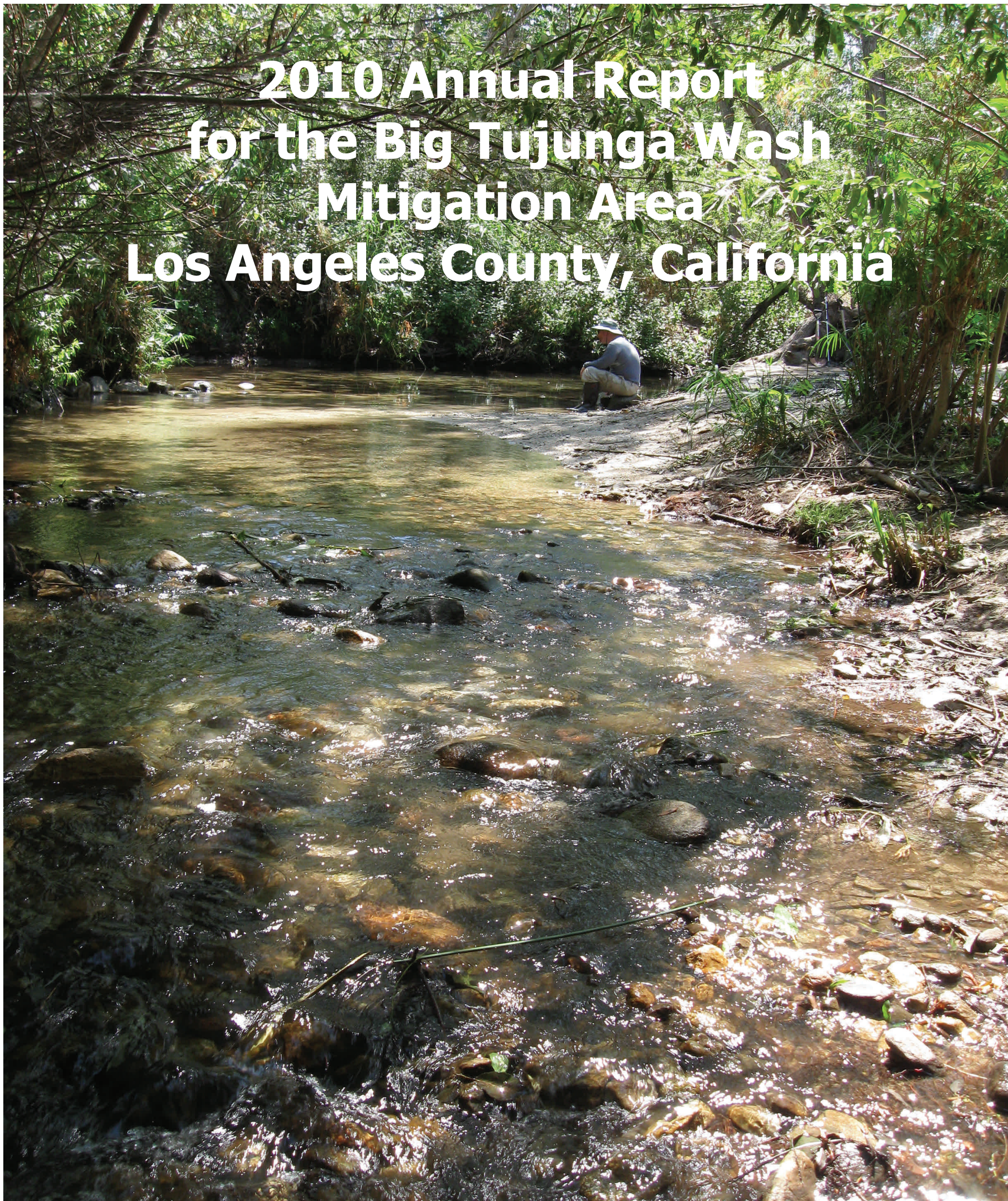

Prepared for:

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Prepared by:

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2010 Annual Report for the
Big Tujunga Wash Mitigation Area,
Los Angeles County, California

Prepared for:

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CONTENTS | **2010 Annual Report for the Big Tujunga Wash Mitigation Area**

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

Guide to Compliance with the Terms and Conditions in the California Department of Fish and Game Streambed Alteration Agreement (SAA) #1600-2008-0253-R5 for the Big Tujunga Wash Mitigation Area, dated January 29, 2009

A draft Streambed Alteration Agreement (SAA) (#1600-2008-0253-R5) was submitted to the Los Angeles County Department of Public Works (LACDPW) from California Department of Fish and Game (CDFG) on January 29, 2009 (Appendix A). The following key provides a quick reference as to how the conditions were addressed and where the explanations of the activities associated with the conditions are located in the document.

Resource Protection

Condition 1: Vegetation removal activities did occur between the dates of March 1 and September 1, however, breeding bird pre-construction surveys were conducted prior to all exotic vegetation removal activities occurring in 2010. In addition, a qualified biological monitor was present during all exotic vegetation removal activities to ensure no impacts to nesting birds occurred (see Section 4.0). As a result, no impacts occurred to breeding/nesting birds within the Big Tujunga Wash Mitigation Area (Mitigation Area).

Condition 2: Pre-construction nesting raptor surveys were conducted prior to all vegetation removal activities occurring within the Mitigation Area in 2010. No active raptor nests were identified within the active work areas, therefore no impacts occurred to nesting raptors and no fencing of nests was required (see Section 4.0).

Condition 3: No active bird nest was destroyed or disturbed during the 2010 breeding season, in accordance with the Migratory Bird Treaty Act (MBTA) of 1918. Appropriate measures, such as pre-construction surveys and biological monitoring, were taken to prevent impacts to breeding/nesting birds protected under the MBTA.

Condition 4: Pre-construction surveys for sensitive species potentially occurring in the Mitigation Area were conducted prior to exotic vegetation removal activities (see Section 4.0).

Condition 5: California Department of Fish and Game (CDFG) has been notified of the presence of all listed and sensitive species occurring within the Mitigation Area. No other listed species were observed in the Mitigation Area.

Condition 6: A qualified biological monitor was on site during all clearing, enhancement, and restoration activities (see Section 4.0). The biological monitor conducted the appropriate pre-construction surveys on site prior to activities occurring in an area.

Condition 7: All native vertebrate species encountered during clearing, enhancement, and restoration activities were safely relocated, if necessary. No native wildlife vertebrate species perished as a result of the activities occurring in the Mitigation Area. No wildlife exclusionary devices were necessary, therefore none were constructed. No work was conducted on site without the presence of a biological monitor (Section 4.0).

Condition 8: A Contractor Education Brochure was created in both English and Spanish and was distributed to all contractors and subcontractors working on the site. This brochure also acted as an informational brochure that was handed out to recreational user groups as part of the new public outreach program (see Section 7.5). In addition, the biological monitor conducted tailgate worker education sessions each morning prior the exotic vegetation activities occurring on the site. A copy of the Contractor Education Brochure is included as Appendix B.

Condition 9: A copy of the 2010 annual report will be submitted to CDFG.

Condition 10: CDFG did not determine that any threatened or endangered species will be affected by the implementation of the Final Master Mitigation Plan (FMMP); therefore, a State Take Permit was not applied for.

Condition 11: Wildlife-proof trash receptacles have not yet been installed in the Mitigation Area.

Condition 12: Hunting was not permitted nor authorized within the Mitigation Area in 2010.

<u>Work Areas and Vegetation Removal</u>

Condition 13: Disturbance and removal of non-native vegetation did not exceed the limits approved by CDFG, as stated in the FMMP (see Section 4.0).

Condition 14: All personnel who conducted activities within the boundaries of the site were provided maps and no native vegetation was removed within or beyond the boundaries of the site. The work areas were clearly delineated and unnecessary impacts did not occur to ephemeral streams and riparian habitats. Activities conducted at the site did not result in any permanent adverse impacts to Haines Canyon Creek and/or Big Tujunga Wash.

Condition 15: No vegetation with a diameter at breast height (dbh) larger than 3 inches was removed, except as stated in the FMMP and approved by CDFG.

Condition 16: No native vegetation was removed from the channel, bed, or banks of the stream except as provided for in the SAA.

<u>Equipment and Access</u>

Condition 17: No vehicles or equipment were operated or driven in water covered portions of the stream. However, illicit off-road vehicle use was observed in areas of the Mitigation Area and the County Sheriff's Department was notified (see Section 7.2).

Condition 18: Access to the site only occurred via existing roads and established trails for all site maintenance and monitoring activities.

Fill and Spoil

Condition 19: No fill was placed in any area of the Mitigation Area.

Structures

Condition 20: No materials were placed in any seasonally dry portions of the stream.

Condition 21: No installation of erosion control structures occurred during 2010, nor was there a need for such structures.

Condition 22: No bridges, culverts, or other structures were constructed as part of the activities associated with the FMMP.

Condition 23: No temporary or permanent dam, structures, or flow restrictions were constructed as part of the activities associated with the FMMP. However, recreational users of the site periodically built rock dams in the creek to create pools. The biologists carefully removed them to restore the natural flow in the creek (see Section 7.5)

Pollution, Sedimentation, and Litter

Condition 24: All litter and pollution laws were complied with by the contractors, subcontractors, and employees of LACDPW. Trash pickup was conducted regularly by the site users, the landscape contractor, and by volunteers during an organized Trails Maintenance Day (Section 7.3).

Condition 25: No equipment maintenance was conducted in the Mitigation Area.

Condition 26: No spills occurred in the Mitigation Area.

Condition 27: No silty/turbid water from dewatering or other activities occurred as a result of the activities conducted in the Mitigation Area.

Condition 28: No equipment washing or other activities were conducted that would have resulted in the production of water containing mud, silt, or other pollutants.

Condition 29: No alteration of the stream's low flow channel, bed, or banks were altered as a result of the implementation of the activities in the Mitigation Area.

Condition 30: As stated under Condition 24, the only movement of rocks within the beds or banks of the stream occurred during the removal of rock dams created by the recreational users. The removal of the rock dams was conducted by biologists who are familiar with the sensitive fishes in the stream (see Section 7.5). The activities were done with as little silt generation as possible and the rocks were placed back into the stream in a natural arrangement. Removal of the rock dams is critical for the federally-listed (threatened) and California Species of Special Concern (SSC) Santa Ana sucker (*Catostomus santaanae*) that occurs in Haines Canyon Creek because it eliminates habitat that is better suited for exotic wildlife (bullfrogs [*Lithobates catesbeianus*], largemouth bass [*Micropterus salmoides*], and etc.) that pose a threat to this species.

Permitting and Safeguards

Condition 31: The United States Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) were consulted with very early in the development of the implementation plan for the Mitigation Area (referred to as the Big Tujunga Conservation Area [BTCA] in the SAA). The Corps stated that they didn't need to issue a permit because there wasn't going to be any fill within their jurisdiction. The continued implementation of the FMMP and the Long-term Maintenance and Monitoring Plan (LTMMP) for the BTCA is not expected to have any impact on Corps' jurisdiction nor will it have any water quality impacts. No additional permits or certifications are required from the RWQCB or the USACE.

Condition 32: LACDPW submitted the Conservation Easement (CE) on December 23, 2010 (see Section 10.0). An extension for the CE submittal was not necessary.

Administrative-Miscellaneous

Condition 33: No amendments to the SAA were submitted to the CDFG during the 2010 period. CDFG did not identify any breaches of the SAA during the 2010 period.

Condition 34: No terms or conditions of the SAA were violated during the 2010 period.

Condition 35: Copies of the SAA were provided to all of the biologists, subcontractors, and workers who conducted activities in the Mitigation Area.

Condition 36: A pre-enhancement restoration meeting/briefing was held on November 11, 2009, prior to any exotic vegetation removal activities occurring in the Mitigation Area. An additional meeting was not necessary during 2010.

Condition 37: CDFG was notified within five days prior to the start of exotic vegetation removal activities occurring within the Mitigation Area (see Section 4.0).

Conditions 38 and 39: CDFG did not request any site visits during the 2010 reporting period.

Conditions 40 through 42: CDFG did not issue a suspension or cancellation of the SAA in 2010.

1.0 INTRODUCTION

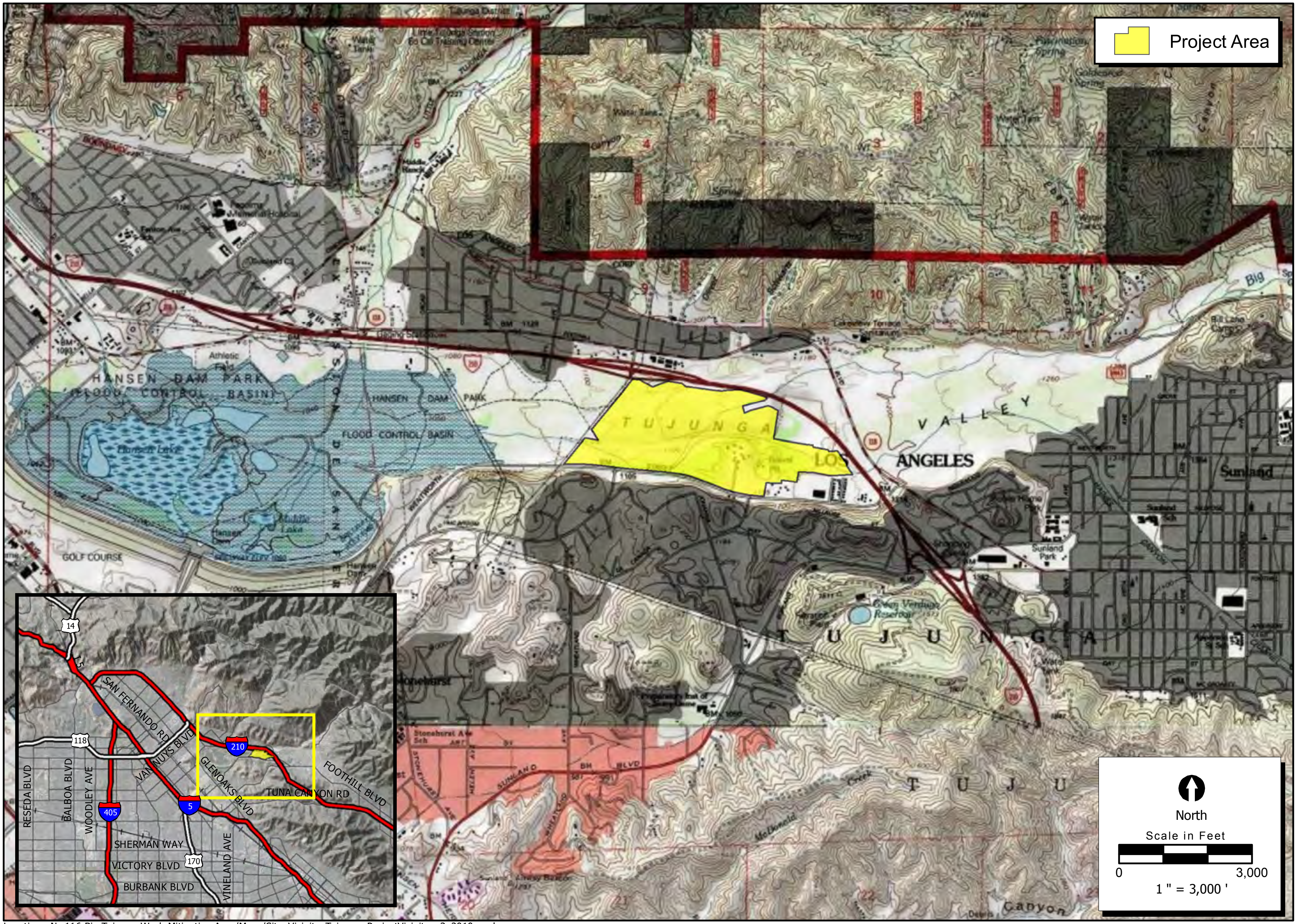
1.1 Purpose

The purpose of this report is to provide a summary of the management activities conducted at the Big Tujunga Wash Mitigation Area (Mitigation Area) from January to December 2010. These activities were conducted in accordance with the Final Master Mitigation Plan (FMMP) for the Mitigation Area. The FMMP was originally created in 2000 to serve as a five-year guide for implementation of various enhancement programs and to fulfill the California Department of Fish and Game (CDFG) requirement for the preparation of a management plan for the site. The FMMP encompassed strategies to enhance and protect existing habitat for wildlife and to create additional natural areas that could be utilized by native wildlife and numerous user (recreational) groups. In addition, the FMMP included programs for the removal of exotic fishes and amphibians, bullfrogs (*Lithobates catesbeianus*), and red swamp crayfish (*Procambarus clarkii*) from the Tujunga Ponds, trapping to control brown-headed cowbirds (*Molothrus ater*), development of a formal trails system, and development of public awareness and education program at the site. Implementation of the FMMP began in August 2000 and was completed five years later. An additional year of limited maintenance and surveys was added between late summer 2006 and late summer 2007. ECORP Consulting, Inc. (ECORP) was contracted by the Los Angeles County Department of Public Works (LACDPW) in July 2007 to continue FMMP activities as part of implementation of the Long-term Maintenance and Monitoring Plan (LTMMP). This report summarizes all activities conducted in the Mitigation Area between January and December 2010.

