

Second Annual Mitigation Monitoring Report for the

Tijuana River Valley Channel Maintenance Mitigation Project



DECEMBER 2015

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

Prepared for:

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DECEMBER 2015

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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, 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, 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 2015 will be documented in a separate report scheduled for spring of 2016. 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). While the City has successfully mitigated for the construction of these channels, 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

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 exotic invasive species.

In addition, 4.31 acres are required to be established outside and adjacent to the maintenance channels as an additional enhancement area 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.



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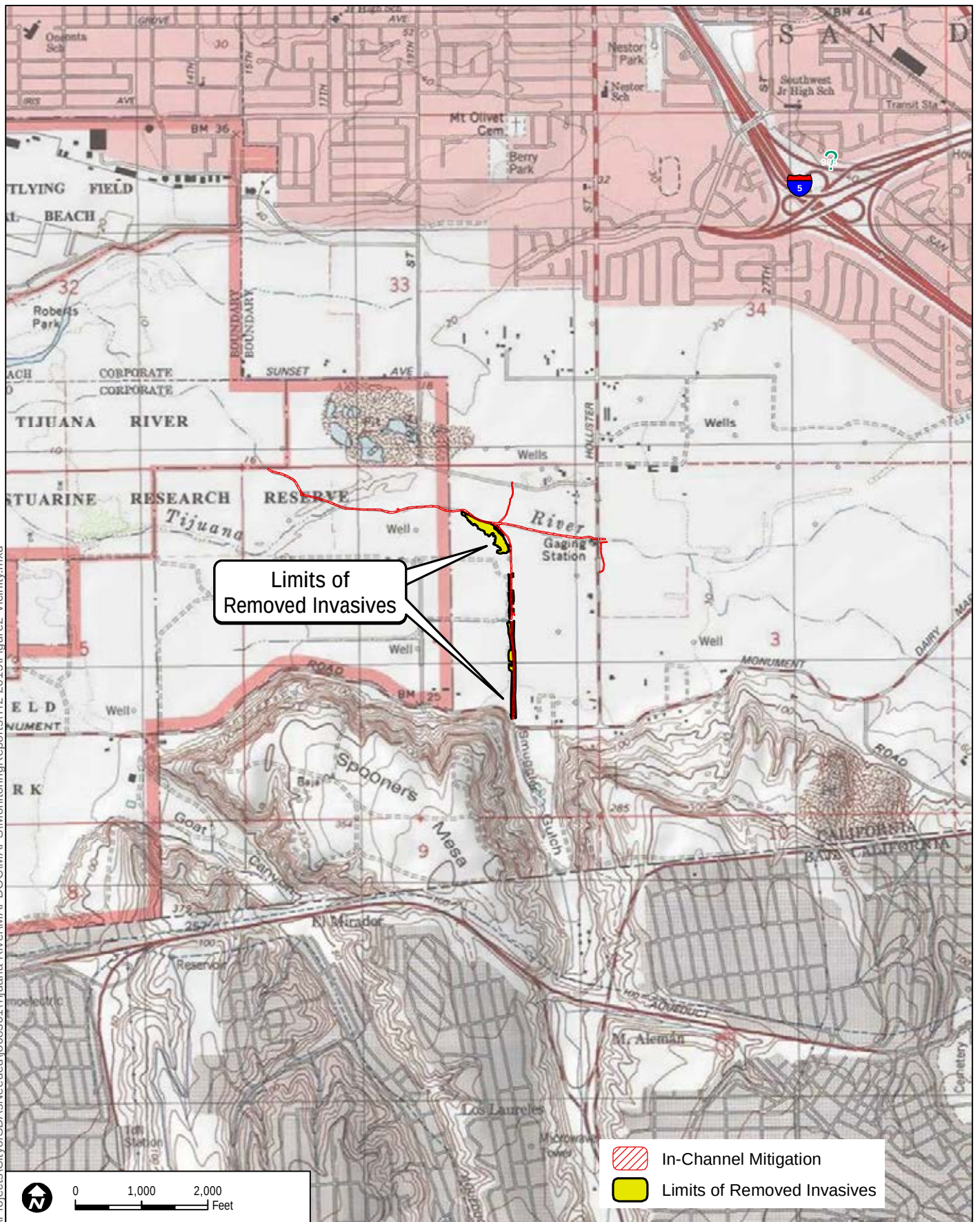
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FIGURE 1
Regional Map

