# SWIA - Tijuana River Valley Invasive Plant Control Program – Phase 7

**Grant Progress Report # 4**

**Reporting Period: 10/01/2012 - 12/31/2012**

**Submittal Date: January 10, 2013**

**Grant Agreement No.: 5001975**

**Project Name: Tijuana River Valley Invasive Plant Control Program – Phase 7**

**Contractor Name: Southwest Wetlands Interpretive Association (SWIA)**

I certify under penalty of law that this document and any attachment was prepared by me or under my direction in accordance with the terms and conditions of each Grant Agreement Exhibit. Based on my inquiry of the persons or persons who manage the project, or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. All information submitted in this document and all attachments conform to and is in accordance with the state and federal laws and I so here certify with my signature. I am aware that there are significant penalties for submitting false or misleading information.

**Project Director: Mayda Winter** **Signature:** Mayda C. Winter

## NARRATIVE

The project has been successfully completed. We treated the invasives within an 8 acre site at the east entrance to the Tijuana Slough National Wildlife Refuge. These invasives included arundo (*Arundo donax*), castor bean (*Ricinus communis*), and tamarisk (*Tamarix* spp.). This was the final treatment of the invasives within this site.

The final stage of the restoration will be revegetation with native plants. Due to site conditions, natural recruitment has shown to be extremely difficult. Establishment of native species will assist in the restoration and prevent invasive species from invading the cleared site.

## SUMMARY OF WORK BY TASK

| Task | Summary of work | % of Work Complete |
|---|---|---|
| 1. Control of Invasive Plants | Treatments completed | 100% |
| 2. Maintenance of a Technical Advisory Group (TAG) | The annual TAG meeting was held on September 21, 2012 | 100% |
| 3. Project Monitoring and Reporting | Monitoring completed. Draft Final Report and Final Report completed. | 100% |
| 4. Administration | Completed | 100% |

## DELIVERABLES

| Task | Deliverables | Due Date | Date Submitted |
|---|---|---|---|
| 1. Control of Invasive Plants | none | | |
| 2. Maintenance of a Technical Advisory Group (TAG) | 2.1. List of TAG members<br>2.2. TAG meeting minutes and attendance list | Apr 30, 2012<br>Sep 30, 2012 | Apr 30, 2012<br>Sep 30, 2012 |
| 3. Project Monitoring and Reporting | 3.1. Draft Final Report<br>3.2 Final Report | Nov 30, 2012<br>Dec 31, 2012 | Nov 30, 2012<br>Jan 10, 2013 |
| 4. Administration | 4.1. Submittal of permits<br>4.2. Submittal of right of entry<br>4.3. Progress reports | Apr 30, 2012<br>Apr 30, 2012<br>Quarterly | Apr 30, 2012<br>Apr 30, 2012<br>Apr 30, 2012,<br>Jun 30, 2012, |

| Task | Deliverables | Due Date | Date Submitted |
|---|---|---|---|
| | | | Sep 30, 2012, Jan 10, 2013. |

**List of Deliverables included in this Monthly Progress Report:**

- 3.2. Final Report

# TIJUANA RIVER VALLEY
# INVASIVE PLANT CONTROL PROGRAM
# PHASE 7:
# FINAL REPORT

**Grant Agreement No.:** 5001975
**Project Name:** Tijuana River Valley Invasive Plant Control Program – Phase 7
**Contractor Name**: Southwest Wetlands Interpretive Association (SWIA)
**Project Director:** Mayda Winter
**Project type**: Invasive species control and habitat enhancement
**Funding source:** *TransNet* Environmental Mitigation Program FY 2011
**Funding amount:** $46,800
**Start date:** April 1, 2012
**End date:** December 31, 2012


DECEMBER 31, 2012

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## 1.0 ABSTRACT

1. The project was carried out on an 8 acre site at the east entrance to the Tijuana Slough National Wildlife Refuge, Imperial Beach.

2. The project conducted the 'final' treatments of the invasives within the site. These invasives included stands of arundo (*Arundo donax*), castor bean (*Ricinus communis*), and tamarisk (*Tamarix* spp.).

