQCB, ACOE, and City of San Diego to continue project work past March 15, 2017 into the breeding season.

Third Annual Mitigation Monitoring Report for the Tijuana River Valley Channel Maintenance Mitigation Project

2.3 Photo Documentation

Permanent photo-documentation stations were set up throughout the mitigation areas to visually document the site conditions and progress over time. A map of the photo points overlaid on an aerial map, along with photos are presented in Appendix A. Photos documenting the end of the year three monitoring period were taken on November 2, 2016, by Christopher Oesch (Dudek). A log of the most recent photo point collection is shown in Table 3.

Table 3
Established Photo Points Taken 11/4/15

Photo Point #	Date	Time	Coordinates (Lat/Long,)	Direction	Location Description	Notes/Conditions
PP-1	11/2/16	0945	117° 5' 18.73" W 32° 33' 03.70" N	N	View of out-of-channel mitigation area along access road.	Area which received recent invasive non-native removal and control.
PP-2	11/2/16	0956	117° 5' 20.71" W 32° 33' 06.58" N	NW	View of out-of-channel mitigation area along access road at horse trail crossing at northern end of site.	Area which received recent invasive non-native removal and control.
PP-3	11/2/16	0958	117° 5' 20.99" W 32° 33' 06.83" N	W	View of out-of-channel mitigation area along access road at horse trail crossing at northern end of site.	Area which received recent invasive non-native removal and control.
PP-4	11/2/16	0957	117° 5' 21.12" W 32° 33' 06.91" N	W	View of out-of-channel mitigation area looking down the horse trail at cleared area.	Area which received recent invasive non-native removal and control.
PP-5	11/2/16	0957	117° 5' 21.12" W 32° 33' 06.91" N	S	View of out-of-channel mitigation area looking south along access road at cleared area.	Area which received recent invasive non-native removal and control.
PP-6	11/2/16	1002	117° 5' 20.44" W 32° 33' 06.19" N	SW	View of out-of-channel mitigation area looking southwest at cleared area.	Area which received recent invasive non-native removal and control.
PP-7	11/2/16	1004	117° 5' 19.62" W 32° 33' 05.62" N	N	View of out-of-channel mitigation area looking north at	Area which received recent invasive non-native removal and control.

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Table 3
Established Photo Points Taken 11/4/15

Photo Point #	Date	Time	Coordinates (Lat/Long,)	Direction	Location Description	Notes/Conditions
					cleared area along access road.	
PP-8	11/2/16	0933	117° 5' 17.71" W 32° 32' 47.05" N	SW	View of both the Smuggler's Gulch channel and the out-of-channel mitigation area looking southwest.	Area which received recent invasive non-native removal and control, as well as the Smuggler's Gulch channel which was dredged.
PP-9	11/2/16	0924	117° 5' 17.59" W 32° 32' 40.42" N	NW	View of both the Smuggler's Gulch channel and the out-of-channel mitigation area looking northwest.	Area which received recent invasive non-native removal and control, as well as the Smuggler's Gulch channel which was dredged.
PP-10	11/2/16	0934	117° 5' 18.29" W 32° 32' 53.15" N	S	View of Smuggler's Gulch channel with out-of-channel treatment areas on banks looking south.	Area which received recent invasive non-native removal and control, as well as the Smuggler's Gulch channel which was dredged.
PP-11	11/2/16	1010	117° 5' 25.91" W 32° 33' 08.95" N	W	View of northwestern most end of the out-of-channel mitigation area looking west along the pilot channel.	Area which received recent invasive non-native removal and control.
PP-12	11/2/16	1010	117° 5' 25.91" W 32° 33' 08.95" N	SE	View of northwestern most end of the out-of-channel mitigation area looking southeast along the pilot channel.	Area which received recent invasive non-native removal and control.
PP-13	11/2/16	0942	117° 5' 18.29" W 32° 32' 53.15" N	NE	View of out-of-channel mitigation area looking northeast from the berm running along the southern side of the site.	Area which received recent invasive non-native removal and control.
PP-14	11/2/16	0942	117° 5' 18.29" W 32° 32' 53.15" N	NW	View of out-of-channel mitigation area looking northwest from the berm running along the southern side of the site.	Area which received recent invasive non-native removal and control.

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2.4 Description of Qualitative Data Collection and Monitoring

In addition to direct compliance monitoring of mitigation maintenance activities, biological monitoring during Year Three consisted of quarterly site walk-throughs to evaluate site conditions and identify maintenance progress and provide recommendations to keep the project in compliance and on track to meet its annual performance criteria. While not directly tied to established performance metrics, monitoring qualitatively noted non-native plant species resprout/presence, soil moisture, hydrologic stability/erosion issues, channel inundation, presence of trash, and site disturbance in accordance with monitoring duties described in section 4.1 of the WMMP.