1.2 Location and Setting

The Mitigation Area is located in Big Tujunga Wash, just downstream of Interstate 210 (I-210) Freeway overcrossing, near the City of Los Angeles' Sunland community in San Fernando Valley, Los Angeles County. The site is bordered on the north and east by I-210 and on the south by Wentworth Street (Figure 1-1). The west side of the site is contiguous with the downstream portion of Big Tujunga Wash.

The Mitigation Area supports two watercourses: Big Tujunga Wash and Haines Canyon Creek. Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam. Flow is intermittent based on rainfall amounts and water releases from the Dam. Haines Canyon Creek, located on the south side of the site, is a tributary that conveys water flow from Haines Canyon to Big Tujunga Wash. Flow is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately one-half mile downstream of the site. The site is located within a state-designated Significant Natural Area (LAX-018) and the biological resources found on the site are of local, regional, and statewide significance. The Big Tujunga Ponds and surrounding habitat were originally created as part of the mitigation measures for the construction of the I-210 Freeway and are located in the northeast corner of the site. An aerial photograph showing Big Tujunga Wash, Haines Canyon Creek, the Tujunga Ponds, and other geographic features can be found on Figure 1-2.



Location: N:-116 Big Tujunga Wash Mitigation Area/Maps/Site_Vicinity_Tujunga_ProjectVicinity_v3_2010.mxd

2010

Figure 1-1. Project Location

2010-116 Big Tujunga Wash Mitigation Area

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Aerial Date: March 2008
Map Date: 2010

Figure 1-2. Big Tujunga Wash Mitigation Area

2010-116 Big Tujunga Wash Mitigation Area

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1.3 Summary of the Annual Report

Table 1-1 provides a list of the tasks described in the FMMP that were implemented during 2010. Certain tasks in the FMMP were not conducted because the scope of work requires that they will be done once during the three-year contract and that they be conducted during a good rain year. Examples of these include the focused surveys for sensitive native fishes, arroyo toad (*Anaxyrus californicus*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*). This suite of surveys was not conducted in 2010. Additional tasks that were implemented but are not shown in the table include the preparation of the reports (Task M) and attendance at meetings with the LACDPW staff (Task N).

Table 1-1. Mitigation and Monitoring Tasks Implemented and/or Continued in 2010

Implemented and/or Continued in 2010	
	TASK B – Continue Brown-headed Cowbird Trapping Program
x	Task B1 – Trap Construction
x	Task B3 – Training of Personnel
x	Task B4 – Daily Trap Checking
x	Task B5 – Draft and Final Reports
	TASK C – Continue Exotic Plant Eradication Program
x	Task C2 – Exotic Riparian Plant Removal and Maintenance
x	Task C3 – Weeding Only – Oak/Sycamore Uplands
	TASK D – Continue Exotic Wildlife Eradication Program
x	Task D1 – Continue Exotic Wildlife Eradication Program
x	Task D3 – Monitoring Reports
	TASK E – Maintain Formal Trails System
x	Task E1 – Trails Closure, Clearing, and Maintenance
x	Task E2 – Quarterly Maintenance Reports
	TASK F – Continue Community Awareness Program
x	Task F1 – Newsletters (Spring, Fall)
x	Task F2 – CAC Meeting Reminders and Meetings
x	Task F3 – CAC Meeting Reports
x	Task F4 – Contribution to Annual Report

	<u>TASK G – Continue Site Maintenance and Monitoring Program</u>
x	Task G1 – Erosion Control and Barrier Maintenance
x	Task G2 – Cottonwood/Willow Restoration Areas Maintenance
x	Task G5 – Success Monitoring
x	Task G7 – Annual Water Quality Monitoring, Analyses, and Report
x	Task G8 – Trails Monitoring
	<u>TASK I – Finalize Formal Banking Agreement</u>
x	Task I1 – Finalize Agreement and Negotiation with Resource Agencies
	<u>TASK J – Update and Renew Permits</u>
x	Task J2 – CDFG SAA and Meetings
	<u>TASK K – Long-term Maintenance and Monitoring Plan</u>
x	Task K1 – Review and Finalize Plans
	<u>TASK L – Post-catastrophic Damage Assessment</u>
x	Task L1 – Damage Assessment
	<u>TASK O – Expanded Public Outreach</u>
x	Task O2 – Outreach Site Visits

1.3.1 Continuation of Habitat Restoration Program

The ultimate goal of the Mitigation Area is to provide for long-term preservation, management, and enhancement of the biological resources for the benefit of the state's fish and wildlife resources. In addition, the Mitigation Area was established to provide compensation for loss of similar resources elsewhere in the Los Angeles Basin. The habitat restoration program was established in August 2000 as part of the FMMP for the Mitigation Area. Although the Big Tujunga Wash site provided habitat for several sensitive and listed wildlife species, much of the habitat was highly disturbed and infested with invasive non-native plant species at the time of the Mitigation Area's establishment. The habitat restoration program was established to target the removal of invasive non-native plant species and ultimately improve the habitat value of the existing plant community. The program was also designed to create habitat in areas that were severely degraded and preserve habitat that was seemingly intact. In late 2007, ECORP conducted an initial site visit to assess the current conditions of the Habitat Restoration Program and to strategize long-term management of the Mitigation Area and its habitat. Habitat restoration activities were continued in 2010 (Section 2.0).

1.3.2 Continuation of Brown-headed Cowbird Trapping Program

Brown-headed cowbird trapping was conducted in and around the Mitigation Area in the spring of 2010. This program is outlined in the FMMP as a method to enhance the ecological value of the site by reducing and ultimately eliminating the occurrence of brood parasitism of native riparian bird species. Two cowbird traps were placed within the Mitigation Area and two traps were placed outside the Mitigation Area in suitable cowbird foraging habitat. A total of 146 cowbirds were removed from the four traps between April 1 and June 30, 2010. Details regarding the brown-headed cowbird trapping program are found in Section 3.0.

1.3.3 Continuation of Exotic Plant Eradication Program

This task consisted of the ongoing monitoring of past exotic plant removal efforts and the continued removal efforts of exotic and invasive vegetation. ECORP combined the previously separate exotic plant eradication programs of "Arundo Removal and Maintenance," "Tamarisk Removal and Maintenance," "Hyacinth Removal and Maintenance," "Castor Bean Removal and Maintenance," and "Eupatory Removal and Maintenance," into one simplified "Exotic Plant Species Control" task. Site visits were conducted to determine locations that would require exotic plant removal and to strategize the best course of action. Periodic site visits were conducted to determine the locations of exotic plant species removal efforts and to determine if and where additional treatments were necessary. The actual removal of exotic plants was conducted at various times throughout the year to ensure that the removal techniques would coincide with the exotic plant species growth cycles. The major focus of this task for the 2010 period was girdling exotic trees and treating exotic plant species (such as arundo and eupatory) with CDFG approved herbicides. Exotic plant species control tasks implemented in 2010 are summarized in Section 4.0.

1.3.4 Continuation of Exotic Wildlife Eradication Program

This task consists of the continued removal of non-native, invasive wildlife species. Efforts were focused on removal of exotic aquatic wildlife species, primarily bullfrogs, largemouth bass (*Micropterus salmoides*), and crayfish, from perennial waters at the Tujunga ponds and Haines Canyon Creek. Exotic wildlife removal efforts targeted both life stages of bullfrogs (tadpoles and adult bullfrogs) in an effort to maximize the efficiency of the removal program. A total of six exotic removal efforts occurred during 2010. Exotic wildlife removal tasks implemented in 2010 are summarized in Section 5.0.

1.3.5 Native Fish Monitoring

Native fish monitoring survey was not conducted within the Mitigation Area during 2010.

1.3.6 Maintenance of Formal Trails System

Quarterly site visits were conducted for the purpose of walking all of the main trails established during implementation of the FMMP and documenting areas that required maintenance, brush clearing, or placement of barriers to close paths that branched from the trails. Areas that required minor repairs were remedied during the quarterly visit or in combination with other task site visits. More extensive problem areas were mapped for repair at a later time. Trail maintenance tasks implemented in 2010 are summarized in Section 6.0.

1.3.7 Continuation of Community Awareness Program

This program consists of the continued implementation of the biannual Community Advisory Committee (CAC) meetings that are held in Spring and Fall of each year. ECORP assumed the duty of distributing meeting reminders to the CAC mailing list, assisting LACDPW with development of meeting agendas and any supporting handouts, summarizing CAC meeting minutes and distribution of the minutes to the CAC meeting list, and producing the Spring and Fall newsletters for distribution by LACDPW. A new community outreach program was implemented in 2009 to educate the various types of recreational user groups about the sensitivity of plant communities and wildlife species present in the Mitigation Area. This program was continued into 2010. The new outreach program also informed the user groups of the types of recreational activities allowed at the site, as well as the types of prohibited activities. The status of the Community Awareness Program and activities conducted in 2010 are summarized in Section 7.0.

1.3.8 Continuation of Site Maintenance and Monitoring Program

The purpose of the Site Maintenance and Monitoring Program task is to monitor the success of the cottonwood/willow restoration areas in the riparian area of the Mitigation Area. Cottonwoods and willows were planted throughout the site in 2001 and 2002. In addition to monitoring the success of these plantings, this task includes assessing erosion control and barrier maintenance issues on the site, as well as water quality monitoring and focused sensitive wildlife surveys. Focused surveys for least Bell's vireo, southwestern willow flycatcher, and arroyo toad were not conducted in 2010. The results of the continued site maintenance and the monitoring program tasks that were conducted during 2010 are summarized in Section 8.0.

1.3.9 Restoration of 11-acre Oak/Sycamore Woodland

The oak/sycamore woodland area was revegetated with native plant species in 2000 and was monitored on an annual basis. The restoration in a portion of the area was not very successful because of failure of the irrigation system (due to coyotes [*Canis latrans*]) and excessive herbivory by gophers (*Thomomys bottae*). ECORP and its installation contractor, Natures Image, conducted a detailed assessment of the oak/sycamore restoration areas in 2008 to develop a new work plan for ensuring the success of this area. A summary of the restoration activities that were conducted within oak/sycamore woodland area during 2010 are included in Section 9.0.

1.3.10 Finalization of Formal Banking Agreement

A draft Conservation Easement (CE) was prepared by LACDPW and submitted to CDFG for review on December 22, 2010. The current status of this task is included in Section 10.0.

1.3.11 Updated and Renewed Permits

Additional permits were not acquired for the Mitigation Area in 2010. The current Streambed Alteration Agreement (SAA) for the Mitigation Area was not revised in 2010; all conditions remained the same for the 2010 period.

1.3.12 Finalization of Existing Long-term Maintenance and Monitoring Plan

ECORP is currently working on a draft LTMMP and a draft version will be submitted to LACDPW in early 2011. The LTMMP will be submitted under a separate cover.

1.3.13 Assessment of Post Catastrophic Event Damage

The Station Fire, one of the largest fires in the history of Los Angeles County, burned a large portion of the Angeles National Forest between August and October of 2009. While the Mitigation Area was not directly burned, the fire resulted in large amounts of burned land and exposed soils in the areas surrounding the Mitigation Area. With heavy rains during the winter of 2009 – 2010, large amounts of water and debris flowed through the Mitigation Area and affected a majority of the Haines Canyon Creek waterway. ECORP biologists conducted a site visit following the winter rains in 2010 to assess damage in the Mitigation Area associated with high water and debris flows. The results of this assessment are discussed in more detail in Section 11.0.

1.3.14 Preparation and Submittal of Reports

This task refers to the preparation of the annual reports and the individual task reports that are included as appendices to the annual report.

1.3.15 Attendance at Meetings with Agencies, Public, and Consultants

ECORP's staff was available to attend meetings as necessary with the LACDPW regarding various aspects of the FMMP implementation. This is discussed in Section 12.0.

2.0 CONTINUATION OF HABITAT RESTORATION PROGRAM

The habitat restoration program was established to preserve, improve, and create habitat for Santa Ana sucker (*Catostomus santannae*), Santa Ana speckled dace (*Rhinichthys osculus*), arroyo chub (*Gila orcutti*), arroyo toad, least Bell's vireo, and southwestern willow flycatcher, all sensitive and listed species known to either occur or have a high potential to occur on site. These species are associated with aquatic and/or riparian habitats. Therefore, the habitat restoration program was focused on the restoration of the cottonwood-willow riparian habitat. Initial installation of willow riparian habitat along Haines Canyon Creek occurred in 2000 and 2001. The Habitat Restoration Program was ongoing through the first part of 2007, when the last plantings were installed. Failure of the plantings due to environmental conditions and vandalism initiated a reevaluation of the restoration program in late 2007. This section of the annual report focuses on the 2007 assessment, the revisions made to the Habitat Restoration Plan, and the activities conducted in 2010.

2.1 Habitat Restoration Plan Assessment

Restoration is intended to improve the habitat value of an existing plant community. The goal of the initial Habitat Restoration Plan was to remove invasive, non-native, and weedy species, such as giant reed (*Arundo donax*), and to replant these areas with native riparian species. In addition, several extraneous equestrian trails throughout the riparian zone were targeted for closure and restoration with native riparian species. The composition of the replacement plantings in the enhancement areas was designed to develop habitat that would support the breeding and foraging activities of a variety of sensitive riparian species, such as the least Bell's vireo. The enhancement plan consisted of various tasks designed to remove the non-native species, prepare the areas prior to planting, install cuttings and container plant materials, and monitor the success of the plantings.

When ECORP took over the contract for the implementation of the original Master Mitigation Plan (MMP) in 2007, an initial assessment of the habitat restoration areas was conducted. ECORP proposed to re-evaluate the habitat restoration program for the cottonwood-willow riparian restoration areas and to prepare a revised habitat restoration plan that would be more applicable to current conditions on the site. In addition, the revised habitat restoration plan was designed to address the long-term management of the restoration areas on the site. The purpose of this revised habitat restoration plan was to review the results of previous habitat restoration planting/enhancement efforts and to propose a new approach, which builds on the results of the previous efforts. The revised habitat restoration plan is included in Appendix C of the 2009 Annual Report for the Big Tujunga Wash Mitigation Area (ECORP 2010).

2.2 Summary of the Original Habitat Restoration Efforts

The original habitat restoration efforts conducted in the Mitigation Area were addressed in detail in Section 2.2 of the 2009 Annual Report for the Big Tujunga Wash Mitigation Area (ECORP 2010); however, a summary of the original habitat restoration efforts is also found below.

During the first five years following implementation of the original MMP, habitat restoration efforts within the Mitigation Area were focused on the planting of new riparian woodland overstory and understory plantings in existing canopy openings or in openings that were created after extensive stands of invasive exotic species were removed. Container plantings and cuttings of native plant species were placed through the Mitigation Area and watered on a regular basis to promote survival. In 2004, the cuttings and container plantings were found to have a low survival rate, presumably due to the lack of naturally available water. However, at that time, it was concluded that natural recruitment was working better to fill openings in the riparian canopy than the active planting program, so no new planting efforts were conducted until 2007.

Additional planting efforts occurred in 2007, however, 2007 was a severe drought year and none of the native plant cuttings survived. The recently-planted container plants did survive and a watering program was implemented immediately to promote survival. No additional loss of these container plants was noted following the watering program.

When ECORP took over the contract for the implementation of the original MMP in mid-2007, the habitat restoration plan was revised in order to better address the changing needs of the Mitigation Area. The habitat restoration plan was also updated in 2009 (ECORP 2010).

2.3 Summary of the Invasive Exotic Plant Species Removal Program

As part of the FMMP, an invasive exotic plant species removal program was undertaken in tandem with the riparian habitat enhancement program. This was done not only to remove the exotic plant species, but also to open up canopy areas for the reestablishment of native woodland cover. Initially, the non-native species listed in Table 2-1 were the species that were targeted for eradication. The initial exotics removal efforts were primarily focused on the giant reed because of the extensive distribution of this species on the site. This effort was for the most part successful and many of the riparian enhancement areas were located in sites formerly dominated by this species.

Table 2-1. Target Non-Native Weed Species

Common Name	Scientific Name
Eupatory	*Ageratina adenophora*
Palm trees	*Arecastrum* sp., *Washingtonia* sp., etc.
Giant reed	*Arundo donax*
Mustards	*Brassica* sp.
Italian thistle	*Carduus pycnocephalus*
Nonnative weedy thistles	*Cirsium* sp.
Water hyacinth	*Eichhornia crassipes*
Eucalyptus	*Eucalyptus* sp.