3. The project was successful.

4. The site now awaits restoration through revegetation with native plants.

## 2.0 BACKGROUND

The Tijuana River Valley is one of the most important biological sites in California (Concur 2000): (1) it includes a county regional park, a state park, and a national wildlife refuge (Figure 1); (2) it contains prime riparian and salt marsh habitats within an urban area; (3) it includes critical habitat for the least Bell's vireo, southwestern willow flycatcher, salt marsh bird's beak, wandering skipper butterfly, light-footed clapper rail,

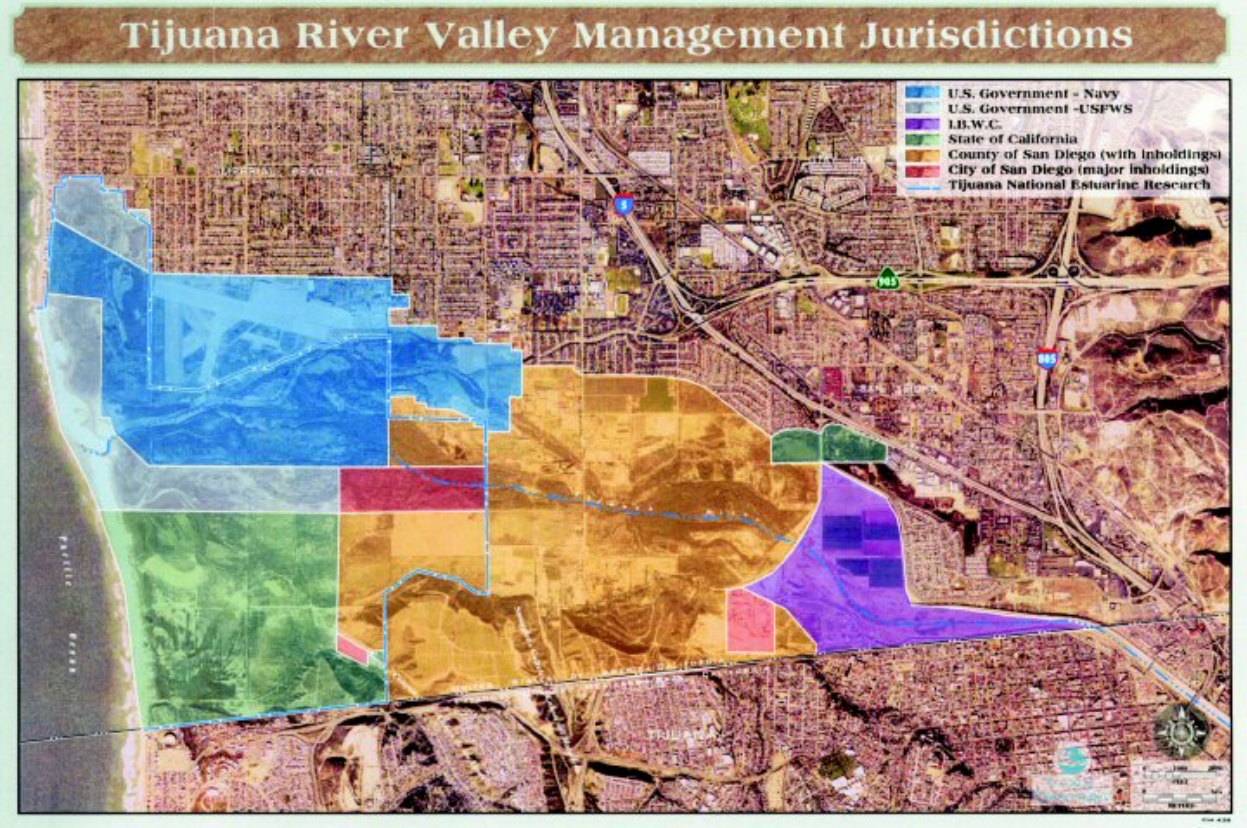



Figure 1. Tijuana River Valley Management Jurisdictions.

and Belding's savannah sparrow; (4) it is one of the sites designated as a Biological Habitat of Special Significance in the San Diego Basin Plan; (5) it is on the California Coastal Commission's list of California's Critical Coastal Areas; and (6) the estuary is federally designated a National Estuarine Research Reserve by NOAA and is internationally recognized as a Wetland of International Importance by the Ramsar Convention.

But the valley is being degraded by non-native invasive plants, particularly giant reed or Arundo (*Arundo donax*), castor bean (*Ricinus communis*) and tamarisk (*Tamarix* spp.; SWIA 2002). These plants alter vegetation structure, displace native plant species, and degrade habitats for native animal species (Bossard et al., 2000). They also increase fire frequency, alter soil chemistry, reduce surface water availability, and alter rates of sedimentation and erosion.

