University of California Santa Barbara

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CHEADLE CENTER FOR BIODIVERSITY & ECOLOGICAL RESTORATION

Annual Report

Arundo Control and Restoration at the TNC Taylor Property, Santa Paula, CA

as part of the

Research and Restoration through the Santa Clara River Reserve: A Proposal to Develop a University of California Research and Education Station

Submitted to the Santa Clara River Trustee Council

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Figure 1. View of the TNC Taylor property after mastication of arundo in November 2012. This area had nearly 100% arundo cover before aboveground biomass removal.

Introduction

The Santa Clara River Trustee Council (TC) approved funding for an arundo (*Arundo donax*) removal and habitat restoration project at The Nature Conservancy's (TNC) Taylor property in Santa Paula. The project is being conducted by UC Santa Barbara (UCSB) as part of the second year of the TC funded project titled *Research and Restoration through the Santa Clara River Reserve: A proposal to develop a University of California Research and Education Station*. The current project consists of habitat restoration in a 10-acre area at the southeast corner of the property. Efforts are focused on removal of non-native, invasive plants, including arundo, and passive and active revegetation where appropriate to reestablish essential habitat for sensitive species and riparian dependent organisms (Figure 1). The project period for the current funding is 1 January 2012 to 31 January 2012.

Project Planning and Permitting

Aerial photo analysis and vegetation surveys were conducted by UCSB staff in Spring 2012 to support development of the restoration plan for the project. UCSB staff met with Trustee Council members (K. Wilson and D. Blankenship) at the restoration site on 6 March 2012 for a

walk-through of the site, and to discuss restoration plans and objectives. TC funding was finalized by USFWS and received by UCSB in April 2012. A draft restoration plan was submitted to the Trustee Council and TNC on 4 May 2012, and a revised version was submitted on 19 June 2012. TNC submitted the revised restoration plan to California Fish and Game (CDFG) for approval. UCSB, TNC, and TC council members met with Jeff Humble of CDFG on 16 August 2012 to discuss the work plan and permitting. CDFG approved the plan on 29 August 2012. UCSB also applied for a Ventura County Watershed Protection District Encroachment Permit for work occurring in the floodway, however, a waiver was granted because the County provides an exemption when work entails only improvement of land. United States Fish and Wildlife Service (USFWS) provided a biological opinion specific to the restoration project site. UCSB and TNC entered into a license agreement formalizing the terms and conditions of UCSB's use of the property during the project period. The approval process required five months for completion (June through October), and was managed by UCSB Office of Budget and Planning and University of California Legal Counsel (Oakland, CA). Regulatory permits and agreements for the project are listed in Table 1.

Table 1. Regulatory permits, license agreement, and waiver associated with the 10 acre Taylor restoration project.

Regulatory Permit	Permit Number	Approval Date
CDFG Streambed Alteration Agreement	1600-2010-0196-R5	March 4, 2011
CDFG Restoration Plan Approval	1600-2010-0196-R5	August 29, 2012
USFWS Biological Opinion	8-8-12-FW-39	September 19, 2012
Ventura Watershed Protection District Encroachment Permit Waiver	-	October 8, 2012
UCSB/TNC License Agreement	-	November 7, 2012

Project Implementation

Implementation in the current year is focused on arundo control through removal of aboveground biomass and herbicide application to cut stumps and resprouts. The initial control plan was to spray mature arundo stands in September and October and wait to mow stands in late January to allow for full herbicide activity. However, the permitting and license agreement processes were not finalized until early November, which delayed implementation. At that point, stands were assessed for signs of winter dormancy and it was determined that plants were well into their resorption phase and foliar application of herbicide on mature stands would not be effective. The alternative method of mowing first and herbicide treatment of resprouts was employed because of the timing of implementation and the requirement to complete herbicide treatment and aboveground biomass removal during the current funding cycle.