Table 2-1. Target Non-Native Weed Species (continued)

Common Name	Scientific Name
Fennel	*Foeniculum vulgare*
Tree tobacco	*Nicotiana glauca*
Castor bean	*Ricinus communis*
Pepper trees	*Schinus* sp.
Milk thistle	*Silybum marianum*
Tamarisk	*Tamarix ramosissima*
Non-native annual grasses Wild oats Slender wild oats Foxtail chess Ripgut brome Soft chess Mediterranean barley Italian ryegrass Annual beard grass	 *Avena fatua* *Avena barbata* *Bromus madritensis* ssp. *rubens* *Bromus diandrus* *Bromus hordeaceus* *Hordeum murinum* *Lolium multiflorum* *Polypogon monspeliensis*
Non-native perennial grasses Pampas grass Bermuda grass Fountain grass Smilo grass	 *Cortaderia selloana* *Cynodon dactylon* *Pennisetum setaceum* *Piptatherum miliaceum*

When ECORP conducted their first site evaluation in 2007, it was noted that giant reed was still present in some of the restoration areas and in some other areas around the Mitigation Area. More importantly, ECORP noted at the time it assumed management of the project that the most dominate group of invasive exotic dominating the riparian canopies were exotic tree species. These included the exotic tree species originally designated for removal and several other dominant non-native canopy trees listed in Table 2-2. In addition, it was evident that in many areas eupatory (*Ageratina adenophora*) was a dominant understory species and this was added to the list of target species.

Table 2-2. Invasive Exotic Tree Species

Common Name	Scientific Name
Acacia species	*Acacia dealbata* and *Acacia* spp.
Common catalpa	*Catalpa bignonioides*
Eucalyptus	*Eucalyptus* spp.
Ornamental fig	*Ficus carica*
Evergreen ash	*Fraxinus uhdei*

Table 2-2. Invasive Exotic Tree Species (continued)

Common Name	Scientific Name
Japanese privot	*Ligustrum japonicum*
Liquidambar	*Liquidambar stryraciflua*
Mulberry	*Morus alba*
Wild tobacco	*Nicotiana glauca*
Castor bean	*Ricinus communis*
California pepper	*Schnius molle*
Brazilian pepper	*Schnius terebinifolius*
Chinese elm	*Ulmus parvifolius*
Palm trees	*Washingtonia* spp., *Phoenix canariensis*, etc.

2.4 Revised Habitat Restoration Program

The Revised Habitat Restoration Plan that was implemented in 2009 was continued in 2010. Back in 2009, the plan was redesigned to focus on addressing the current habitat restoration needs of the Mitigation Area, as those needs evolved. Instead of planting container plants and cuttings throughout the Mitigation Area (as was the focus in the original plan), the habitat restoration efforts in 2009 and 2010 targeted the elimination of the large, non-native trees that create the dense overstory within the Mitigation Area. In addition, the plan identified 39 non-native species of trees, shrubs, and grasses that would be targeted for removal if they were observed in the Mitigation Area. Removal of these non-native plants will allow more sunlight to reach the ground surface and will result in less competition for the native plant species. Non-native plant species removal efforts conducted in 2010 are discussed in more detail in Section 4.0. The Revised Habitat Restoration Plan document can be found in Appendix C of the 2009 Annual Report for the Big Tujunga Wash Mitigation Area (ECORP 2010).

3.0 CONTINUATION OF BROWN-HEADED COWBIRD TRAPPING PROGRAM

The brown-headed cowbird trapping program was established at the Mitigation Area to decrease and ultimately eliminate nest predation on sensitive songbird species present or potentially present in the Mitigation Area, such as least Bell's vireo and southwestern willow flycatcher. Trapping and eradicating brown-headed cowbirds increases the ecological value of the site by enhancing the reproductive success of these sensitive riparian songbirds and promoting general breeding activity within the Mitigation Area. Trapping in the Mitigation Area was conducted yearly between 2001 and 2006, 2009 and again in 2010. Griffith Wildlife Biology operated two cowbird traps within the Mitigation Area and two traps adjacent to the Mitigation Area between April 1 and June 30, 2010 (Griffith Wildlife Biology 2010). The methodology, results, and discussion of the 2010 trapping are presented below and a full copy of the report is included as Appendix C.

3.1 Brown-headed Cowbird Natural History

Brown-headed cowbirds are known as a brood parasite. This bird species parasitizes the nests of native bird host species by laying their larger egg(s) in the host species nest and leaving the egg(s) to be reared by the native host. Female cowbirds do not make a nest of their own, nor do they contribute in raising their own young. Brown-headed cowbird young are often larger and more demanding than the offspring of the native birds, resulting in the host bird raising the cowbird chick and neglecting the rest of the young. Female cowbirds can lay between 40 and 100 eggs during the breeding season (ranging from two to four months).

Population declines of sensitive native songbirds such as the least Bell's vireo and the southwestern willow flycatcher can be partially attributed to high nest predation rates by brown-headed cowbirds. In many areas, the reduction or elimination of brown-headed cowbirds through trapping has been directly related to native bird species population increase.

3.2 Methodology

Brown-headed cowbird trapping was conducted by Griffith Wildlife Biology according to the Brown-headed Cowbird Trapping Protocol (Griffith Wildlife Biology 1992), the standard protocol accepted by the United States Fish and Wildlife Service (USFWS) and CDFG. Four traps were established in and around the mitigation area; Trap 1 at the Hansen Dam Stables, Traps 2 and 3 inside the Mitigation Area, and Trap 4 at Gibson Ranch (Figure 3-1). Traps 2 and 3 were placed in riparian and coastal sage scrub habitat, while Traps 1 and 4 were placed in cowbird foraging areas.

Location: N-116 Big Tujunga Mitigation Area/MAPS/Mitigation Monitoring/Report2010/Cowbird/Tujunga_Cowbird_Traps_2010_Updated20120229.mxd.

Aerial Date: NAIP 2010
Map Date: 2010

Figure 3-1. Brown-headed Cowbird Trap Locations

2010-116 Big Tujunga Wash Mitigation Area

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Traps were removed from storage and transported to the Mitigation Area. Each trap, measuring approximately 6 feet wide, 8 feet long, and 6 feet tall, was constructed at each trap site. Food, water, perches, and shade were provided inside each trap. A sign was prominently placed outside of each trap explaining the significance of the trap and urging recreational users not to tamper with the trap. At the start of trapping on April 1, one male and two female decoy cowbirds were present in the traps. After April 20, the preferred ratio of male to female decoys was established in each trap with at least 2 males for every 3 females (up to 3 males and 5 females). The traps were opened on April 1 and operated every day, including holidays, until June 30, 2010. Each trap was serviced daily by either the Principal Investigator or a trapping assistant and daily servicing activities included:

- Replenishing and/or cleaning the water source;
- Refilling the feed tray with sunflower-free seed;
- Making repairs to the traps, shade cloths, warning signs;
- Wing clipping newly captured female cowbirds;
- Adding/removing decoy cowbirds to maintain the appropriate male to female ratio (2:3);
- Removing and releasing non-target native bird species in the traps; and
- Recording all activities and appropriate data on a data sheet.

Traps were disassembled and returned to storage after June 30, 2010. The cowbirds not used as decoys were euthanized with carbon monoxide and moved off-site to be provided as forage for raptor rehabilitation/reintroduction facilities.

3.3 Results

A total of 146 cowbirds were removed during the 2010 trapping season, including 78 males, 67 females, and 1 juvenile. Most cowbirds were captured and removed during the weeks 2 through 7 of the 13-week trapping period (between April 8 and May 19).

A total of 466 non-target birds were captured in the traps and then quickly released. Seven non-target species were captured, including European starling (*Sturnus vulvaris*), black phoebe (*Sayornis nigricans*), California towhee (*Pipilo crissalis*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), red-winged blackbird (*Agelaius phoeniceus*), and the CDFG Species of Special Concern (SSC) yellow-headed blackbird (*Xanthocephalus xanthocephalus*). The single yellow-headed blackbird captured during the trapping period was released unharmed and in good health. In addition, banded cowbirds and/or banded non-target species were also not captured during the trapping season. There were no mortalities of decoy or non-target birds due to the lack of water, food, shade, or unclean conditions present in the trap. One red-winged blackbird and four California towhees were predated upon inside the traps during the 13 weeks of trapping.

Only one incident of trap vandalism occurred to Trap 2 on May 7, 2010. The trap hasp was tampered with and three brown-headed cowbird males were released. Trap 2 was fixed immediately and no trap days were lost.

3.4 Discussion

A total of 146 brown-headed cowbirds were removed from the Mitigation Area and surrounding areas. This was higher than the annual average trapped and removed between 2001 and 2010 (average of 110.4 brown-headed cowbirds removed per year). The average number of male cowbirds removed annually is 49.6, and the average number of females is 55.6. Juveniles locally raised are relatively easy to capture within their natal habitat and can be a good indication of the success of a trapping program. Only one juvenile brown-headed cowbird was removed during the 2010 trapping season, possibly indicating that nest predation levels were low during the breeding season.

In order to effectively reduce regional cowbird populations, brown-headed cowbird trapping would need to be conducted on a yearly basis until the number of cowbirds captured decreases each year. Yearly trapping would be effective at reducing nest predation on native host species present in the riparian habitat at the Mitigation Area. Griffith Wildlife Biology recommended no change in the protocol, the number of traps (four), or the dates and duration of cowbird trapping (April 1 to June 30).

4.0 CONTINUATION OF EXOTIC PLANT ERADICATION PROGRAM

The purpose of exotic plant removal and eradication at the Mitigation Area is to increase the suitability and ecological value of the existing native vegetation communities. As described in Section 2.0 of this annual report, the original exotic plant removal program was targeted at the riparian communities in and around Haines Canyon Creek, Big Tujunga Wash, and the Tujunga ponds. By removing the exotic plant species from the riparian areas, native plant species are able to flourish because competition for resources such as light and water is reduced. This ultimately allows for natural recovery of native plant communities and results in an improvement in the ecological function of the entire area. Improvement of the function of these habitats benefits common and sensitive species of plants and wildlife that either occur or have the potential to occur at the Mitigation Area.

Site visits were conducted at the site on numerous occasions during 2010 to either plan for the exotic plant removal methods or to document exotic plant locations within the riparian areas during 2010. Site visits were conducted between January and December 2010 by ECORP biologists Gregorio Benavides, Kristen Mobraaten, Alicia Pool, Phillip Wasz, and Terrance Wroblewski on January 4-5 and 12, April 28-30, May 5, and October 25-28, 2010. During each site visit, the biologists conducted a walkthrough of all of the trails in the riparian and upland areas. The purpose of these surveys was to record locations where infestations of exotic plant species were becoming problematic. Location coordinates were taken with a global positioning system unit (GPS) and recorded on data sheets. Coordinates were incorporated into monthly memos and were displayed on a map of the site, showing each exotic plant location. The maps were provided to Nature's Image to aid in the removal of exotic plants from upland areas and the eventual removal of exotic plants from riparian areas once the SAA was received from CDFG.

4.1 Riparian Exotic Plant Removal

Exotic plant removal activities occurred over 9 days during 2010 (January 4-5, 12, April 29, May 5, and October 25-28, 2010). All removal activities took place within the riparian vegetation communities throughout the Mitigation Area and CDFG was notified prior to the commencement of all removal activities. A biological monitor conducted pre-construction surveys for sensitive wildlife and breeding birds (during the breeding bird season) prior to the commencement of the exotic plant removal and remained on site during the removal activities to ensure the crews conducted work within the appropriate pre-defined work areas. The biological monitor conducted daily tailgate sessions to remind the crews about the sensitive biological resources present in the Mitigation Area. A bilingual worker education brochure that contained general information and guidelines pertaining to the site was distributed to all new workers entering the site (Appendix B). The biological monitor also showed the removal crews locations of exotic plant species that had been previously recorded during quarterly site visits. Newly identified stands of exotic vegetation were treated as they were discovered. All treated areas were recorded using a GPS unit by the biological monitor and digital photographs were taken to document removal efforts. Plants and trees treated with herbicide were flagged with survey flagging to aid detection during follow up visits to determine success.

Exotic plants and trees were removed either manually (by cutting or sawing) or by herbicide treatment. Gas powered circular hand-saws and hand tools (machete or axe) were used for cutting or girdling exotic trees. Locations within a 15-foot distance from permanent (Haines Canyon Creek, Big Tujunga Ponds) or temporary (ephemeral ponds from rains) bodies of water were treated with an approved water-certified herbicide (AquaMaster™). All other locations were treated with either Razor® Pro or, when girdling, with Garlon® 4 herbicide. All removal efforts were conducted within the riparian habitat throughout the Mitigation Area (Figure 4-1). Cuttings of giant reed stands (and other exotic plant species) were not removed from the site but were arranged in a manner that would not allow for re-growth or establishment of new stands. The cuttings were also placed in areas that would not impede visitor traffic or pose a safety hazard. Locations of the placement of these cuttings were recorded with a GPS unit by the biological monitor.

Approximately 604 locations throughout the Mitigation Area were targeted for exotic plant and tree species removal in 2009. These same locations were targeted during all exotic plant removal efforts in 2010 utilizing the same techniques employed during 2009.

Copies of all memos documenting exotic plant removal, CDFG notifications and photographs taken during the exotic plant removal efforts can be found in Appendix D.

4.2 Upland Weeding in Oak/Sycamore Area

Natures Image continued weeding activities throughout 2010 in the upland oak/sycamore area near the Cottonwood entrance. Weeding activities were conducted on May 4-5 and December 28, 2010. Site visits were conducted during 2010 to assess the success of weeding in the upland areas. It appears that the weeding has contributing to the overall health and growth of the native tree and upland species. More detailed information regarding this task is found in Section 9.0.

Location: N-116 Big Tujunga Mitigation Area/MAPS/Mitigation Monitoring/Report 2010/Exotic Plant Removal/Tujunga_Exotic_Plants_2010_v2.mxd

Aerial Date: March 2008
Map Date: 2010

Figure 4-1. Exotic Plant Removal Locations

2010-116 Big Tujunga Wash Mitigation Area

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5.0 CONTINUATION OF EXOTIC AQUATIC WILDLIFE ERADICATION PROGRAM

The overall purpose of the exotic wildlife removal program is to restore, create, and maintain suitable habitat for native aquatic species, and to remove and eliminate ecological pressures on native species resulting from the presence of the exotic species. The exotic wildlife removal program consists of the removal of non-native fishes, bullfrogs, turtles, and red swamp crayfish from both of the Tujunga ponds and Haines Canyon Creek.

In an ongoing effort to protect and enhance the existing habitat at the Mitigation Area for native wildlife species, ECORP has continued the exotic aquatic species removal effort as described in the FMMP. The FMMP provides direction for the eradication of exotic wildlife from the Tujunga ponds (East Pond and West Pond) and Haines Canyon Creek to relieve some of the potentially negative impacts to native species. Due to the fecund nature of exotic species, and their ability to inhabit various habitat types while tolerating extreme environmental conditions, exotic species can out-compete natives for available space and food resources. Exotics can also pose direct impacts to native species through predation of adults and their young, or indirectly through the transmission of pathogens or parasites.

ECORP Fisheries biologists conducted an initial site survey when ECORP was issued the contract to continue the implementation of the FMMP. The purpose of the site assessment survey was to determine the most appropriate methods for continuing the exotic aquatic wildlife eradication program. The goal was to identify those methods that would produce the most significant impacts on the eradication of exotic aquatic wildlife species and ultimately result in the enhancement of habitat for the native fishes in Haines Canyon Creek. The data presented in this section of the annual report summarizes the results of six exotic removal efforts conducted during 2010.

5.1 Methodology

A wide range of sampling techniques was utilized during the exotic aquatic wildlife removal efforts. The sampling approaches were adapted to the various site conditions during each sampling session. Eight different methods were utilized to capture and remove exotic aquatic species, including: fyke-net trapping, spearfishing (daytime and nighttime), hand capture/snorkel surveys, minnow trapping, seining, backpack electrofishing, bullfrog surveying, and turtle trapping.

Prior to each removal effort, the potential sampling methods were evaluated to determine which would be most effective. The site conditions (access points, water visibility, presence of submerged aquatic vegetation, and crew safety) were taken into consideration prior to any final decisions on which methods would be utilized. All spearfishing and hand capturing efforts were conducted while snorkeling. Bullfrog removal was primarily done at night by patrolling the parameter of the ponds and upper portions of Haines Canyon Creek. Seining was accomplished using a 100-foot bagged beach seine deployed by a small inflatable boat. Turtle and crayfish/minnow traps were baited with small cans of sardines and cat food with small holes punched into them. All traps were allowed to fish overnight. Additionally, during snorkeling activities any Centrarchid (Sunfish Family) nests or bullfrog egg masses observed were destroyed or removed.

Exotics wildlife collection and removal in the Tujunga ponds and Haines Canyon Creek was conducted on March 2-4, March 10-11, June 21-23, October 11-13, November 18-19, and December 1-3, 2010. Results of the sampling efforts were summarized in Exotic Wildlife Removal Memos following each of the surveys. The locations of aquatic removal efforts are displayed in Figure 5-1.