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SOURCE: USGS 7.5-Minute Series Imperial Beach Quadrangle.

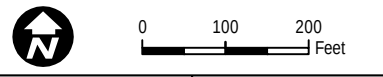
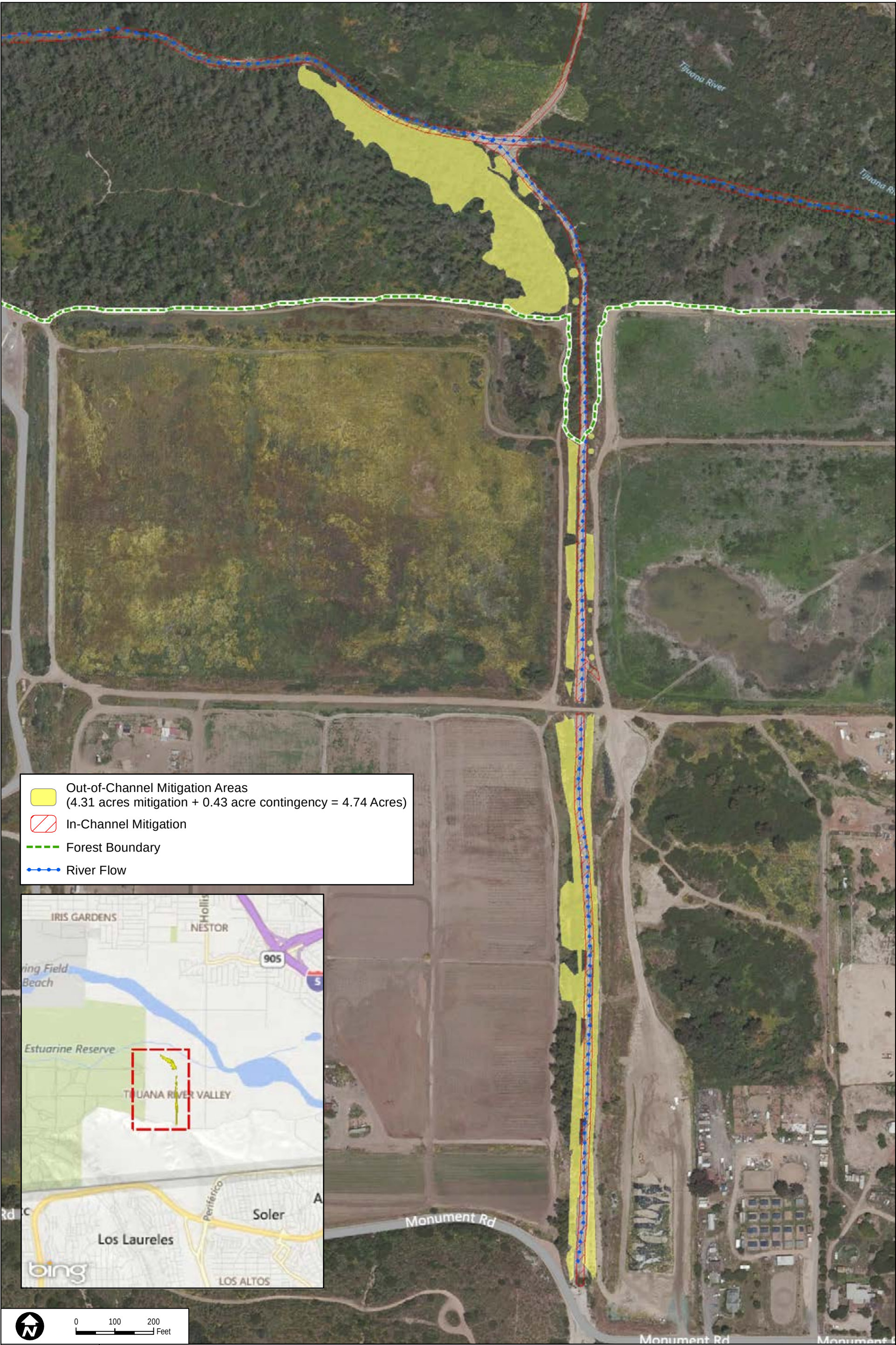
FIGURE 2
Vicinity Map