UCSB staff prepared the site in the summer and fall by marking the boundaries of the work area and conducting biological surveys to determine presence of sensitive species. D. Orr surveyed the project area and surrounding areas for least Bell's vireo, southwest willow

flycatcher, and other sensitive bird species on 18 June 2012. A. Lambert and student interns surveyed the site for sensitive mammal, reptile, and amphibian species on several occasions throughout the summer. UCSB staff and volunteers began removing arundo from around native trees in November after the UCSB-TNC license agreement was finalized. A. Lambert conducted a pre-construction survey of the work area on 20 November 2012 before large-scale mastication of arundo began. Burns Equipment Services began mowing on 23 November 2012 using a tractor mounted forestry masticator and finished mowing within an eight acre monoculture area on 7 December 2012 (Figure 2).

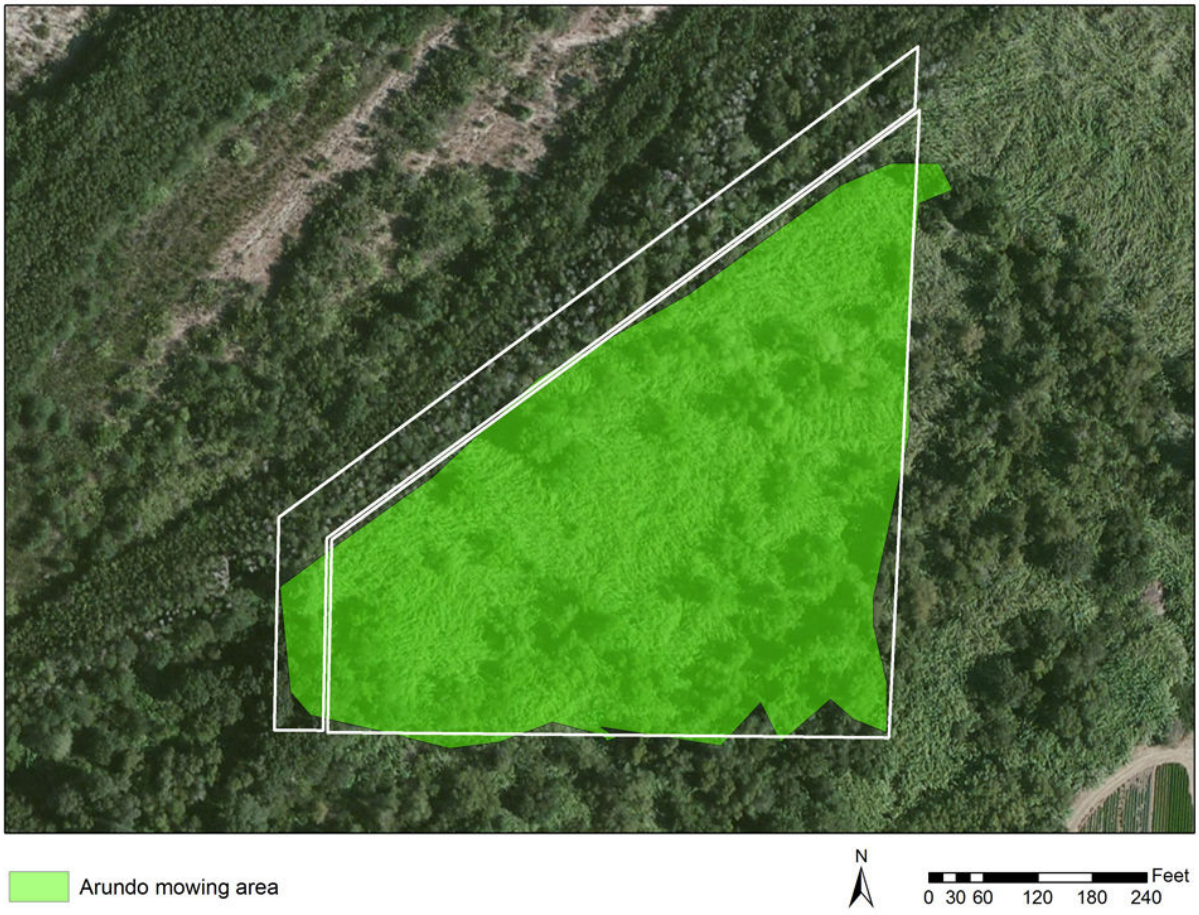

Figure 2. Area at project site where tractor with forestry masticator was used to remove monocultures of arundo. Hand removal was used to clear arundo from around native trees in this area.