Tijuana River Valley Invasive Plant Control Program was started by SWIA in 2002. The purpose of the program was to control the spread of the worst invasive plants in the entire 3,600 acre valley. The ambitious program was expected to require several phases and to extend over several years. So far the program has been continuously funded since 2002, has gone through seven phases and has already treated invasives within more than 1,600 acres with funding of over $2.6m. Treatments have been conducted within the county regional park, the state park, the national wildlife refuge, and the national estuarine research reserve. The program has enthusiastic support from the various public landowners in the valley and from the resource agencies.

## 3.0 PROJECT GOALS

The project was undertaken to enhance prime riparian/upland habitats within the Tijuana River Valley through the treatment of invasive, non-native plants. The project was on public lands within the Tijuana Slough National Wildlife Refuge. The overall goals of the project were to improve these valuable sites to control the spread of invasive plants and thereby enhance native habitats.

The main tasks of the project were to:

- **Control Invasive Plants**
  The control involved the 'final' treatment of the invasive plants within 8 acres. This was the most important task and required the most time, effort and expense.

- **Maintain a Technical Advisory Group (TAG)**
  The TAG was used to guide and advise the entire project.

- **Conduct Project Monitoring**
  Monitoring of the invasives treatment sites provided valuable information on the success and effectiveness of the project.

## 4.0 DESCRIPTION OF SITE

The project was conducted on an 8 acre site at the east entrance to the Tijuana Slough National Wildlife Refuge (Figure 2; Table 1). The site was an old agricultural field and is relatively dry and open. The plant species in the area included many invasives associated with fallow farmland – castor bean, arundo and myoporum (*Myoporum laetum)* – and some scattered riparian scrub, dominated by mule-fat (*Baccharis salicifolia*). Least Bell's vireos are known to breed in the extensive riparian vegetation to the north and south of the site. Most of the site had already been treated twice, in 2007 and 2008. These treatments had been successful, but many castor bean and a few arundo had regrown since then. The goal of the project was to conduct the 'final' treatment of the site in preparation for a later restoration effort.