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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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1.5 Mitigation Schedule

Year	J	F	M	A	M	J	J	A	S	O	N	D
2013									S, EB,QM			QM
2014			SB, QM			QM			EB, QM			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											

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

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

= Work completed to date

1.6 Biological Consultants

Dudek

605 Third Street

Encinitas, California 92024

Contact: Christopher Oesch 760.479.4268 or coesch@dudek.com

Rincon

5135 Avenida Encinas, Suite A

Carlsbad, California 92008

Contact: Jennifer Kendrick 760.918.9444 EXT 205 or jkendrick@rinconconsultants.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

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1.8 Report Preparers

This report was prepared by Christopher Oesch of Dudek and Jennifer Kendrick of Rincon, the project biologists. Publications assistance was provided by Dudek Publications Department, and graphics were prepared by the Dudek GIS department.

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2 ANNUAL MONITORING CONDUCTED DURING YEAR TWO

Mitigation monitoring observations of mitigation establishment and maintenance activities during Year Two (2015) for In-Channel and Out-of-Channel mitigation activities are discussed in Sections 2.1 and 2.2 respectively. During Year Two, Dudek and Rincon 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 Two 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 clapper rail. Results of the survey were provided to ACOE at least 24 hours prior to project implementation. No clapper rail were detected, so no agency reporting was required.
2. In-Channel and Out-of-Channel mitigation maintenance activities conducted during 2015, were conducted prior to March 15 and after September 15, outside of the nesting bird season.
3. Prior to In-Channel and Out-of-Channel mitigation establishment and maintenance activities occurring between January 1 and March 15, nesting bird surveys were performed, per permit requirements.
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 two. 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 two.

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

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2.1 In-Channel Mitigation Activities During Year Two

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

A current dredge activity is ongoing for the 2015-2016 work season at the time of this report. Approximately half of the channel has undergone vegetation removal associated with maintenance activities, including Smuggler's Gulch and about two-thirds of the area between the confluence and Hollister Rd. 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 3 as part of the In-Channel mitigation maintenance program.

2.2 Out-of-Channel Mitigation Activities During Year Two

The Out-of-Channel mitigation site was maintained during year two (2015) from January through March 15 by RECON. Maintenance activities were suspended during the bird breeding season, and were resumed following the end of the bird breeding season on September 15.

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 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.

The initial round of maintenance following the end of the bird nesting season on September 15 for both the In-Channel and Out-of-Channel sites was conducted by RECON prior to the end of

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November 2015. Maintenance follow up treatments are scheduled to occur during the remainder of 2015, continuing into 2016, and will conclude for the summer prior to March 15.

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 two monitoring period were taken on November 4, 2015, 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	11/4/15	1044	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	11/4/15	1050	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	11/4/15	1051	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	11/4/15	1052	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	11/4/15	1053	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	11/4/15	1049	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.