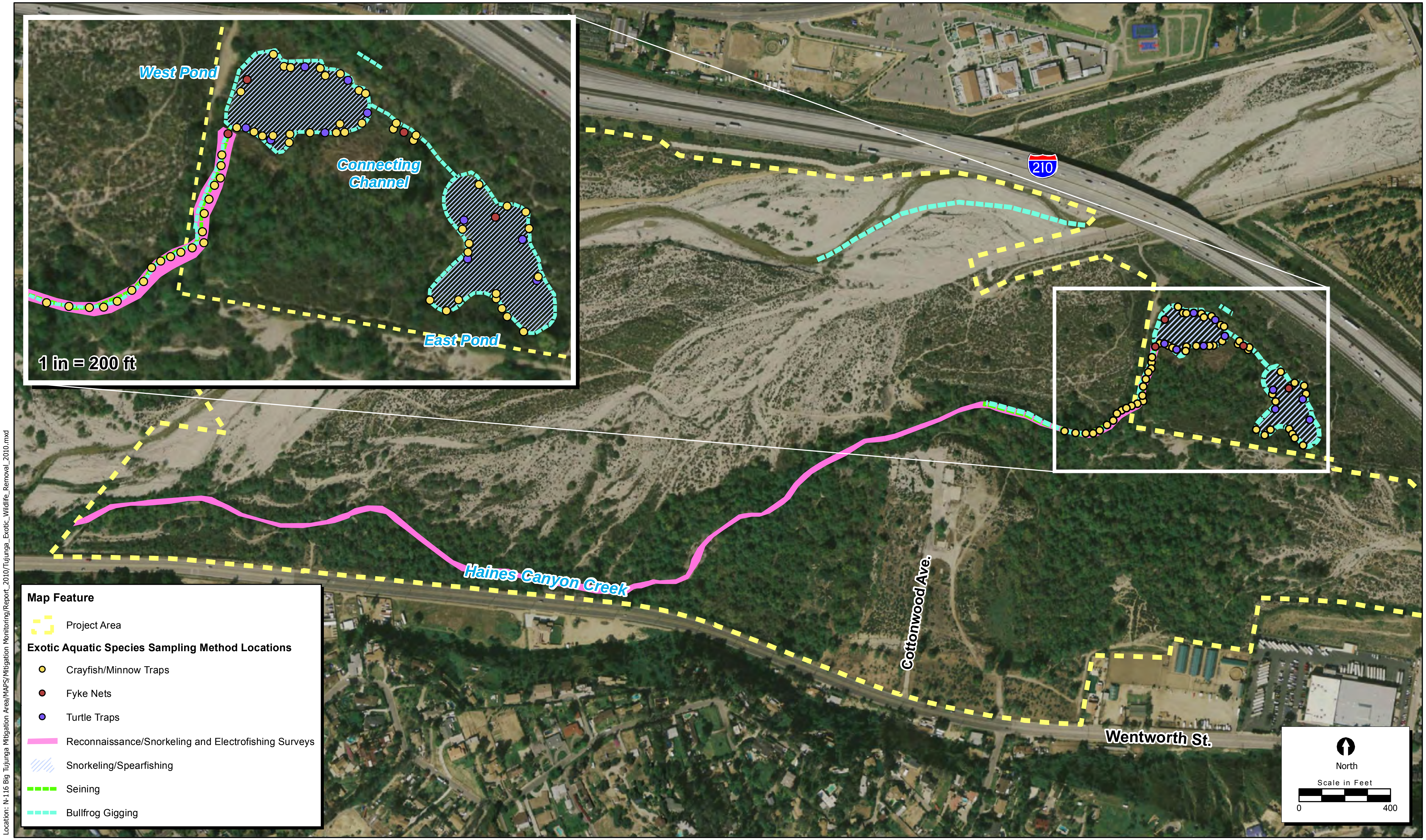
5.2 Results

A total of 2,389 exotic species individuals were removed during the four sampling efforts (Table 5-1). Captures in Haines Canyon Creek accounted for the highest proportion of this total (76.9%), followed by the East Pond (10.42%), West Pond (7.79%), and the Connecting Channel (2.13%). The highest proportion of exotics species were captured using backpack electrofishing (55.68%), followed by minnow trapping (13.35%), seine (11.59%), spearfishing (11.39%), hand captures (1.72%) and bullfrog surveys (1.59%).

The six exotic aquatic species removal efforts resulted in the capture and removal of 1,455 red swamp crayfish, 645 largemouth bass, 97 green sunfish (*Lepomis cyanellus*), 65 mosquitofish (*Gambusia affinis*), 63 bullfrog tadpoles, 19 goldfish (*Carassius auratus*), 18 bluegill (*Lepomis macrochirus*), nine red-eared slider turtles (*Trachemys scripta elegans*), eight black bullhead (*Ameiurus melas*), six adult bullfrogs, two juvenile bullfrogs, one common carp (*Cyprinus Carpio),* and one common snapping turtle (*Chelydra serpentine*).

5.3 Discussion

A dynamic sampling approach during the 2010 efforts yielded just under 2,400 exotic species individuals. While the results were comparable between five of the six sampling efforts, sampling in the Haines Canyon Creek produced approximately 80 percent of the total exotic species captures. This fact underscores the following two points: 1) exotic aquatic species are moving downstream from the Tujunga Ponds into Haines Canyon Creek; and 2) backpack electrofishers are among the most effective methods for removing exotic aquatic species from the Mitigation Area.



Aerial Date: DigitalGlobe March 2008
Map Date: 2010

Figure 5-1. Exotic Aquatic Species Sampling Locations

2010-116 Big Tujunga Wash Mitigation Area

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Table 5-1. Summary of Exotic Aquatic Species Sampling Efforts, Contract Year 2010

		Exotic Species Captured														Native Species Captured					
Sampling Location	Sampling Dates	Goldfish	Common carp	Black bullhead	Mosquitofish	Green sunfish	Bluegill	Largemouth bass	Bullfrog adult	Bullfrog juvenile	Bullfrog tadpole	Common snapping turtle	Red-eared slider	Red swamp crayfish	Exotic Species Total	Arroyo chub	Santa Ana speckled dace	Santa Ana sucker	Western pond turtle	Native Species Total	GRAND TOTAL
HAINES CANYON CREEK																					
Sampling Effort #1	March 2 - 4, 2010													31	**31**	2				**2**	33
Sampling Effort #2	March 10 - 11, 2010							1						40	**41**						41
Sampling Effort #3	June 21 - 23, 2010													49	**49**						49
Sampling Effort #4	October 11 - 13, 2010	16		6		26		225		2				1,079	**1354**	13	14	150		**177**	1,531
Sampling Effort #5	November 18 - 19, 2010					3		99						50	**152**	1				**1**	153
Sampling Effort #6	December 1 - 3, 2010				65	4		68						138	**275**	3				**3**	278
	Subtotal	**16**		**6**	**65**	**33**		**393**		**2**				**1,387**	**1,902**	**19**	**14**	**150**		**183**	**2,085**
WEST POND																					
Sampling Effort #1	March 2 - 4, 2010					3	1	21	1				1		**27**						27
Sampling Effort #2	March 10 - 11, 2010					1	2	43	1				2		**49**						49
Sampling Effort #3	June 21 - 23, 2010	2				13	8	58	1						**82**						82
Sampling Effort #5	November 18 - 19, 2010							4							**4**						4
Sampling Effort #6	December 1 - 3, 2010					2	2	20							**24**						24
	Subtotal	**2**				**19**	**13**	**146**	**3**				**3**		**186**						**186**
CONNECTING CHANNEL																					
Sampling Effort #1	March 2 - 4, 2010							1						9	**10**						10
Sampling Effort #3	June 21 - 23, 2010							20			5			1	**26**						26
Sampling Effort #5	November 18 - 19, 2010							10							**10**						10
Sampling Effort #6	December 1 - 3, 2010							2			3				**5**						5
	Subtotal							**33**			**8**			**10**	**51**						**51**
EAST POND																					
Sampling Effort #1	March 2 - 4, 2010	1				19	2	11			5	1	4	4	**47**						47
Sampling Effort #2	March 10 - 11, 2010			1		15	1	16			8		1	4	**46**				1	**1**	47
Sampling Effort #3	June 21 - 23, 2010		1			4		29	1		31		1	24	**91**						91
Sampling Effort #5	November 18 - 19, 2010						2	1			9			1	**13**						13
Sampling Effort #6	December 1 - 3, 2010			1		7		16	1		2			25	**52**						52
	Subtotal	**1**	**1**	**2**		**45**	**5**	**73**	**2**		**55**	**1**	**6**	**58**	**249**				**1**	**1**	**250**
FREEWAY DRAINAGE																					
Sampling Effort #1	March 2 - 4, 2010								1						**1**						1
	Subtotal								**1**						**1**						**1**
Grand Total		19	1	8	65	97	18	645	6	2	63	1	9	1,455	**2,389**	19	14	150	1	**184**	**2,573**

Currently, there are populations of native species Santa Ana sucker, Santa Ana speckled dace, and arroyo chub in Haines Canyon Creek. As a condition of Todd Chapman and Manna Warburton's USFWS 10(a)(1)(A) permits (TE-110094-1 and TE-106908-0, respectively) for Santa Ana sucker, sampling must be conducted in a manner that avoids all impacts to the species during the spawning season and to any young-of-the-year (YOY). The condition states that "no electrofishing shall be conducted in areas where Santa Ana suckers are known to exist between March 1 and July 31." This limits the sampling methods available for use in the creek. With this in mind, biologists conducted backpacking electrofishing sampling during the non-spawning season only (August 1 through February 28). ECORP surveyed the entire length of Haines Canyon Creek on foot to identify potential sampling areas when electrofishing could not be conducted. Simultaneously, snorkel surveys were also conducted in waters deeper than 8 inches providing field biologists insight into existing underwater habitat features, species specific habitat preferences, and locations of exotic aquatic species to target during electrofishing efforts.

In addition to exotic species removal efforts in the creek, efforts were also made to remove rock dams and foot bridges. Rock dams and foot bridges impair the normal flow of the creek and can adversely impact the native fish species in Haines Canyon Creek. They can change the stream habitat (from riffle, rapid, or glide to deep pools or runs) and stream habitat complexity (i.e., filamentous algae, aquatic macrophytes, and overhanging vegetation). In addition, these disturbances to natural flow often provide suitable foraging and breeding habitat for exotic aquatic species, making it favorable for their establishment and overall success in these areas.

The Tujunga Ponds are home to an almost exclusively exotic species assemblage. This assemblage is primarily composed of fish, reptile, amphibian, and macro-invertebrates that use these Ponds as a site to forage, breed, and shelter. As such, the Ponds act as a source population of exotic species that have the ability to migrate and become established downstream in Haines Canyon Creek.

During Sampling Efforts 1–3 and 5–6, the West Pond was sampled using a variety of methods. Of those methods, spearfishing at night proved to be the most effective at capturing the highest number of individuals, accounting for 50.00% of the total catch in the West Pond. Daytime spearfishing and fyke-net trapping were effective at removing 29.03% and 18.82% of West Pond catches, respectively, while captures by hand and bullfrog gigging were the least effective methods used and accounted for just over 2% of the total West Pond catch. Seining was not conducted in the West Pond because the pond's topography is not amenable to seining (there is a propensity for net snags). This year electrofishing was not conducted in the West Pond due to the lack of suitable sampling areas present (lack of consistently shallow-water areas) and due to the low number of individuals captured per level of effort. Both daytime and nighttime spearfishing and fyke-net trapping provided for the most effective means of removing exotic species from the West Pond.

Of the three areas of the Big Tujunga Ponds system, the Connecting Channel accounted for the least amount of catch per effort. In the previous year, fyke-net trappings were nearly double that of the West or East Pond. This year catch was very low (51 individuals). Minnow traps were also less effective (10 individuals captured) than in previous years. Both catch and species diversity was low (only three species represented in the Connecting Channel, however it is important to point out that over 60% of Connecting Channel captures consisted of largemouth bass, a voracious predator.

During Sampling Efforts 1–3 and 5–6, six methods were utilized in the East Pond (daytime and nighttime spearfishing, minnow trapping, bullfrog surveys, fyke-net trapping, and capture by hand). Spearfishing at night proved to be the most effective method, capturing the highest number of individuals and accounting for 46.18% of the total East Pond catch. Spearfishing during the day was less effective than previous, resulting in just 4% of the total East Pond catch. Fish are less active during the night-time hours and are easily approached. Minnow trapping proved to be a suitable method for capturing benthic species, such as red swamp crayfish and bullfrog tadpoles. Equally effective in capturing tadpoles is by gigging. The East Pond's floor topography is suitable for supporting large aggregations of bullfrog tadpoles, as it provides plenty of flat resting places on the bottom of the pond. It should be noted these large groups of bullfrog tadpoles persisted even in the presence of large adult largemouth bass that corroborates the results of palatability studies showing tadpoles to be the least preferred food item of largemouth bass (Kruse and Francis 1977). Turtle traps were deployed in the East Pond but they were not productive. A single common snapping turtle was captured by hand in the East Pond. It weighed over 16 kg and was removed during a night survey in March, 2010. ECORP biologist Brian Zitt removed the turtle, and it was processed and later released to an organization dedicated to fostering stray and abandoned turtles.

In Haines Canyon Creek, red swamp crayfish was the most abundant capture. It comprised over 70% of total Haines Canyon Creek captures, most of which was captured during effort 4 in October, 2010. Exotic fish captures in the creek were also high. The results show that exotic fish are continually migrating away from the Tujunga Ponds and into the creek. Electrofishing and seining efforts in the Haines Canyon Creek were effective in capturing over 500 individuals of exotic fish species. The majority of the fish captures here occurred during the late fall and early winter months – long after the native fish breeding season. During the breeding season, minnow traps were not effective in capturing exotic species. A combination of visual (snorkel) surveys and the use of seine nets may yield higher capture rates during those months when electrofishing in the Haines Canyon Creek is not permissible.

Photo documentation and results of each of the sampling efforts are included in the exotic wildlife removal report (Appendix E). Appendix E also includes the summary memoranda that were prepared after each of the removal efforts.

6.0 MAINTENANCE OF FORMAL TRAILS SYSTEM

The purpose and goal of maintaining a formal trails system at the Mitigation Area is to allow recreational use of the Mitigation Area while still preserving sensitive wildlife and their habitats. Established trails used by equestrians and hikers are present in the Big Tujunga Wash Mitigation Area. The preservation of main trails and the closure of several unnecessary trails were essential components in the success of original restoration and enhancement of the site. This program has been continued in order to discourage the establishment of any new trails in the mitigation area. By ensuring that the main trails are kept clear and can be readily used by equestrians and hikers, the amount of unauthorized creation of new trails and illegal use of the mitigation area (camping, making fires) will be reduced. The maintenance and monitoring of the trail system is a necessary component of the overall restoration and enhancement program.

In 2010 the trails maintenance effort began with a site visit by ECORP biologists on January 4th and 5th, 2010 to assess the current condition of the trails present in the Mitigation Area and to mark locations needing maintenance or attention. Quarterly site visits were conducted to look for areas that might qualify for trails closure, for identifying areas where trails were blocked by trash or debris, and for marking locations of extensive stands of poison oak. Assessment of trail signs, information kiosks, and portable toilets were included in each survey. Areas that required minor repairs were remedied during the quarterly visit or in combination with other site visits. More extensive problem areas were mapped for repair at a later time.

Quarterly site visits were conducted by ECORP biologists Gregorio Benavides, Kristen Mobraaten, Alicia Pool, Phillip Wasz, and Terrance Wroblewski between January and December 2010. The biologists walked the trail system, taking site photographs and recording locations of trash, debris, graffiti and vandalism, un-maintained trails, and potential areas for trail closure. These areas were summarized into quarterly trail maintenance reports, which are included as Appendix F. The existing trails that were surveyed and problem areas that were recorded by ECORP in 2010 are shown on Figure 6-1.

Aerial Date: DigitalGlobe March 2008
Map Date: 2010

Figure 6-1. Vegetation Communities and Trails in the Mitigation Area

2010-116 Big Tujunga Wash Mitigation Area

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Vandalism and graffiti continue to be prevalent throughout the Mitigation Area. The most common locations were on the portable toilets, the kiosks, the informational signs, boulders, and etc. In addition, trash was observed in various areas throughout the site. Steel drums, tires, chicken wire, metal debris, toys, and clothing were present throughout the riparian area, alluvial/wash area, and adjacent to the Tujunga Ponds and Haines Canyon Creek. Natures Image visited the site on several occasions during 2010 to remove many of the large pieces of trash; however, trash dumping continues to be a problem in the Mitigation Area.

Local volunteers and equestrian groups continue to be active participants in the maintenance of the trails system. These groups patrol the Mitigation Area on a regular basis to document unauthorized overnight campers and vandals, collect and remove trash, and clear debris from trails.

The Station Fire (August to October 2009) burned many areas surrounding and upstream of the Mitigation Area. Heavy winter rains following the Station Fire resulted in large amounts of debris and sediment runoff in all the region's waterways. Unfortunately, the high water flows and large amounts of sediment and debris affected many areas within the Mitigation Area. Details on the assessment of this damage to the Mitigation Area are found in Section 11.0.