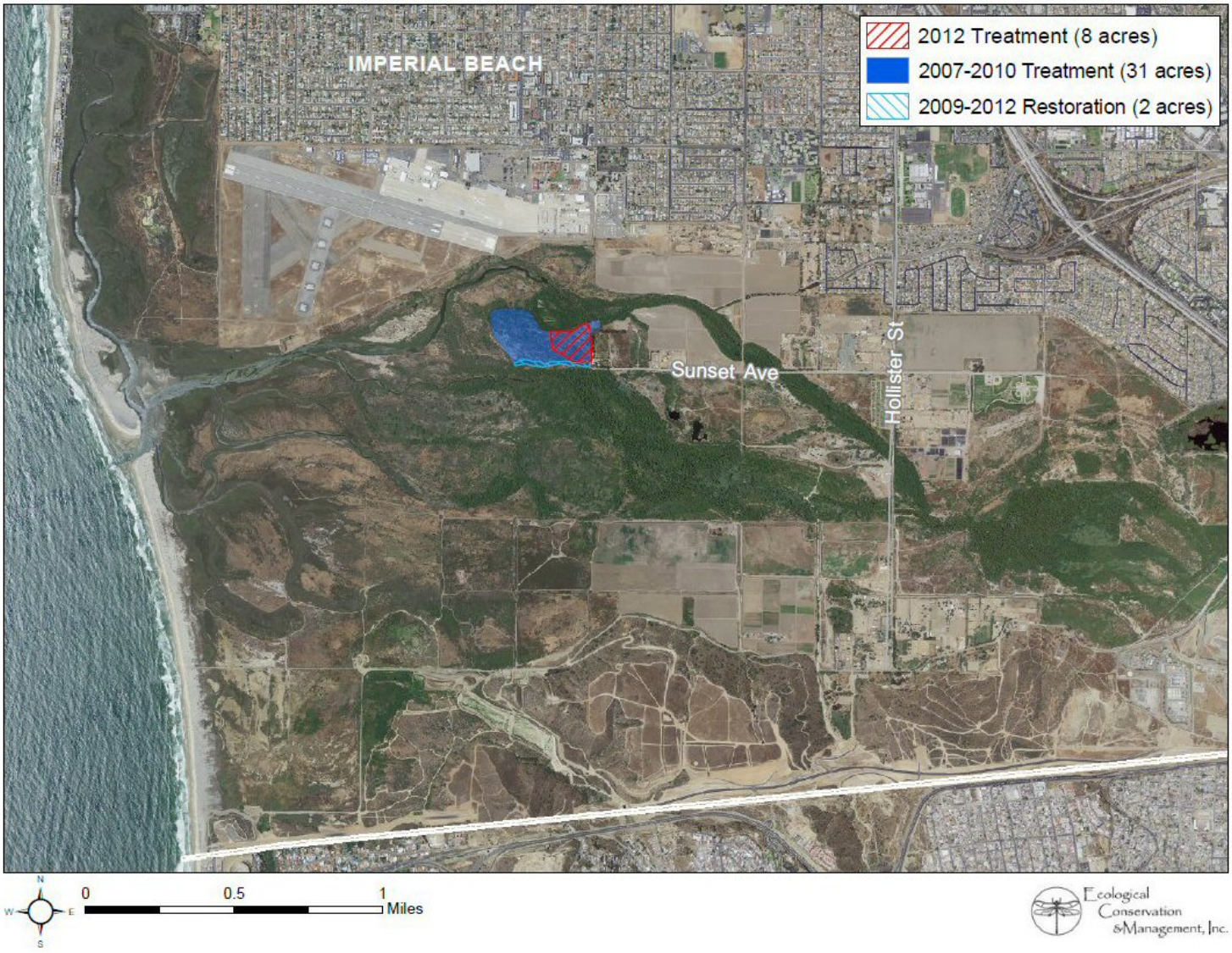



Figure 2. Map showing the project site (hatched in red; 8 acres).

Table 1. Co-ordinates for points along the boundary of the project site.

| Point | latitude | longitude |
|---|---|---|
| A | 32° 33.511' N | 117° 6.091' W |
| B | 32° 33.630' N | 117° 6.092' W |
| C | 32° 33.602' N | 117° 6.184' W |
| D | 32° 33.602' N | 117° 6.247' W |
| E | 32° 33.541' N | 117° 6.248' W |
| F | 32° 33.514' N | 117° 6.199' W |

# 5.0 METHODS

## 5.1 Control of Invasive Species

SWIA hired Ecological Conservation & Management, Inc. (ECM) to conduct the invasives treatment. They had already treated the site twice, in 2007 and 2008. These treatments had been successful, but many castor bean and a few arundo had regrown since then.

ECM treated the invasive plants and mulched the extensive dead brush to prepare the site for a later restoration effort. Treatments were conducted in the following manner on the targeted invasive species:
**Tamarisk** – trunks cut with hand-tools, stumps sprayed with Garlon 4 Ultra (triclopyr);
**Arundo** – foliar spray with NuFarm Credit Extra (glyphosate) and left standing;
***Pepper tree*** – cut-stump sprayed with NuFarm Credit Extra (glyphosate);
***Myoporum*** – cut-stump sprayed with NuFarm Credit Extra (glyphosate); and
**Castor bean** – foliar spray with NuFarm Credit Extra (glyphosate).

## 5.2 Maintenance of Technical Advisory Group (TAG)

The TAG was maintained throughout the course of this project. The TAG included members from the resource agencies, Tijuana River Valley land owning agencies, and experts in the field of invasive plant control. The current members are listed in Table 2. The TAG attended one annual meeting during the project which was held on September 8, 2009. The meeting was well attended and involved a presentation of past results and a discussion of the planned TransNet work. The TAG's ideas and opinions were incorporated into the work. The meeting was documented; the agenda, meeting minutes and attendance list were provided to the Grant Manager.

Table 2. Technical Advisory Group (TAG) – List of Members

| | |
|---|---|
| Don Brubaker | U.S. Fish and Wildlife Service |
| Brian Collins | U.S. Fish and Wildlife Service |
| Patrick Gower | U.S. Fish and Wildlife Service |
| Carolyn Lieberman | U.S. Fish and Wildlife Service |
| Slader Buck | U.S. Fish and Wildlife Service |
| Kelly Fisher | California Fish and Game |
| Christine Fritz | California Fish and Game |
| Chris Peregrin | California State Parks |