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3 COMPARISON OF RESULTS WITH SUCCESS STANDARDS

3.1 Performance Criteria

The performance standards from the agency approved *Final Wetlands Mitigation and Monitoring Plan (WMMP) for the Tijuana River Valley Channel Maintenance Project* (Dudek 2013) are shown in Table 4, with the compliance status of the project.

Table 4
Performance Metrics and Compliance Status

Year	Performance Metric	Compliance Status
1	At least 75% of the target invasive plants have clearly been treated at least once	In Compliance: 100% of both the in and out of channel target invasives have been treated.
2	100% of the target invasive plants have clearly been treated at least once	In Compliance: See notation above.
3	Fewer than 50% of the initially treated target invasive plants are alive (have resprouts);	In Compliance: Less than 50% of initially treated target invasive plants have resprouts.
4	Fewer than 10% of the initially treated target invasive plants are alive (have resprouts);	--
5	Complete kill of initially treated target invasive plants	--

3.2 Monitoring Results

Overall, the site is meeting and exceeding its Year Three mitigation requirement of having fewer than 50% of the target invasive species treated at least once within the mitigation areas. In addition to meeting this metric, work conducted during Year Three maintained compliance with work restrictions and other permit conditions. Reporting components outlined in project permits, mitigation plans, and project documents are presented in Sections 3.21 through 3.2.3. Performance criteria from previous years is shown in Table 4.

3.2.1 Topographic Complexity

Aside from the dredge action itself, no grading was included as a component of the mitigation implementation. Mitigation occurring outside of the dredge footprint occurs on generally flat topography, within the floodplains of Smuggler's Gulch and the Pilot Channel for the Tijuana River.

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3.2.2 Source of Hydrology and Hydrologic Connectivity

The source of hydrology for the mitigation areas is provided by the Smuggler's Gulch channel and the Pilot Channel of the Tijuana River. Surface water is not perennially present along the reaches that pass the mitigation sites. Channel overflow into the out-of-channel mitigation areas is possible during significant stormflow events. Both stream systems originate across the border into Mexico to the south. These flows terminate in the Pacific Ocean to the west.

3.2.3 Benthic Macroinvertebrate and Water Quality Monitoring Results

Monitoring of Benthic Macroinvertebrate (BMI) and target water quality parameters are being conducted as part of the Receiving Water Monitoring component of this project. A detailed description of these monitoring parameters, their results, and maps of monitoring locations, are presented in the *Tijuana River Valley Channel Maintenance Project Receiving Water Monitoring Report-Final Year 4- 2016 Monitoring Event* (AMEC 2016). This report was submitted to RWQCB on November 17, 2016.

Results from the biological monitoring events indicate a benthic community that is highly tolerant to disturbance. The low diversity, corresponding scores, and high dominance of a single type of feeding group point to a biological community that may be responding to one or more stressors. A location on the Tijuana River in close proximity to the downstream Pilot Channel station (Tijuana River at Saturn Blvd.) and at approximately the same elevation was monitored for freshwater invertebrates in May 2010 and May 2012 by the County of San Diego's co-permittee receiving waters monitoring program. Taxa collected at this site showed a similar community structure, with combined pollution tolerant taxa comprising 99 and 95 percent of the community, for those two monitoring events respectively.

The tidal influence present at the downstream Pilot Channel location (located downstream and to the west of the maintenance area, near where the Tijuana River intersects the Saturn Blvd. right-of-way) likely affects the types of organisms that can survive there. Increased total dissolved solids/conductivity is one of the factors affecting community scoring. The limited community, with few taxa, and corresponding average scores observed at this station may be indicative of stress due to fluctuations in salinity known to occur at that location (0.4 to 18 ppt) (AMEC 2016), anthropogenic stressors, or a combination of both. While it is difficult to tease apart natural versus anthropogenic impacts to ambient conditions at a station with physical characteristics such as this, continued biological monitoring at this location in association with dredging operations will provide an assessment of the biological community and how it is changing in response to the ongoing maintenance dredging.

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Water quality samples were collected at the upstream (located upstream of the maintenance area, east of where Hollister Road crosses the Tijuana River) and downstream Pilot Channel locations for the pre-dredge, during-dredge, and post-dredge conditions. No samples were collected at upstream Smuggler's Gulch station (located upstream, and to the south of Monument Road) due to no-flow conditions during each monitoring event. The reported water quality results are summarized as follows:

- Nutrient, chlorophyll, nitrate and nitrite concentrations were generally higher upstream to downstream prior to dredging; however in subsequent sampling, nitrate and nitrite concentrations evened out among the sampling locations.
- Tidal influence likely elevated chloride concentrations and in-situ conductivity periodically downstream of the maintenance area.
- Dissolved oxygen concentrations were depressed at both Pilot Channel stations, with the exception of the August 2016 event at upstream Tijuana River Pilot Channel station. Concentrations of dissolved oxygen were exceptionally high (13.0 mg/L) at upstream Tijuana River Pilot Channel station during the final event, likely as a result of increased algal photosynthesis.