6.1 Trails Closures

In June 2010, a spooked horse escaped from its owner onto Wentworth Street. The horse tried to run on an embankment off Wentworth Street located west of the Mitigation Area boundaries, but instead it fell to its death on the trail below the street. The carcass was not found until July 2010 and, at that point, the carcass had decomposed so much that removal was not an option. In addition, the location of the carcass proved very difficult to conduct a removal effort. LACDPW established a temporary trail closure sign on the trail within the Mitigation Area leading to the location of the horse, closing the trail for health and safety reasons. The trail west of the carcass, in an area managed by Los Angeles Department of Parks and Recreation, was also closed for the same reasons. The carcass was eventually removed. This was the only formal trail closure that was conducted in 2010. A copy of the sign that was placed in the Mitigation Area is found in Appendix F.

7.0 CONTINUATION OF COMMUNITY AWARENESS PROGRAM

The CAC was formed in early 2001 as part of FMMP requirements for a community awareness program. The CAC has been meeting on a biannual basis to update the community on the progress of ongoing restoration activities, ongoing exotic eradication activities, upcoming scheduled activities at the Big Tujunga Wash Mitigation Area, and to discuss any issues that the community would like to see addressed. In July 2007, ECORP assumed the responsibilities of preparing the Spring and Fall newsletters, sending out the meeting reminders, assisting with preparation of meeting agendas and handouts, recording meeting minutes, and distributing the meeting minutes to the most current CAC mailing list. Biannual CAC meetings were conducted in April and September 2010 to be consistent with the Spring and Fall schedule already established by LACDPW. All deliverables were submitted to LACDPW electronically for posting on the LACDPW web page (http://dpw.lacounty.gov/wrd/facilities).

Community residents and representatives from local community organizations serve as the major components of the CAC, but the committee also includes agency and elected official from various local, state, and federal organizations. A list of the key stakeholders included as part of the most recent mailing is included in Appendix G.

7.1 Newsletters (Spring, Fall)

ECORP drafted two newsletters during 2010, the Spring edition in April and the Fall edition in September. Electronic versions of these newsletters were submitted to LACDPW for distribution and incorporation on their web page. The newsletters are included in Appendix H.

7.2 CAC Meetings (Spring, Fall)

The CAC meetings were held in the Spring and the Fall of 2010. The Spring CAC meeting took place on Thursday, April 29, 2010 and the Fall CAC meeting took place on Thursday, September 23, 2010. CAC meetings were held from 6:30 pm to 8:30 pm at LACDPW's Hansen Yard, 10179 Glenoaks Boulevard, Sun Valley, California 91352. ECORP drafted and sent a meeting reminder/invitation to the most recent CAC mailing list two weeks prior to each scheduled meeting. ECORP assisted LACDPW with the preparation of an agenda for the meetings and this was provided in the mailing as well as being made available as a handout at the meeting. ECORP representatives, Ms. Mari Quillman, Ms. Kristen Mobraaten, and Mr. Gregorio Benavides, attended the meetings and provided a sign-in sheet for all attendees. ECORP recorded notes during the meeting in order to prepare the official meeting minutes summarizing the general proceedings. ECORP submitted draft meeting minutes to LACDPW for review and commenting prior to distribution of the meeting minutes to the most current CAC mailing list. The proceedings at the Spring and Fall 2010 CAC meetings are summarized in the meeting minutes which are included as Appendix I. Below is a list of the major issues discussed during the 2010 CAC meetings.

- Site Safety Issues
    - Changes in law enforcement patrol of the Mitigation Area
    - Updating contact phone numbers on all signs in the Mitigation Area
    - Off-road vehicle use
    - Los Angeles County Vector Control for mosquito spraying
    - Issues with loose dogs
    - Removal of a horse carcass
    - Fire in the Mitigation Area

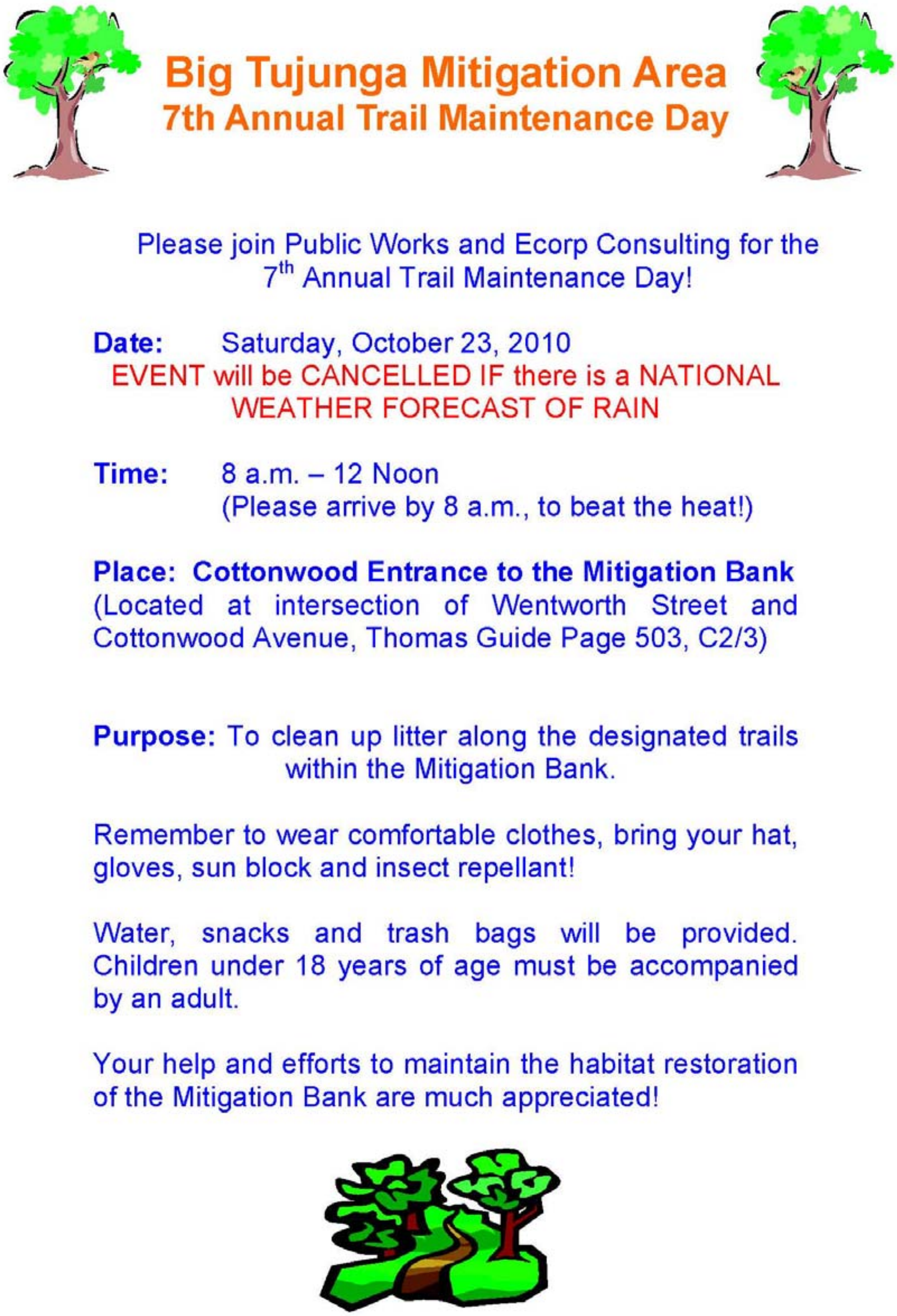
- General site maintenance activities
    - General site signage and maintenance of signs throughout the Mitigation Area
    - Gate and fence repair, reconstruction, and removal
    - Prevention of new trail construction in the Mitigation Area and in the Creek
    - Poison oak control along the trails
    - Orange County Vector Control activities

- Updates on FMMP Programs
    - Exotic plant removal activities
    - Exotic wildlife removal activities
    - Riparian and upland restoration and maintenance activities
    - Water quality monitoring
    - Trail usage and monitoring

- Public outreach
    - Continue public outreach program to educate all types of user groups on the appropriate use of the Mitigation Area, including the homeless
    - Creating informational flyers targeted for specific user groups
    - Protecting native plants present in the Mitigation Area, such as yucca
    - Enforcing acquisition of appropriate use permits from LACDPW for organized events occurring in the Mitigation Area
    - Gibson Ranch Charity Event – "Ride for a Cure"

7.3 Trail Maintenance Day

The Seventh Annual Trail Maintenance Day did not occur in 2010 due to scheduling conflicts and rainy weather. The original Trail Maintenance Day was scheduled for Saturday, October 16 with the rain day being Saturday, October 23, 2010. There was a Shadow Hills Property Owners Association (SHPOA) event occurring on October 16th, so the Trail Maintenance Day was rescheduled for October 23. Unfortunately, due to heavy rains at the site occurring the week prior to October 23, the 2010 Trail Maintenance Day was cancelled for the year. A copy of the flyer distributed to the public is included as Figure 7-1.



Big Tujunga Mitigation Area
7th Annual Trail Maintenance Day

Please join Public Works and Ecorp Consulting for the 7th Annual Trail Maintenance Day!

Date: Saturday, October 23, 2010
EVENT will be CANCELLED IF there is a NATIONAL WEATHER FORECAST OF RAIN

Time: 8 a.m. – 12 Noon
(Please arrive by 8 a.m., to beat the heat!)

Place: Cottonwood Entrance to the Mitigation Bank
(Located at intersection of Wentworth Street and Cottonwood Avenue, Thomas Guide Page 503, C2/3)

Purpose: To clean up litter along the designated trails within the Mitigation Bank.

Remember to wear comfortable clothes, bring your hat, gloves, sun block and insect repellant!

Water, snacks and trash bags will be provided. Children under 18 years of age must be accompanied by an adult.

Your help and efforts to maintain the habitat restoration of the Mitigation Bank are much appreciated!

Figure 7-1. October 2010 Trail Maintenance Day Flyer

7.4 Charity Event Display

On October 2, 2010, LACDPW and ECORP staff set up a display booth at a charity event located at the Gibson Ranch, which is immediately adjacent to the Mitigation Area. The event, which was called Ride for a Cure, consisted of a full day of live music, celebrity guests, a silent auction, equestrian competitions and performances as well as information booths and food and merchandise vendors. The charities that benefitted from the event included the American Parkinson Disease Foundation and The Roy and Patricia Disney Cancer Center at Providence St. Joseph's.

Ms. Valerie De La Cruz from LACDPW and Ms. Christine Tischer from ECORP staffed the booth and talked to attendees and local equestrians about the habitat values in the Mitigation Area and the importance of preserving the area. In addition, they also informed people about the permitted and unpermitted activities in the Mitigation Area and the importance of staying on established trails. The newsletters, trails maps, and other LACDPW brochures were made available to the public during the charity event. A photograph of the display is shown in Figure 7-2.

Figure 7-2. Display at the Ride for a Cure Charity Event

7.5 Public Outreach Education Program

In an ongoing effort to enhance and protect the existing wildlife and habitats at the Big Tujunga Wash Mitigation Bank, another task under the Community Awareness Program was developed and implemented during the 2009 contract year. This task was the direct result of the increasing evidence of problem areas associated with recreational use observed throughout the Mitigation Area. ECORP and LACDPW developed new public outreach efforts to educate all types of recreational user-groups about the importance of the Mitigation Area as a conservation area as well as to inform users of the approved and prohibited types of recreational activities within the Bank. This task was continued into the 2010 contract year as well because of its success during 2009.

During site visits in the spring and summer of 2009, ECORP biologists observed increasing problems with visitors utilizing the waterways (Haines Canyon Creek and Big Tujunga Ponds) in the Mitigation Area for recreational activities such as picnicking, fishing, swimming, and wading. In some rare cases, cooking, barbequing, and alcohol consumption were observed. In areas popular for swimming, recreational users were using rocks, large boulders, and branches from nearby dead trees to dam the creek to create larger and deeper pools so they could swim. These types of recreational activities resulted in damage to the waterways and native riparian habitats and had the potential to reduce the ecological value of the site as a Mitigation Area. After observing and understanding the various problems associated with the recreational user groups in the Mitigation Area, ECORP and LACDPW created and implemented a bilingual recreational user education program to expand the public outreach for the Mitigation Area. A bilingual educational brochure was developed and handed out to the different user-groups during the weekend site visits (Appendix B).

The newly developed public outreach program was continued throughout the 2010 contract year. On site interviews and education about the Mitigation Area were conducted by ECORP's bilingual biologist, Gregorio Benavides, during June and September 2010. All outreach efforts took place on weekends, during the peak visiting hours of 10 AM to 5 PM. During these outreach efforts, Mr. Benavides handed out the bilingual brochures describing the ecological purpose of the Mitigation Area, the importance of protecting sensitive biological resources, and the allowed recreational uses within the Mitigation Area. The brochure also outlined LACDPW's conservation goals, regulations regarding use of the site, and how the behavior and conduct of recreational visitors can help contribute further to these goals.

Many brochures were distributed to weekend visitors during 2010. Mr. Benavides also conducted informal interviews, short question and answer sessions, and explained LACDPW's conservation goals to approximately 300 people. Outreach took place either in the Mitigation Area or at Gabrieliño Park, which is commonly used as a staging area to enter the Mitigation Area. Memos documenting the results of the outreach efforts in 2010 are included in Appendix J.

The outreach effort will be addressed in the LTMMP that is currently under development for the site and will continue in the future.

8.0 CONTINUATION OF SITE MAINTENANCE AND MONITORING PROGRAM

The purpose of the Site Maintenance and Monitoring Program task is to monitor the success of the cottonwood/willow restoration areas that were planted throughout the riparian areas of the Mitigation Areain 2001 and 2002. In addition to monitoring the success of these plantings, this task includes erosion control and barrier maintenance, weed and trash removal in order to maintain restoration areas, replacement of cuttings/containers and reseeding of areas if necessary, water quality monitoring, and focused wildlife surveys for least Bell's vireo, southwestern willow flycatcher, and arroyo toad. Presence/absence surveys for least Bell's vireo, southwestern willow flycatcher, and arroyo toad were recommended every three years in the original draft LTMMP prepared by Chambers Group (Chambers 2007) and were therefore not conducted in 2010 because focused surveys were conducted during the spring and summer of 2009.

8.1 Erosion Control and Barrier Maintenance

ECORP's Restoration Specialist and biologists and/or ECORP's maintenance contractor, Nature's Image, conducted quarterly site visits during 2010 to survey the condition of existing barriers surrounding the site and identify potential erosion problems that may require the installation of erosion control measures. Surveyors walked the entire site and coordinates of problem areas or areas in question were recorded.

ECORP biologists Gregorio Benavides, Kristen Mobraaten, Alicia Pool, Phil Wasz, and/or Terrance Wroblewski conducted site visits in January, March, April, September, October, and December 2010. Areas of erosion in the oak/sycamore woodland area and where the fence surrounding the site had been compromised were recorded using a handheld GPS unit and are shown on Figure 6-1 in Section 6.0. The GPS coordinates for these locations are included in the quarterly Erosion Control and Barrier Maintenance Reports, which are included as Appendix K. The locations of problems were reported to either Natures Image or LACDPW so they could be resolved.

8.2 Cottonwood/Willow Restoration Area Maintenance

ECORP's Restoration Specialist and biologists and/or ECORP's maintenance contractor, Nature's Image, conducted quarterly site visits to survey the condition of the cottonwood/willow restoration areas. Surveyors walked the entire site coordinates of problem areas or areas in question were recorded. This task includes removal of invasive weeds and trash from riparian areas, watering existing plantings, and assessing the need for exotic plant removal activities. Representative site photos were taken. Noxious weeds were identified and mapped during the quarterly site visits and those occurring in areas where impacts to breeding birds would not be an issue, were controlled using hand and mechanical methods (hand-pulling and string-trimming). Watering of the cottonwoods that were installed by Chambers Group in late spring of 2007 was continued throughout 2010 in order to maximize their survival. The 2007 assessment of the habitat restoration plan approach to achieving the success criteria indicated that planting additional cuttings and containers likely would not be practical, therefore no additional plantings or cuttings were installed in the restoration areas in

2010 (see Section 2.0). The revised approach to the exotic plant removal includes a more aggressive program of removing exotic trees throughout the cottonwood willow habitat areas in order to open up the canopy so natural recruitment can occur at a higher rate. The exotic plant species removal program will continue in the future in order to continue the efforts to open up the canopy and to encourage more natural recruitment. All efforts were conducted according to the terms and conditions of the new SAA. The quarterly Cottonwood/Willow Restoration Area Maintenance Memos are found in Appendix L.

8.3 Cottonwood/Willow Restoration Success Monitoring

A modified version of the hydrogeomorphic (HGM) approach was used for the functional assessment of the riparian or floodplain habitat in the Mitigation Area(Brinson 1995). The logic behind the HGM approach is to compare the wetlands functions of the target sites to a reference standard site determined to have the highest level of functioning (Brinson 1995). By definition, reference standard functions receive an index score of 1.0. Target sites are assigned a score of between 0 for no function and 1.0 for as high as the reference standard. The crediting and debiting mechanism for Skunk Hollow Mitigation Area (Stein 1997) was used as a starting point and adapted to be specific for this analysis. Evaluation variables assess riparian habitat functions (e.g., cover, structure, etc.), hydrologic and biogeochemical functions, and wildlife values. A complete discussion of the functional analysis design and results are included in the 2010 Functional Analysis and Success Monitoring Report (Appendix M).