| | |
|---|---|
| Clay Phillips | California State Parks |
| Kim O'Connor | U.S. Navy |
| Larry Duke | San Diego County Parks and Recreation |
| Yidelwo Asbu | San Diego County Parks and Recreation |
| Jessica Norton | San Diego County Parks and Recreation |
| Megan Hamilton | San Diego County Parks and Recreation |
| Lisa Wood | City of San Diego |
| Wade Caffrey | City of San Diego |
| Jim Nakagawa | City of Imperial Beach |
| Bill Winans | San Diego County Dept of Agriculture |
| Lee McEachern | California Coastal Commission |
| Karen Bane | California State Coastal Conservancy |
| Megan Johnson | California State Coastal Conservancy |
| Steve Smullen | U.S. International Boundary and Water Commission |
| Joshua Gough | U.S. Border Patrol |
| Barbara Kus | U.S. Geological Survey |
| Chris Nordby | Nordby Biological Consulting |
| Mike McCoy | Southwest Wetlands Interpretive Association |
| Jeff Crooks | Tijuana River National Estuarine Research Reserve |

### 5.3 Project Monitoring and Reporting

SWIA hired Dr. John Boland to conduct the independent monitoring of the restoration project. His monitoring included before-and-after vegetation surveys at three fixed sites (using the line-intercept method along 30 m-long transects), before-and-after examination of invasive plants scattered throughout the site measuring herbicide effectiveness, and before-and-after photos taken at five fixed Photo Points.

## 6.0 RESULTS AND DISCUSSION

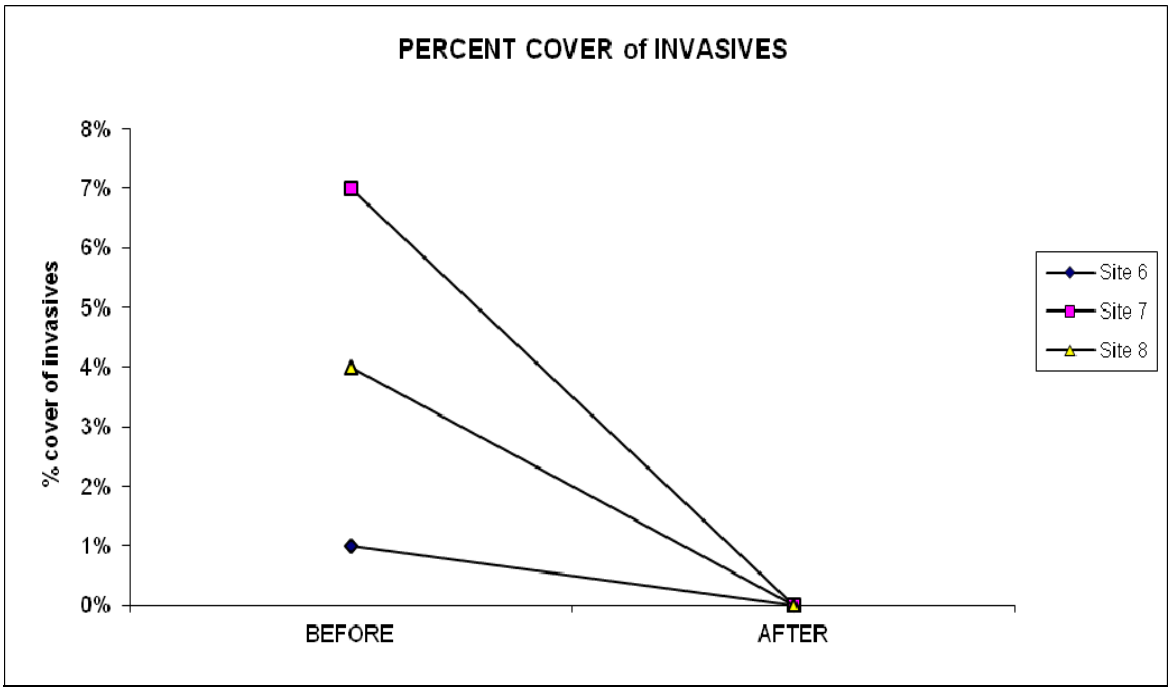
### 6.1 Control of Invasive Species

The treatment of invasives was successful. The few large arundo, many large castor bean and other invasive plants were treated. Individual invasive plants that were followed during the course of the project were all successfully treated and were dead at the end of the project (Table 3). The aerial cover of invasives declined throughout the restoration site. The decline is illustrated by the decline in invasives along the three 30 m transects (Figure 3a).