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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
PP-7	11/4/15	1047	117° 5' 19.62" W 32° 33' 05.62" N	N	View of out-of-channel mitigation area looking north at cleared area along access road.	Area which received recent invasive non-native removal and control.
PP-8	11/4/15	1111	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	11/4/15	1115	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	11/4/15	1105	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	11/4/15	1036	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	11/4/15	1036	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	11/4/15	1057	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	11/4/15	1057	117° 5' 18.29" W 32° 32' 53.15" N	NW	View of out-of-channel mitigation area looking northwest from the	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
					berm running along the southern side of the site.	

2.4 Description of Qualitative Data Collection and Monitoring

In addition to direct compliance monitoring of mitigation maintenance activities, biological monitoring during Year Two 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);	--
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 Two mitigation requirement of having 100% of the target invasive species treated at least once within the mitigation areas. In addition to meeting this metric, work conducted during Year Two 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.

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.

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

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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 and their results are presented in the *Tijuana river Valley Channel Maintenance Project Receiving Water Monitoring Report-Final Year 2- 2015 Monitoring Event* (Amec 2015).

Results from annual BMI monitoring indicate a benthic community that is highly tolerant to disturbance. The low diversity and overwhelming dominance of a single feeding type group point to a biological community that may be responding to one or more stressors. A County of San Diego Stormwater Copermittee monitoring program 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 during two separate sampling events, with taxa collected at this site showing a similar community structure to the downstream Pilot Channel location, with tolerant taxa comprising 99 and 95 percent of the community, for those two monitoring events. The tidal influence present at the downstream Pilot Channel location likely influences the types of organisms that can survive there. Total dissolved solids and conductivity (both of which are elevated in tidally influenced areas) are factors used in generating the tolerance values of taxa. The limited community, with few taxa, and high average tolerance score observed at the downstream Pilot Channel location may be indicative of stress due to fluctuations in salinity known to occur at that location, 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. The benthic invertebrate community results obtained during the May 2015 sampling event are consistent with all previous annual monitoring events (i.e. pre-project, pre-dredge, during dredge, and post-dredge) indicating a stable, unchanging community.

Water quality samples were collected at the upstream and downstream Pilot Channel locations only, as they were the only ones with sufficient water present for this monitoring event. The reported water quality results are summarized as follows:

- Nutrient concentrations were consistently higher at the upstream Pilot Channel location.

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- Alkalinity and chloride were higher at the downstream Pilot Channel location, likely due to the tidal influence in this area.
- The chlorophyll-a concentration was higher at the downstream Pilot Channel location, however was consistent with all previous monitoring events.
- The TSS concentration and turbidity at the upstream Pilot Channel location were 2.8 and 2.1 times higher, relative to the downstream location, respectively.
- Dissolved oxygen was depressed at both Pilot Channel locations, however the upstream station was much more so.

Water quality and benthic community data collected thus far appear to suggest that maintenance activities are not having an impact on water quality. However, due to the limited amount of data collected thus far, it is premature to make a definitive determination of representative mean biological metrics or analytical water concentrations at each station, trends in data, or whether meaningful statistical differences exist between the monitoring stations over time. As more data is collected, statistical analyses will become more robust in identifying trends over the course of the project.

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4 MAINTENANCE RECOMMENDATIONS FOR YEAR THREE

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.
2. The Project Biologist Team recommends regular periodic trash removal within the mitigation sites.

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5 REFERENCES

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Dudek. 2013. *Final Wetlands Mitigation and Monitoring Plan (WMMP) for the Tijuana River Valley Channel Maintenance Project*. San Diego, California. February.

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Dudek. 2014. *Final Monitoring Report for the Tijuana River Valley Channel Maintenance Project, 2013-2014*. San Diego, California. May.

Dudek. 2014. *First Annual Mitigation Monitoring Report for the Tijuana River Valley Channel Maintenance Mitigation Project*. San Diego, California. December.

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APPENDIX A

Site Photo Points

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Photopoint Locations



Channel Maintenance Zone



0

100

200

Feet



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)

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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).