Annual functional analyses were conducted to quantitatively assess the progress of the restoration effort. A functional analysis was conducted on the site in 1997 to establish baseline functional values for the riparian habitats (Chambers 1998). Field sampling for the 2010 annual functional analysis was conducted on June 24, 2010 by ECORP botanist Ryan Gilmore and ECORP biologist Cara Snellen.

Additionally, success monitoring and analysis, recently implemented in 2009, was included as a quantitative method to evaluate the performance specifically of the riparian restoration areas. Field data collection for the success monitoring was conducted by Mr. Gilmore and Ms. Snellen on June 22 and 23, 2010. A summary of the results is presented below.

8.3.1 Annual Performance Monitoring

ECORP conducted the functional analysis data collection on June 24, 2010. Vegetation cover within the riparian habitat was determined by measuring the canopy cover of each tree or shrub included in the point-centered quarter method described in the 2010 Functional Analysis and Success Monitoring Report. In order to provide a more thorough assessment of the riparian habitat and specifically monitor and measure the success of the updated revegetation efforts, a second analysis methodology was implemented. This success analysis of vegetation included detailed analysis of growth, cover, height, and viability of 10 of the 23 restoration areas using point transect methods as described in the 2010 Functional Analysis and Success Monitoring Report.

ECORP conducted the success monitoring data collection on June 22 and 23, 2010. Copies of all data sheets are included in the report found in Appendix M.

8.3.1.1 Functional Analysis of the Riparian Habitat

Vegetation cover of mature plants was moderate for 2010, with approximately 76 trees and 296 shrubs per acre were found in the riparian habitat at the Mitigation Area. Approximately 87 percent of the trees and 65 percent of the shrubs encountered were native species. The tree canopy forms a dense multi-layered canopy throughout the site in most areas (86.1% cover overall) and shrubs form an open understory of approximately 4 percent cover. The relative density of trees and shrubs at the community level was approximately 20 percent trees and 80 percent shrubs. However, overall tree cover dominated the community with a relative dominance value of approximately 95 percent. Furthermore, overall tree cover consists primarily of native species. Despite the apparently underdeveloped understory (only 5% overall), native shrubs are well-represented with a relative dominance value of approximately 85 percent. The results for overall density, relative density, dominance (percent cover), and relative dominance for the Mitigation Area riparian habitat are summarized in Table 8-1.

Table 8-1. Density, Relative Density, Dominance, and Relative Dominance

	Density (# plants/acre)	Relative Density (% of total community)	Dominance (% Cover)	Relative Dominance (% of total community)
Native Species				
Trees	66.5	87.2	78.3	90.6
Shrubs	192.5	64.9	3.8	84.5
Non-Native Species				
Trees	9.8	12.8	8.1	9.4
Shrubs	103.9	35.1	0.7	15.5
Summary All Species				
Trees	76.2	20.5	86.1	95.3
Shrubs	296.4	79.5	4.2	4.7

Overall organic cover and cover of annual grasses were relatively low at approximately 38 percent and 4 percent, respectively. The average number of topographic features encountered per 330 feet was approximately 10. The average tree height analysis (2.9 category units) indicated that most trees on the site are greater than 13 feet in height with some falling into the 7 to 13 foot height range. The results of percent organic cover, percent annual grass cover, tree height, and average topography score measurements for the riparian habitat within the Mitigation Area are summarized in Table 8-2.

Table 8-2. Percent Organic Cover, Annual Grass Cover, Average Tree Height, and Average Number of Topographic Features

Percent Organic Cover	Percent Cover of Annual Grass	Average Tree Height (Category units)	Average Topography Features (per 100 meters)
38.3	4.4	2.9	9.9

For the riparian system, the Functional Unit (FU) is calculated to be 0.84 per acre. In previous functional analysis reports for the Big Tujunga Wash Mitigation Area, a total of 76.0 acres of willow riparian habitat was used to calculate the Functional Unit Capacity (FCU). However, in 2009, the habitats in the Mitigation Area were remapped in order to create a new vegetation map. The number of acres of willow riparian habitat present in 2009 was then recalculated using GIS. In order to get a more accurate estimate of the acres of willow riparian habitat, GIS was also utilized to subtract the number of acres encompassed by the trails through the willow riparian habitat. The resulting total acreage for willow riparian habitat currently present in the Mitigation Area is 91.2 acres. This is an increase over what was originally mapped in 1997. Therefore, based on the new acreage of 91.2 acres, the total FCU for riparian habitat in the Mitigation Area in 2010 is:

$FCU_{\text{Big T}}$ = (0.84 $_{\text{FU willows}}$)(91.2 acres of willows) = 76.61

The FCU value of the riparian habitat at the Mitigation Areahas increased from 59.74 in 1997 to 76.61 in 2010. The target functional value for the enhanced riparian habitat along Haines Canyon Creek (as set forth by the FMMP) is 0.87 with a functional capacity unit value of 66.12. Although the FU is slightly below the target value, the overall functional capacity for the riparian habitat within the Big Tujunga Wash has exceeded the fifth-year standards. The results and further discussion of the Functional Analysis is found in Appendix M.

8.3.1.2 Success Monitoring of Restoration Areas

Native species were well-represented in the tree layer at approximately 61 percent; no non-native trees were present in the restoration areas. The shrub layer was relatively open with native species accounting for approximately 21 percent and non-natives for 9 percent. Ground cover was dominated by non-native species (36.6%) while cover of natives was approximately 18 percent. Plant cover values, determined for both native and non-native species at each of the three vegetation layers (tree, shrub, and ground), are presented in Table 8-3.

Table 8-3. Percent Cover by Vegetation Layer and Plant Category

	Percent Cover	
Vegetation Layer	**Native**	**Non-native**
Tree	60.8	0.0
Shrub	21.3	9.2
Ground	17.9	36.6

Additionally, total percent cover in the restoration areas was determined for native and non-native species (Table 8-4). Cover of native plant species was slightly higher at 72 percent when compared to non-natives (59.6%). Bare ground accounted for approximately 3 percent of the restoration areas sampled. Combined coverage of all three vegetation components was greater than 100 percent as a result of presence of both native and non-native species at a single transect sampling point.

Table 8-4. Percent Cover of Natives, Non-natives, and Bare Ground

Percent Cover Of Native Species	Percent Cover of Non-native Species	Percent Cover of Bare Ground
72.0	59.6	3.4

Survival and percent cover requirements of plantings were established in the original FMMP Plantings shall have a minimum of 80 percent survival the first year, 90 percent survival after the third year, and 100 percent survival thereafter, and/or shall attain 75 percent cover after 5 years. In 2007, there were a total of 51 surviving cottonwoods from the 2002 and 2007 riparian planting efforts (ECORP 2008a). Forty-eight live individuals were counted during the 2009 success analysis field sampling, indicating a survival rate of 94 percent for cottonwoods over a span of two years (ECORP 2010). Due to the high survival rate of cottonwoods, as well as the increasing difficulty in distinguishing planted and recruited individuals, count data for cottonwoods were not collected during the 2010 success analysis field effort. The other native plant species originally included in the riparian plantings are mulefat (*Baccharis salicifolia*), black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), California wild rose (*Rosa californica*), and California blackberry (*Rubus ursinus*). These species appeared to be well established in the restoration areas; however, detailed information regarding the success of each could not be adequately gauged.

8.3.1.3 Riparian Area Survival

In 2008, ECORP submitted a Revised Habitat Restoration Plan for the Mitigation Area(ECORP 2008b). The new revegetation strategy was to include a more active non-native plant removal program and to increase maintenance efforts for the surviving cottonwoods. It was also determined that future success monitoring would focus on the success criteria of 75 percent native cover in the restoration areas rather than the survival of riparian plantings. In previous years, results of the functional analysis were used to estimate percent cover and overall success of the restoration areas. In the 2008 annual report, it was suggested that the 5th year requirement of 75 percent native cover had been met in riparian restoration areas based on the cover values calculated as part of the functional analysis. However, it was determined in 2009 that the success criteria had not been met in the riparian restoration areas based on the success monitoring and analysis results (54.2%). Percent cover values calculated during the 2009 success analysis also indicated a much lower level of vegetative cover by layer in the restoration areas (native trees 48.8% and shrubs 13.2%) as compared to the riparian habitat (native trees 148.5% and shrubs 19.2%).

In addition to the relatively low native cover in 2009, non-native cover in the restoration areas was very high at approximately 58 percent overall. It was determined that an intense non-native plant removal program would be the most effective revegetation strategy as it would provide space for growth of important riparian plant species as well as additional opportunities for native plant establishment. Removal efforts began in earnest in late 2009 once the revised Streambed Alteration Agreement was issued by CDFG. Although non-native cover is still high overall in 2010 (59.6%), there have been several improvements in the restoration areas as a result of the non-native plant removal effort. Non-native trees appear to have been eradicated and non-native ground cover has been reduced by almost 50 percent (36.6% compared to 61.8% in 2009). Furthermore, native species have benefitted from the removal of the competitive non-native plants; native cover is currently at 72 percent in the restoration areas.

During the summer of 2007, an intensive supplemental watering regime was implemented to help with the survival and establishment of planted cottonwoods during drought conditions. The high survival rate of the planted cottonwoods (94%) indicates both the success of these efforts as well as the potential for improvement in the restoration areas. Because the cottonwoods are now established, the supplemental watering regime will be scaled back and restoration efforts will be focused on the removal of non-native species. In addition, cottonwoods appeared to be recruiting naturally; the distinction between plantings and recruits could no longer be made.

A major goal of the Mitigation Plan for the Mitigation Area was to improve habitat and thus better support breeding and foraging activities of sensitive riparian wildlife species, such as the least Bell's vireo, in the restoration areas (Chambers 2000). High cover of native riparian trees and shrubs is essential for these sensitive species; however, the 2009 success analysis results indicated that the restoration areas provided limited native cover. The intense non-native plant removal program that was subsequently implemented appears be very effective in providing establishment opportunities and increasing cover of natives. Although native riparian cover did increase to 72 percent, the 2010 success analysis results indicate that non-natives plant species are still a major presence in the restoration areas. Due to the massive amounts of debris produced, debris flows from the 2009 Station Fire (August-October) are expected over the next five years and will likely bring in additional non-native seeds from upland areas. It is imperative that the non-native plant removal program continue as this type of vegetation will adversely affect sensitive wildlife species utilizing the riparian habitat as well as limit any future improvements in native cover. If the non-native plant removal program is also maintained at the same level of intensity, the success criteria of 75 percent native cover in the restoration areas may be achieved sooner than expected, resulting in improved habitat quality for riparian wildlife.

8.4 Trails Enhancement/Reclamation

Trails enhancement largely consisted of activities designed to keep equestrians and hikers on established trails while discouraging them from wandering off of the trails or from establishing new trails. Enhancement activities took place during periodic maintenance sessions. Large rocks and overhanging branches were removed from the trails for safety purposes. These materials were placed alongside the trails to further delineate the paths. The closed trails were monitored and obstructive barriers were replaced as needed. Large boulders and branches were strategically placed to prevent the use of unauthorized side trails as part of the trails reclamation process. Trail users have continued to access some of the reclaimed trails. Detailed information on the Trails Program can be found in Section 6.0.

8.5 Annual Water Quality Monitoring

ECORP's subconsultant, MWH, conducted the annual water quality sampling for the site in 2010. The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern. A series of sampling parameters were collected in the field from four sampling locations utilizing a HACH SensION 6 DO meter and an Orion 230A with HACH 51935 electrode. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Laboratory analyses were performed at MWH Laboratories in Monrovia, California. Quality assurance/quality control (QA/QC) procedures in the laboratory followed the methods described in the MWH Laboratories Quality Assurance Manual. In addition to the water quality monitoring, flows in the outlet from Big Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were estimated using a simple field procedure. The technique uses a float (a small plastic ball) to measure stream velocity.

Water quality sampling was conducted by MWH on November 19, 2010. The 2010 Water Quality Report is typically submitted to LACDPW in January 2011. A summary of the 2010 results of the water quality monitoring are provided below.

8.5.1 Baseline Water Quality

Sampling and analysis conducted by LACDPW prior to implementation of the FMMP is considered the baseline for water quality conditions at the site. The results of baseline analyses conducted in April 2000 are listed in Table 8-5 and provided in the 2010 Water Quality Monitoring Report that is included as Appendix N. Higher bacteria and turbidity observed in the April 18, 2000 baseline samples were attributed to a rain event. Phosphorus levels were also high in the April 18, 2000 samples, perhaps due to release from sediments.

Table 8-5. Baseline Water Quality Sampling Results (2000)

Parameter	Units	Date	Haines Canyon Creek, inflow to Tujunga Ponds	Haines Canyon Creek, outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
pH	std units	4/12/00	7.78	7.68	7.96	7.91
		4/18/00	7.18	7.47	7.45	7.06
Ammonia-N	mg/L	4/12/00	0	0	0	0
		4/18/00	0	0	0	0
Kjeldahl-N	mg/L	4/12/00	0	0.1062	0.163	0
		4/18/00	0	0.848	0.42	0.428
Nitrite-N	mg/L	4/12/00	0.061	0	0	0
		4/18/00	0.055	0	0	0
Nitrate-N	mg/L	4/12/00	8.38	5.19	0	3.73
		4/18/00	8.2	3.91	0.253	0.438
Dissolved phosphorus	mg/L	4/12/00	0.078	0.056	0	0.063
		4/18/00	0.089	0.148	0.111	0.163
Total phosphorus	mg/L	4/12/00	0.086	0.062	0	0.066
		4/18/00	0.113	0.153	0.134	0.211
Turbidity	NTU	4/12/00	1.83	0.38	1.75	0.6
		4/18/00	4.24	323	4070	737
Fecal coliform	MPN/ 100 ml	4/12/00	500	300	40	80
		4/18/00	500	30,000	2,400	50,000
Total coliform	MPN/ 100 ml	4/12/00	3,000	5,000	170	1,700
		4/18/00	2,200	170,000	2,400	70,000

8.5.2 Water Quality Sampling Results for 2010

Results of analyses conducted by MWH and Emax Laboratories are summarized in Table 8-6. Note that the yields (percent recoveries) of QC samples were within acceptable limits (percentages) for all samples. In addition, some of the water quality constituents that are tested on an annual basis after the implementation of the FMMP were not included in the baseline water quality sampling. Tests for herbicides and pesticides were added to determine whether or not these chemicals were being transported downstream to the Mitigation Area.

Table 8-6. Summary of Water Quality (November 19, 2010)

Parameter	Units	Haines Canyon Creek, Inflow to Tujunga Ponds	Haines Canyon Creek, Outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Temperature	°C	17.3	16.7	12.5	15.8
Dissolved Oxygen	mg/L	4.06	4.73	9.75	8.56
pH	std units	6.50	6.54	7.85	7.56
Total residual chlorine	mg/L	ND	ND	ND	ND
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	ND	ND	ND	ND
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	9.2	6.4	<0.2	6.0
Orthophosphate-P	mg/L	0.026	ND	0.013	0.013
Total phosphorus-P	mg/L	0.033	<0.02	0.022	<0.02
Glyphosate	µg/L	ND	ND	ND	ND
Chloropyrifos*	ng/L	ND	ND	ND	ND
Pesticides (EPA 8081A)**	µg/L	ND	ND	ND	ND
Turbidity	NTU	0.4	0.2	2.3	0.5
Fecal Coliform Bacteria	(MPN/100 ml)	23	70	30	80
Total Coliform Bacteria	(MPN/100 ml)	1600	170	110	500

NTU – nephelometric turbidity units MPN – most probable number ND – non-detect

[1], [2] Pesticide samples collected 12/1/10

[1] The analytical method used for chloropyrifos (EPA 8141A) also tests for the following chemicals: azinphos-methyl, bolster, coumaphos, diazinon, demeton, dichlorvos, disulfoton, ethoprop, fensulfothion, fenthion, mevinphos, naled, phorate, runnel, stirophos, parathion-methyl, tokuthion, and trichloronate.

[2] EPA method 8081A tests for aldrin, BHC, Chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptaclor, methoxychlor, and toxaphene.

8.5.2.1 Discharge Measurements

Using the field technique described in the methodology section, flows in the outlet from Big Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were approximated. Estimated flows for November 2010 are summarized in Table 8-7.

Table 8-7. Estimated Flows for December 2007 and 2008

Sampling Date	Approximate Flow (cubic feet per second)		
	Outlet of Big Tujunga Ponds	Haines Canyon Creek leaving the site	Big Tujunga Wash
11/19/2010	2.0	4.2	15.2

8.5.2.2 Comparison of Results with Aquatic Life Criteria

Table 8-8 provides the results of the November 2010 water quality sampling when compared to objectives established by the Los Angeles Regional Water Quality Control Board for protection of beneficial uses in Big Tujunga Wash (including wildlife habitat) and the Environmental Protection Agency (EPA) criteria for freshwater aquatic life.