A summary of the in-situ water quality results are summarized as follows:

- While pH measurements at the two sites for the first two events were similar, an increase in pH upstream of the maintenance site was detected, likely due to increased algal activity.
- Tidal influence and precipitation events likely influence fluctuations observed in conductance as measured by chloride concentrations.
- Turbidity was greater at upstream compared to downstream, with some variability among sampling events. Downstream measurements remained consistent.
- Upstream and downstream dissolved oxygen levels were comparable during the first two monitoring events; however, a substantial increase in dissolved oxygen was observed at the upstream Pilot Channel location during the August 2016 event. This is likely due to the increased algal activity upstream.

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4 MAINTENANCE RECOMMENDATIONS FOR YEAR FOUR

The following maintenance recommendations are intended to keep the project in compliance with its annual performance standards, as well as keep the project progressing on a trajectory that will achieve its ultimate completion by the end of the five year maintenance and monitoring period. Given the persistent nature of the target invasive species, regular and thorough follow-up control efforts are anticipated to be necessary for satisfactory control.

1. The Project Biologist Team recommends regular follow-up herbicide treatment and/or physical removal of target non-native invasive species which may resprout within the in-channel and out-of-channel mitigation areas. Herbicide treatments alone while plants are small are the preferred approach, in order to avoid biomass removal due to presence of PSHB within the vicinity of the project.
2. The Project Biologist Team recommends regular periodic trash removal within the mitigation sites.
3. The Project Biologist Team recommends monitoring the site for signs of PSHB/ FD impact on willows and other native riparian species throughout the sites.

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5 REFERENCES

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APPENDIX A

Site Photo Points

Document Path: Z:\Projects\CityofSD\AsNeeded\868501\Tijuana River\MA PDOC\MAPS\MonitoringReports\Yr3 2016\Apx A-1_PhotoPoints_Yr3.mxd





Photo Point 1 (November 2, 2016)



Photo Point 2 (November 2, 2016)



Photo Point 3 (November 2, 2016)



Photo Point 4 (November 2, 2016)



Photo Point 5 (November 2, 2016)



Photo Point 6 (November 2, 2016)



Photo Point 7 (November 2, 2016)



Photo Point 8 (November 2, 2016)



Photo Point 9 (November 2, 2016)



Photo Point 10 (November 2, 2016)



Photo Point 11 (November 2, 2016)



Photo Point 12 (November 2, 2016)



Photo Point 13 (November 2, 2016)



Photo Point 14 (November 2, 2016)



Photo Point 1 (November 4, 2015)



Photo Point 2 (November 4, 2015)



Photo Point 3 (November 4, 2015)



Photo Point 4 (November 4, 2015)



Photo Point 5 (November 4, 2015)



Photo Point 6 (November 4, 2015)



Photo Point 7 (November 4, 2015)



Photo Point 8 (November 4, 2015)



Photo Point 9 (November 4, 2015)



Photo Point 10 (November 4, 2015)



Photo Point 11 (November 4, 2015)



Photo Point 12 (November 4, 2015)

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Photo Point 13 (November 4, 2015)



Photo Point 14 (November 4, 2015)



Photo Point #1 (February 5, 2014).



Photo Point #2 (February 5, 2014).



Photo Point #3 (February 5, 2014).



Photo Point #4 (February 5, 2014).



Photo Point #5 (February 5, 2014).



Photo Point #6 (February 5, 2014).



Photo Point #7 (February 5, 2014).



Photo Point #8 (February 5, 2014).



Photo Point #9 (February 5, 2014).



Photo Point #10 (February 5, 2014).



Photo Point #1 (March 22, 2014).



Photo Point #2 (March 22, 2014).



Photo Point #3 (March 22, 2014).



Photo Point #4 (March 22, 2014).



Photo Point #5 (March 22, 2014).



Photo Point #6 (March 22, 2014).



Photo Point #7 (March 22, 2014).



Photo Point #8 (March 22, 2014).



Photo Point #9 (March 22, 2014).



Photo Point #10 (March 22, 2014).



Photo Point #1 (December 1, 2014).



Photo Point #2 (December 1, 2014).



Photo Point #3 (December 1, 2014).



Photo Point #4 (December 1, 2014).



Photo Point #5 (December 1, 2014).



Photo Point #6 (December 1, 2014).



Photo Point #7 (December 1, 2014).



Photo Point #8 (December 1, 2014).



Photo Point #9 (December 1, 2014).



Photo Point #10 (December 1, 2014).



Photo Point #11 (December 1, 2014).



Photo Point #12 (December 1, 2014).



Photo Point #14 (December 1, 2014).



Photo Point #14 (December 1, 2014).