Table 3. Survivorship of treated plants.

| Species | number alive | number dead | total | % alive |
|---|---|---|---|---|
| ARUNDO (clumps) | 0 | 26 | 26 | 0% |
| CASTOR BEAN | 0 | 60 | 60 | 0% |
| TAMARISK | 0 | 4 | 4 | 0% |

In addition, there has been steady growth of the existing native plants in the site. This growth is shown in the modest increase in natives along the three 30 m transects (Figure 3b). There has been no obvious recruitment of new native seedlings into the site. Recruitment of riparian plants and mule fat requires flooding and the site has not been flooded since 1980.



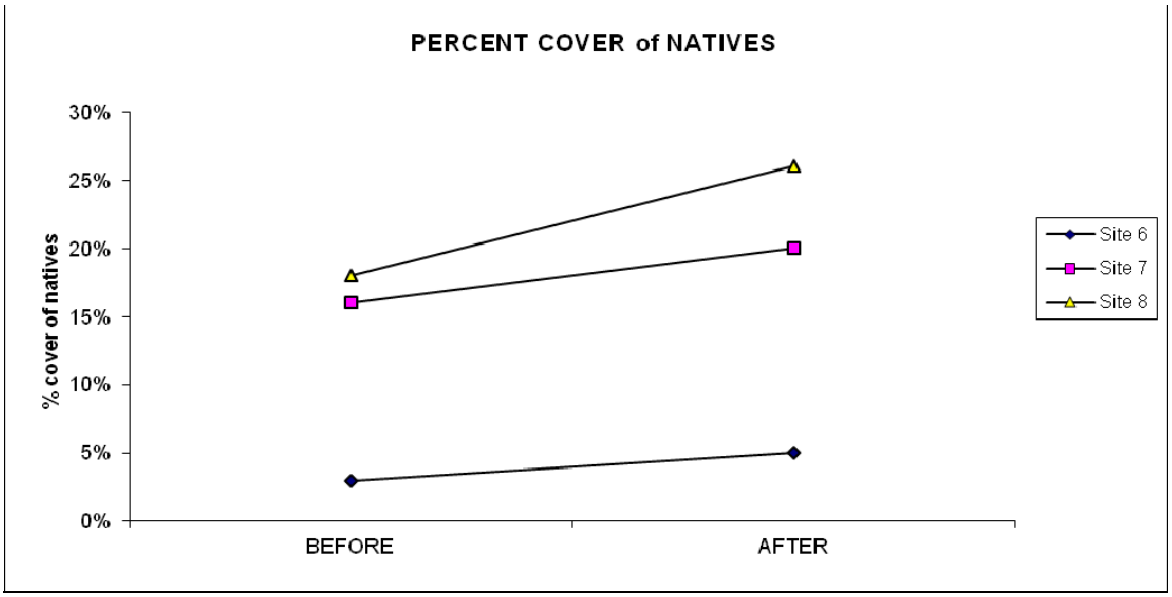




Figure 3. Changes in the percent cover of invasives and natives along three transects.

### 6.2 Maintenance of TAG

SWIA held the annual TAG meeting on September 21, 2012. TAG meeting minutes and attendance list was submitted with the September 30, 2012 Progress Report.

### 6.3 Photo points

Photos taken at Photo Points show how the site has changed over the course of the project. Two sets are shown here (Figures 4 - 5). The photos show that during this project the invasive plants have been successfully treated. The site is now suitable for revegetation.

Figure 4. Before- and after-treatment photos taken in 2010 and 2012 at Site 10. Notice that the arundo and castor bean alive in 2010 were all dead in 2012.


Figure 5. Before- and after-treatment photos taken in 2010 and 2012 at Site 9. Notice that the arundo patches alive in 2010 were dead in 2012.

## 7.0 CONCLUSIONS

The monitoring shows that the project was very successful:

- Treatments were thorough and effective;
- Invasive plant cover was substantially reduced providing space for the expansion of native plants; and
- Sites were dramatically changed, showing new views of resources previously hidden by invasives.

## 8.0 LITERATURE CITED


Bossard, C., J. Randall and M. Hoshovsky (eds.) 2000. *Invasive Plants of California's Wildlands.* University of California Press, Berkeley, CA.

CONCUR, Inc. 2000. *Comprehensive Management Plan for Tijuana River National Estuarine Research Reserve and Tijuana Slough National Wildlife Refuge.* Prepared for California Dept. of Parks and Recreation, US Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration.

SWIA. 2002. *Tijuana River Valley Invasive Plant Control Program.* Plan used to support CEQA and NEPA documents. Prepared for SWIA by Tierra Environmental Services. 26 pages plus 41 maps in Appendix.