Table 8-8. Discussion of November 2010 Big Tujunga Wash Sampling Results

Parameter	Discussion
Temperature	• Observed temperatures were below levels of concern for growth and survival of warmwater fish species at all stations.
Dissolved oxygen	• Dissolved oxygen levels ranged from 4.06 mg/L in the inflow pond to 9.75 in Big Tujunga Wash. DO levels in the ponds were below the recommended minimum for warmwater fish species (5.0 mg/L).
pH	• Lowest pH was observed in the inflow to Tujunga Ponds (6.50), with highest pH observed in Big Tujunga Wash (7.85). On this date, pH measurements at all stations were within the 6.5 to 8.5 range identified in the Basin Plan.
Total residual chlorine	• No residual chlorine was detected at any station.
Nitrogen	• Nitrate-nitrogen measurements at all stations were below the drinking water standard of 10 mg/L. • Ammonia was below the detection limit at all stations.
Phosphorus	• Total phosphorus levels at all sites were below EPA's recommended range for streams to prevent excess algae growth (observed range at these three stations was ND to 0.033 mg/L; recommended range is <0.05 – 0.1 mg/L).
Glyphosate	• Glyphosate was not detected at any station.
Chloropyrifos	• Chloropyrifos and the other pesticides tested using EPA's analytical method 8141A were not detected at any station.
Pesticides	• Pesticides analyzed by EPA Method 8081A were not detected at any station.
Turbidity	• Turbidity levels were low (≤2.3 NTU) at all stations.
Bacteria	• Fecal coliform levels at all stations were below the water contact recreation standard of 200 MPN. Total coliform levels ranged from 110 in Big Tujunga Wash to 1,600 in the Tujunga Pond inlet.

9.0 RESTORATION OF 11-ACRE OAK/SYCAMORE WOODLAND

The oak/sycamore woodland area is located adjacent to Wentworth Street and south of Haines Canyon Creek. This area was revegetated with native plant species in 2000 and the success of the restoration was monitored on an annual basis between 2000 and 2005. The revegetation of this area was designed to increase the number of oak and sycamore trees and to create a coastal sage scrub understory that would support a wide diversity of plants and wildlife. This effort suffered repeated setbacks early on in the implementation. Coyotes were diligently and repeatedly destroying the tubing associated with the irrigation system. As a result, many of the plantings either died or their growth was inhibited due to lack of sufficient water. In addition, gophers were removing the planted shrubs at an alarming rate. When ECORP was issued the contract for the implementation of the FMMP in July of 2007, the task for the oak/sycamore woodland restoration only included weeding. During the negotiations, LACDPW and ECORP discussed options for the oak/sycamore woodland recovery. The decision was made to focus the efforts on weed and non-native grass removal to reduce competition for resources between the native and non-native species. Without the competition, this focused effort is expected to enhance the oak/sycamore woodland restoration area by allowing the existing native plant species to naturally recruit new individuals. As a result, the value of the habitat for native wildlife species is also expected to increase. This vegetation community, once mature, would act as a natural buffer zone between the urban activities and the riparian areas to the north.

The oak/sycamore woodland weed removal efforts began on July 5, 2007 with a meeting between ECORP and Natures Image to discuss the plan of action for restoring the upland area. Methods discussed for restoration included weed whipping areas around the native shrubs and trees, such as flat-top buckwheat (*Eriogonum fasiculatum*), laurel sumac (*Malosma laurina*), and oaks (*Quercus* spp.). It was also decided that no weed removal activities would occur near the oak and elderberry (*Sambucus mexicanus*) trees along the fence bordering Wentworth Street unless exotic plants and/or ornamental trees had become established. Castor bean and tree tobacco were included as target species in the weed removal program. Weed removal activities were conducted by hand using Round-Up® herbicide, hand tools, and gasoline-powered weed whackers. The schedule for weed removal activities includes four efforts during each contract year. The weed removal efforts were timed to remove the weeds and non-native grasses during the growing season and prior to them depositing new seeds in the restoration area. Weed removal efforts continued through 2010.

Active restoration of the 11-acre oak/sycamore woodland is not being conducted at this time; however, Natures Image performed weed removal activities on May 4-5 and December 28, 2010. Following each of the weed removal efforts, ECORP biologists visited the site to survey and document the locations and success of weed removal. Notes and representative site photographs were taken and the coordinates of additional weed/exotic plant locations were recorded using a handheld GPS unit.

During site visits in the middle of the spring, new growth was observed on many of the shrubs and trees on which the weeding had been conducted. The native shrub and tree species planted in this area in 2001 and 2002 appear to be thriving and replanting/reseeding is not necessary at this time. Quarterly reports were produced summarizing the restoration efforts in the 11-acre oak/sycamore woodland (Appendix O).

10.0 FINALIZATION OF FORMAL BANKING AGREEMENT

ECORP provided informational support in 2010 for the preparation of the Conservation Easement (CE) for the Mitigation Area. LACDPW prepared the CE and submitted the document to CDFG on December 22, 2010, prior to the December 31, 2010 deadline. The remaining credits available for the Mitigation Area are presented Table 10-1, which was provided to ECORP by LACDPW in December 2010.

Big Tujunga Mitigation Area
Credit Transfer Ledger

	Agency Credit Issue (Acres)		
Total for Big Tujunga Wash Mitigation Area	U.S. Army Corps of Engineers	California Regional Water Quality Control Board	California Department of Fish and Game
Total Credits Granted	157.6	154.0	
Total Wetland and Riparian Habitat Credits	108.2	108.2	
Total Upland Habitat Credits (If used to mitigate Riparian Habitat impacts)	49.4	45.8	
Total Upland Habitat Credits (If used to mitigate Upland Habitat impacts)	N/A*		

Project Utilizing Mitigation Credits	Acres / Permit Number	Habitat Type / Date	Acres / Permit Number	Habitat Type / Date	Acres / Permit Number	Habitat Type / Date
100 Reaches Channel Clearing	62.7	Riparian	62.7	Riparian	62.7	Riparian
	8-0002701-AOA †	(12/09/1999)	99-011 †	(10/17/2003)	5-07 6-99 †	(09/22/1999)
Friendly Woods Drain	0.6	Riparian	1.2	Riparian	1.6	Riparian
	200000711-JPL	(5/04/2000)	00-019	(5/02/2000)	5-050-00	(05/11/2000)
Thompson Creek Dam Seismic Rehabilitation Project	2.0	Upland	2.0	Upland	2.0	Upland
	2000-00947-JPL	(9/14/2000)	00-044	(6/23/2000)	5-086-00 (Rev2)	(6/28/2000)
Big Dalton Reservoir Post-Fire Sediment Removal	0	-	3.34	Riparian	0	-
	200300333-JLB	(04/25/2003)	02-196	(04/23/2003)	R5-2002.0435	Date
Big Dalton Dam Subdrain Extension	0	-	0	-	0	-
	200602244-KW	2/2/2007	02-196	(04/23/2003)	R5-2002.0435	Date
Live Oak Reservoir Post-Fire Sediment Removal	2.0	Riparian	2.0	Riparian	1.0	Riparian
	200400936-KW	(08/11/2004)	04-061	(06/23/2004)	1600-2004-0111-R5	(07/23/2004)
Devils Gate Reservoir Outlet Works Sediment Removal	0	-	?	Riparian	?	Riparian
	200601242-KW	(10/16/2006)	Permit Number	Date	Permit Number	Date
Puddingstone Diversion Reservoir Post-Fire Sediment Removal	?	Riparian	5.1	Riparian	0	-
	200300331JLB	?	02-198	(06/23/2003)	R5-2002-0437	Date
San Dimas Reservoir Post-Fire Sediment Removal	0	-	5.4	Riparian	0	-
	200300332-JLB	(04/30/2003)	02-195	(04/23/2003)	R5-2002-0436	(06/11/2003)
San Gabriel Reservoir Post-Fire Sediment Removal (Access Ramp)	0	-	0	-	0	-
	Permit Number	Date	Permit Number	Date	Permit Number	Date
Burro Canyon Sediment Placement Site Debris Basins	0	Riparian	0.3	Riparian	0	Riparian
	003-00323-A0A)	(5/23/2003)	02-199	(5/06/2003)	R5-2002-0438	(11/24/2003)
Big Tujunga Dam Rehabilitation Project	0.86	Riparian	0.43	Riparian	0	Riparian
	2006-00546-AOA	(07/12/2006)	06-017	(05/24/2006)	1600-2006-0029-R5	2/27/2006
Santa Anita Dam and Reservoir Riser Modification and Sediment Removal	0.24	Riparian	0.3	Upland	6.9	Upland
	SPL-2008-00370-VEN	(12/30/2009)	08-088	(10/22/2009)	1600-2008-1073-R5	(2/25/2010)
Riparian Credits Used	65.54	Acres	82.34	Acres	67.3	Acres
Upland Credits Used	2.0	Acres	2.3	Acres	8.9	Acres
Riparian Credit Balance	42.66	Acres	25.86	Acres	-67.3	Acres
Upland Credit Balance	#VALUE!	Acres	-2.3	Acres	-8.9	Acres

*Corps does not regulate activities in upland areas
† The mitigation ratio resulting in the 62.7 Ac figure was identified in the August 20, 1999 Initial Study prepared by the State Water Resources Control Board (Pg 3-12)

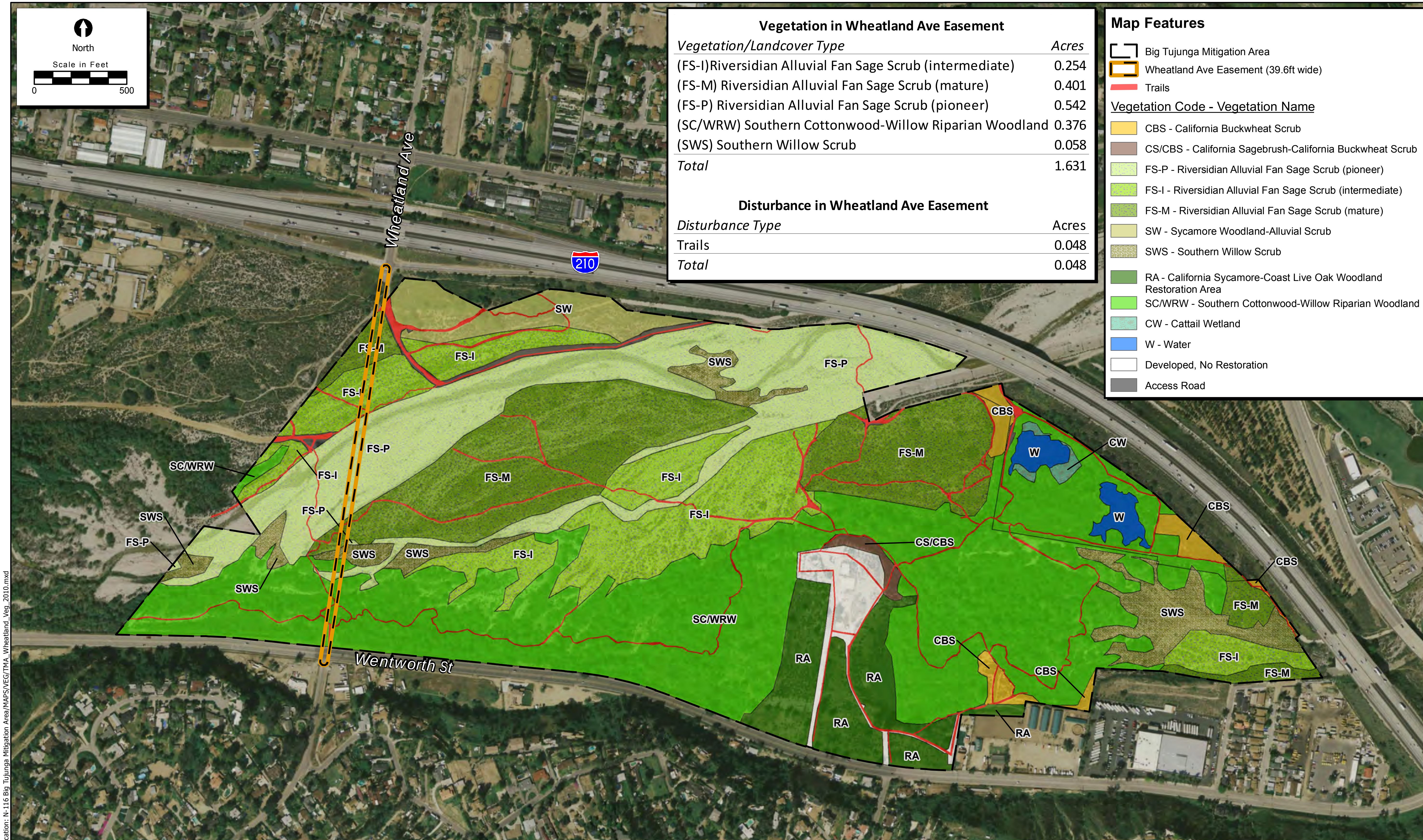
Table 10-1. Mitigation Area Credit Ledger (Updated August 2010)

10.1 Wheatland Avenue Easement

While preparing the CE it came to the attention of LACDPW that a third party-owned road extension and an existing easement belonging to the City of Los Angeles (City) remained within the Mitigation Area. This road extension easement, the Wheatland Avenue extension, was a historical easement set aside by the City as a potential future road and water line easement. It is located in the western portion of the Mitigation Area, is approximately 39.6 feet in width, and runs a straight line through the Mitigation Area (Figure 10-1). The City has abandoned the street easement but has retained the water easement. The current owner of this parcel is unknown at the time. LACDPW has decided to deduct the acreage within the Mitigation Area until ownership can be resolved. Using Geographic Information Systems (GIS) software, ECORP placed the Wheatland Avenue extension easement on an existing vegetation community map of the Mitigation Area and calculated vegetation acreages to deduct from the total credit ledger. Table 10-2 presents the acreage by vegetation community to be deducted from the Mitigation Area credit ledger. Approximately 0.048 acre of trails occurs within the easement; this acreage is also deducted from the credit ledger.

Table 10-2. Wheatland Avenue Extension Easement Acreages

Vegetation Type	Acres Excluded Due To Easement
FS-P - Riversidian Alluvial Fan Sage Scrub (Pioneer)	0.254
FS-I - Riversidian Alluvial Fan Sage Scrub (Intermediate)	0.401
FS-M - Riversidian Alluvial Fan Sage Scrub (Mature)	0.542
SWS - Southern Willow Scrub*	0.376
SC/WRW - Southern Cottonwood-Willow Riparian Woodland*	0.058
Total:	**1.631**



Vegetation in Wheatland Ave Easement

Vegetation/Landcover Type	*Acres*
(FS-I)Riversidian Alluvial Fan Sage Scrub (intermediate)	0.254
(FS-M) Riversidian Alluvial Fan Sage Scrub (mature)	0.401
(FS-P) Riversidian Alluvial Fan Sage Scrub (pioneer)	0.542
(SC/WRW) Southern Cottonwood-Willow Riparian Woodland	0.376
(SWS) Southern Willow Scrub	0.058
Total	1.631

Disturbance in Wheatland Ave Easement

Disturbance Type	Acres
Trails	0.048
Total	0.048

Aerial Date: DigitalGlobe March 2008
Map Date: 2010

Figure 10-1. Wheatland Avenue Easement

2010-116 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

11.0 POST-CATASTROPHIC DAMAGE ASSESSMENT

In the late Summer and early Fall of 2009 the Angeles National Forest experienced the largest fire in its recorded history, the Station Fire. The Station Fire began on August 26, 2009, was fully contained on October 16, 2009, and burned over 160,000 acres in the forest and adjacent areas (inciweb.org). The Mitigation Area was not burned as a result of this fire; however, many areas upstream in the forested portions of the region were severely burned. High winter rains following the Station Fire presented a substantial risk of large debris flows in streams, drainages, and debris basins surrounding the burned areas due to the lack of vegetation that was consumed by the fire. ECORP biologists conducted site visits to the Mitigation Area following the winter rains in March 2010 to assess the effects of high rainfall and potential debris flows within Big Tujunga Wash and Haines Canyon Creek.

ECORP biologists Gregorio Benavides and Kristen Mobraaten conducted site visits on March 5 and 16, 2010 to document and assess the status of the following issues of concern that resulted from the post-fire rains: trail erosion and stability, trash and debris, damage to vegetation, flooding of understory vegetation, and creek condition. The entire length of the Mitigation Area trail system was surveyed on both days, and problem areas were documented with digital photography and locations were recorded using a GPS unit. Problem areas were ranked to prioritize locations that would require immediate attention with highest priority problems consisting of those that posed a danger to recreational visitors and/or those that impeded or obstructed flow in Haines Canyon Creek. Problem areas documented during these visits are presented in Figure 6-1 in Section 6.0.

In general, the major effects on the Mitigation Area from the Station Fire included large amounts of debris and trash washed into the Mitigation Area from upstream areas; major flooding of existing trails, Haines Canyon Creek, and Big Tujunga Wash; silty and/or muddy water entering Haines Canyon Creek and Big Tujunga Wash; and wash out of the existing vegetation understory due to high volume and speed of water rushing throughout the Mitigation Area from upstream areas.