A. Lambert acted as the biological monitor for all work. Numerous volunteers assisted with project implementation (Table 2). Another volunteer event will be held on 19 January 2013 with volunteers from the Ventura City Corps and UCSB. Photos of the project site are provided in Appendix A.

Table 2. Volunteer events during the current project period.

Date	Number of volunteers	Total volunteer hours	Organization
05/04/12	2	8	UCSB
06/18/12	1	3	UCSB
06/29/12	3	12	UCSB
08/15/12	1	5	UCSB
11/03/12	6	18	FSCR
11/15/12	4	16	UCSB
11/21/12	1	7	High School
12/08/12	6	18	FSCR
12/08/12	1	3	UCSB
12/11/12	1	4	UCSB
01/19/12	10	40	Ventura City Corps
02/1/12 - 01/31/13	6	120	UCSB
Total	42	254	

Herbicide treatment will continue through January 2013 when arundo resprouts are between two and three feet tall. Herbicides will be applied around native vegetation using backpack sprayers and a tractor mounted pressure sprayer will be used in areas where only arundo occurs. Additional hand removal and cut stump herbicide treatments will occur throughout the project area during January. Arundo litter will be removed from test plots located throughout the project area to assess differences in passive recruitment of native species between areas covered with arundo litter and bare soil.

Future Actions and Recommendations

After initial arundo removal is complete, maintenance will be required to control arundo resprouts and other non-native, invasive plant species within the restoration area and to facilitate the establishment of native vegetation. We expect substantial resprouting of arundo because of the density of rhizomes in the removal area. Multiple retreatments for a period of 3-5 years is often necessary to completely eliminate arundo. Removal methods discussed in the restoration plan will be used for maintenance activities in the upcoming months.

We will continue to assess native plant recruitment in areas where arundo biomass has been left in place after mastication and in areas where biomass has been removed to determine if active revegetation or further removal of masticated biomass is necessary. We strongly

encourage limited active planting of cuttings in the higher terrace areas where flood flows are unlikely to deposit propagules during most rainy seasons. Planting of native trees in these areas will speed recovery of the riparian forest and increase canopy cover, reducing the probability of reinvasion of arundo and other weeds.

In the second year of the restoration project, we propose to continue arundo removal on the Taylor property to the west of the current project area. These new areas consist of dense riparian forest with low levels of arundo in the understory (approximately 5-25% cover). Removal of arundo in these areas will reduce fire risk and further enhance this high quality wildlife habitat, and connect the restored portion of the Taylor property with Hedrick Ranch Natural Area. Arundo removal in these areas would require hand clearing (cut and paint technique) and removal of biomass from the active river channel. Additional work outside the current project area will require approval from CDFG and it will be most cost effective to request approval for restoration work that could occur in the full 40 acre property.

Monitoring of wildlife in the project area will continue during the next project year to document movement of organisms into the restoration areas and effectiveness of restoration activities. Monitoring will include quantitative assessment of plant and bird populations, but should also include assessment of other invertebrate and vertebrate groups to determine if food webs and trophic structure are being restored.

Appendix A. Photo documentation of the restoration site.

Arundo along southern property border before removal. Photo was taken at southwest corner facing north.

Tractor with forestry masticator used for mowing arundo.

Beginning of arundo mowing on 23 November 2012.

View of southwest corner of property after arundo mowing. Facing north.

View of southwest corner of property after arundo mowing. Facing west.

Mature red willow (*Salix laevigata*) trees after arundo is cleared from the understory. Facing west.

Arundo stand in southwestern portion of property before removal. Facing west.

Area in previous photo after arundo removal. Facing northwest.

Red willow (*Salix laevigata*) and cottonwood (*Populus fremontii*) grove after arundo was removed from the understory at southwest corner of work area. Facing west.

Edge of riparian terrace near artesian springs along western boundary of project area. Facing southwest.

Arundo removal occurring around mature cottonwood (*Populus fremontii*). Facing north.

Area in previous photo after arundo removal. Facing north.