Following the site visit, a photograph log was created to illustrate the conditions of the Mitigation Area prior to the Station Fire and high winter rains and the post-fire conditions. The photograph log and associated memorandum sent to LACDPW are included in Appendix P. Development of a restoration plan to offset the effects of the Station Fire on the Mitigation Area was not necessary.

12.0 ATTENDANCE AT MEETINGS WITH AGENCIES, PUBLIC, AND CONSULTANTS

ECORP was available on an on-call basis to attend meetings with agencies, public, and consultants as a representative of LACDPW; however, no meetings pertaining to the Mitigation Area were held in 2010.

13.0 REFERENCES

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1995 *The HGM Approach Explained*. National Wetlands Newsletter.

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2008b Revised Habitat Restoration Plan for the Big Tujunga Wash Mitigation Area. Unpublished Report submitted to Los Angeles County Department of Public Works. September 2009.

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APPENDIX A

Streambed Alteration Agreement #1600-2008-0253-R5

Big T Draft 1600

CALIFORNIA DEPARTMENT OF FISH AND GAME
South Coast Region
4949 Viewridge Avenue
San Diego, CA 92123

January 29, 2009

AGREEMENT REGARDING PROPOSED STREAM OR LAKE ALTERATION

THIS AGREEMENT, entered into between the State of California, Department of Fish and Game, hereinafter called the Department, and County of Los Angeles, Department of Public Works Water Resources Division (LACoDPWWRD), represented by Mr. Christopher Stone, 900 S. Fremont Avenue, Alhambra, California, 91803, (626) 458-6102, hereinafter called the Applicant or LACoDPWWRD, is as follows:

WHEREAS, pursuant to Section 1602 of California Fish and Game Code, the Applicant, on the 23rd day of July, 2008, notified the Department that they intend to divert or obstruct the natural flow of, or change the bed, channel, or bank of, or use material from: Big Tujunga Wash and Haines Canyon Creek, named tributaries to Hansen Dam Flood Control Basin, in Los Angeles County, to conduct extensive invasive species management and routine maintenance activities within the approximately 247-acre Big Tujunga Conservation Area. Jurisdictional streambeds and waters of the state regulated under Department authority which are to be impacted as a result of the Applicant's project-related activities include: Haines Canyon Creek, wash and ephemeral streambed(s), and wetlands, including vegetated riparian habitats. The portion of Haines Canyon Creek, wash and unnamed ephemeral streambed(s), and wetland to be impacted as a result of the Applicant's project-related activities can be located using the following resources: 1) United States Geological Survey 7.5 Minute Quad Map, Sunland, Township 2 N, Range 14 W, Los Angeles County; 2) Latitude: 34.16.80 North Longitude: 118.20.53 West 3) County Assessor's Parcel Number(s): MR 29-51-52, MB 16-166-167, MB 662-44, and MB 198-8-10

WHEREAS, the Department (represented by Jamie Jackson) during a site visit conducted on August 05, 2007, and based on information received by the Applicant, has determined that such operations may substantially adversely affect those existing fish and wildlife resources within the Haines Canyon Creek and Big Tujunga Wash watershed(s), the project site, and the vicinity of the project site, specifically identified as follows: **Fishes:** arroyo chub (*Gila Orcutti*), Santa Ana speckled dace (*Rhinichthys osculus*), Santa Ana sucker (*Catostomus santaanae*); **Amphibians:** arroyo southwestern toad (*Bufo microscaphus californicus*), California red-legged frog (*Rana aurora*), mountain yellow-legged frog (*Rana muscosa*), western toad (*Bufo boreas*); **Reptiles:** southwestern pond turtle (*Emys marmorata pallida*), San Diego horned lizard (*Phrynosoma coronatum blainvillii*), western fence lizard (*Sceloporus occidentalis*), side-botched lizard (*Uta stansburiana*); **Birds:** California gnatcatcher (*Polioptila californica californica*), southwestern willow flycatcher (*Empidonax traillii extimus*), least Bell's vireo (*bellii pusillus*), black-crowned night heron (*Nycticorax nycticorax*), mourning dove (*Zenaida macroura*), house finch (*Carpodacus mexicanus*), lesser goldfinch (*Carduelis psaltria*), black-headed grosbeak (*Pheucticus melanocephalus*), great blue heron (*Ardea Herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), black-chinned hummingbird (*Archilochus californica*), rufous hummingbird (*Selasphorus rufus*), western scrub jay (*Aphelocoma californica*), Bullock's oriole (*Icterus bullockii*), California quail (*Callipepla californica*), loggerhead shrike (*Lanius ludovicianus*), barn swallow (*Hirundo rustica*), California towhee (*Pipilo crissalis*), Wilson's warbler (*Wilsonia pusilla*), Bewick's wren (*Thryomanes ludovicianus*), Cooper's hawk (*Accipiter cooperii*); **Mammals:** coyote (*Canis latrans*), brush rabbit (*Sylvilagus Bachmani*), muledeer (*Odocoileus hemionus*), California ground squirrel (*Spermophilus beecheyi*); **Native Plants:** slender-horned spineflower (*Dodecahema leptoceras)*, Nevin's barberry (*Berberis nevinii*), Plummer's mariposa lily (*Calochortus plummerae*), Mt. Gleason Indian paintbrush (*Castilleja gleasonii*), San Fernando Valley spineflower (*Chorizanthe parryi* var.

fernandina), Davidson's bush mallow (*Malacothamnus davidsonii*), Orcutt's linanthuis (*Linanthus orcuttii*),California sycamore (*Platanus racemosa*), white alder (*Alnus rhombifolia*), Fremont cottonwood (*Populus fremontii*), mulefat (*Baccharis salicifolia*), Scale-broom (*Lepidospartum squamatum*), cattails (*Typha latifolia*), California sagebrush (*Artemisia californica*), willow (*Salix* sp.), Southern Sycamore-Alder Riparian Woodland; and all other aquatic and wildlife resources in the area, including the riparian vegetation which provides habitat for such species in the area.

These resources are further detailed and more particularly described in the reports entitled "California Department of Fish and Game Streambed Alteration Application Big Tujunga Wash Mitigation Bank" dated July 2008, prepared by Gonzales Environmental Consulting, LLC, prepared for County of Los Angeles, Department of Public Works Water Resources Division; "The Final Master Mitigation Plan for the Big Tujunga Wash Conservation Area (FMMP)", dated April 2000, prepared by Chambers Group, prepared for the County of Los Angeles Department of Public Works, and shall be implemented as proposed, complete with all attachments and exhibits.

THEREFORE, the Department hereby proposes measures to protect fish and wildlife resources during the Applicant's work. The Applicant hereby agrees to accept and implement the following measures/conditions as part of the proposed work. The following provisions constitute the limit of activities agreed to and resolved by this Agreement. The signing of this Agreement does not imply that the Operator is precluded from doing other activities at the site. However, activities not specifically agreed to and resolved by this Agreement shall be subject to separate notification pursuant to Fish and Game Code Sections 1600 *et seq*.

If the Applicant's work changes from that stated in the notification specified above, this Agreement is no longer valid and a new notification shall be submitted to the Department of Fish and Game. Failure to comply with the provisions of this Agreement and with other pertinent code sections, including but not limited to Fish and Game Code Sections 5650, 5652, 5901, 5931, 5937, and 5948, may result in prosecution.

Nothing in this Agreement authorizes the Applicant to trespass on any land or property, nor does it relieve the Applicant of responsibility for compliance with applicable federal, state, or local laws or ordinances. A consummated Agreement does not constitute Department of Fish and Game endorsement of the proposed operation, or assure the Department's concurrence with permits required from other agencies.

This Agreement becomes effective the date of the Department's signature and the restoration and enhancement portion terminates on 03/31/2014. This Agreement shall remain in effect to satisfy the terms/conditions of this Agreement and all mitigation obligations associated with the FMMP. Any provisions of the Agreement may be amended at any time provided such amendment is agreed to in writing by both parties. Mutually approved amendments become part of the original agreement and are subject to all previously negotiated provisions.

Pursuant to Section 1600 et seq., the Applicant may request one extension of the Agreement; the Applicant shall request the extension of this Agreement prior to its termination. The one extension may be granted for up to five years from the date of termination of the Agreement and is subject to Departmental approval. The extension request and fees shall be submitted to the Department's South Coast Office at the above address. If the Applicant fails to request the extension prior to the Agreement's termination, then the Applicant shall submit a new notification with fees and required information to the Department. Any construction/impacts conducted under an expired Agreement are a violation of Fish and Game Code Section 1600 et seq. For complete information see Fish and Game Code Section 1600 et seq.

Project Location:

The approximately 247-acre project site is located within the Big Tujunga Wash, just downstream of the 210 Freeway over-crossing, near the City of Los Angeles' Sunland community in the San Gabriel Valley in Los Angeles County. The site is bordered on the north and east by the I-210 freeway and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of the Big Tujunga Wash (2007 Thomas Brothers Guide page 503-B2:C2:D2).

Project Description:

The Final Master Mitigation Plan for the Big Tujunga Wash Conservation Area (FMMP), dated April 2000, prepared for the County of Los Angeles Department of Public Works, prepared by Chambers Group, shall be implemented as proposed. The FMMP proposes the long-term mitigation and management guidelines for the 247 acre Big Tujunga Site. Proposed works described within the FMMP includes elements designed to restore and enhance existing habitats on the Big Tujunga Wash site by removing non-native plant, fish, amphibian, and reptile species. In addition, the FMMP includes future plans to create a diverse coast live oak-California sycamore woodland and coastal sage scrub habitat in an area that is currently heavily disturbed. The FMMP proposes to target the Haines Canyon Creek and Big Tujunga Wash for removal of invasive plant (Arundo (*Arundo donax*), tamarisk (*Tamarix* spp.), eucalyptus (*Eucalyptus* spp.), pepper tree (*Schinus molle*), castor bean (*Ricinus communis*), umbrella sedge (*Cyperus eragrostis* Nutsedge), mustards (*Brassica* spp.), tree tobacco (*Nicotiana* glauca), water hyacinth (*Eichornia crassipes*), cape ivy (*Delairea odorata*), etc.) and animal (brown-headed cowbird (*Molothrus ater*), bull frog (*Rana catesbeiana*), crayfish (*Theragra Chalcormma*)) species, management, enhancement, and reclamation of existing equestrian and hiking trails, brown-headed cowbird eradication, water quality monitoring, riparian habitat enhancement, site inspection and maintenance, and success monitoring (fish and wildlife) for the Big Tujunga Conservation Area. Contact: Mr. Christopher Stone at Phone: (626) 458-6102 for additional information.

The Department believes that a newer FMMP exists for the Big Tujunga Wash Conservation Area (BTWCA), prepared by Chambers Group for Los Angeles County Department of Public Works Water Resources Division (LACoDPWWRD), dated October 2006, which was not included with the Streambed Notification. The Department is in receipt of a FMMP dated April 2000. The Department requests a copy of the FMMP dated October 2006.

The Applicant shall provide clarification for the following items, as found in the FMMP dated October 2006, PRIOR to the Execution of this Agreement. If the following items are already adequately addressed within the FMMP the Applicant shall identify the location of the items within the FMMP. The Department shall determine if they have been adequately addressed or require further information. Once these items have been verified within the FMMP they may be removed from this draft document PRIOR to its execution.

- Conservation Credits Remaining.

Listed below is a table summarizing the mitigation acres already used within the BTWCA by LACoDPWWRD projects.

100 Channel Clearing	Friendly Wood Drain	Thompson Creek Dam Seismic Rehab	Puddingstone Diversion Cleanout	San Dimas Cleanout	Big Dalton Cleanout	Burro Canyon Debris Basins	Live Oak	Big Tujunga Dam Seismic Rehab	Devil's Gate Cleanout
62.7	1.6	1.7	5.1	5.1	3.34	0.3	2.0	0.43	2.68

The Department has not yet finalized the total number of credits available for use by LACoDPWWRD in the BTWCA. The Applicant estimates a total of 247 acres including both jurisdictional and upland areas. The total acreage for the BTWCA that the Department currently acknowledges is 207 acres with 122.05 remaining for credit. It has been determined that 84.95 acres have already been used. The Department requests that LACoDPWWRD provide detailed maps depicting total acres, acres remaining for mitigation purposes, additional acres utilized not accounted for in the above table, acres representing areas that are not, or will not, be restored to functional habitat. The primary area of concern is found in and around the Cottonwood entrance, where the old gravel mining pad occurred. Some of this area is not going to be restored and will remain in use as parking.

- Existing Public Use

The number of horse trails remains a concern to the Department. The density of trails, side loops, and duplication is a concern, as these areas do not support habitat and reduce wildlife's ability to utilize adjacent habitat. The trail running parallel to Haines Creek, the only perennial water source in this area is also a concern. Acreage for trails used by equestrian groups in the area, particularly wider trails in the alluvial scrub, shall be explicitly identified. Areas beyond five feet in width that are being impacted by trail use shall be calculated and deducted from the total remaining acres as determined by the Applicant available for future mitigation credit. Trail widths in alluvial areas could be narrowed. The LACoDPWWRD shall define and restrict use on pre-determined paths for equestrian uses. Similarly, continued public access to the two large ponds found adjacent to the BTWCA, owned by the Army Corps of Engineers, but maintained by LACoDPWWRD, create an ongoing management problem. Since the ponds were mitigation for wetland impacts to the 210 freeway, the continued presence of visitors disrupting the ecology and the introduction of exotic animals is a concern. Further efforts to explore whether this area can be closed to public access other than special uses, education visits, and similar types of activities need to be addressed.

- Functional Analysis Ratings

Page 10, Sec 2.3.1- indicates the functional condition of alluvial scrub increased from .79 to .88 (although it is unclear if this is the whole area, or just alluvial scrub, and the last paragraph discusses riparian habitat despite an alluvial scrub header). Please clarify what changed to account for this increase in functional condition of alluvial scrub? In addition, please describe the method that was used to determine the functional values of the habitat.

- Invasive Plants

Table 3-1 shows the list of targeted weeds for control. Please add eupatory (*Ageratina adenophora*) to this list (note on page 7 that control of this species is occurring).

- Patrolling

This section does not contain much information. The Department requests LACoDPWWRD provide the following information: What will be the patrol frequency? Who is anticipated to do patrolling? Will they have authority to write tickets? How do they access the site? How much of the site is anticipated to be viewed during a two-hour visit? The Department would like a commitment to regular patrols within the BTWCA.

- Water Quality Monitoring

If conducted annually, the most optimum time of year or hydrologic condition should be specified to maximize the effectiveness of the monitoring.

- Section 3.4- Contingency Measures-wildfire related

A pro-active Wildfire Emergency Response Plan should be included. Wildfire suppression (bulldozing, backfires, firelines, and retardants) can cause substantial damage to resources. This Plan could take the form of a good map that is provided to the local fire stations, with legends indicating: access points, areas of high sensitivity, contacts, request to minimize any ground disturbance, etc. A meeting with the Fire Department to refine the strategy should also occur.

- Site Maintenance Issues:

There is little or no information on maintenance of infrastructure, particularly fencing and gates. Please include this information.

- Arroyo toad surveys:

We suggest these occur ONLY in years of relatively normal rainfall, or wetter. If surveys are conducted every third year as proposed in the plan, and that year happens to be very dry, too much time could pass between surveys. The Department recommends a more flexible plan.

- Santa Ana Sucker

We suggest these occur ONLY in years of relatively normal rainfall, or wetter. If surveys are conducted every third year as proposed in the plan, and that year happens to be very dry, too much time could pass between surveys. The Department recommends a more flexible plan.

- Cowbird trapping

Cowbird trapping should continue each year. The cowbird trapping program was instituted to restore the BTWCA as potential habitat for least Bell's vireo and southwestern flycatcher. The Department requests a detailed analysis of the Applicant's proposed cowbird trapping and reporting program. The Department also requests the report due date for the brown-headed cowbird trapping reports be adjusted to eliminate two separately dated reports. Currently, the due dates are different for the Department versus the United States Fish and Wildlife Service (USFWS).

- Reporting

There are a number of reports that are shown as being sent only to the USFWS. The Department would also like to receive copies of these reports.

- Costs

There is no information on costs contained within the FMMP. Normally, this type of plan would include an operation and maintenance budget estimate. The Department requests that LACoDPWWRD provide a detailed cost analysis and budget outline for funding all future long-term maintenance and restoration efforts within the BTWCA.

IMPACTS

Temporary Impacts:

Temporary, minor impacts are anticipated in Department jurisdictional areas as a result of the Applicant's activities. The FMMP will improve the habitat quality of approximately 60 acres of southern willow woodlands along Haines Canyon Creek and the Big Tujunga Ponds. The Department shall be notified immediately if unforeseen temporary impacts occur within Department jurisdictional areas not previously considered as part of this Agreement or the FMMP as a result of the Applicants project-related activities. Conditions may need to be added or revised, based on new information, to prevent further temporary impacts from occurring in Department jurisdictional areas.

MITIGATION

Mitigation for all Temporary Impacts:

The Applicant shall implement the FMMP as proposed.

CONDITIONS

Resource Protection:

1. The Applicant shall not remove, or otherwise disturb vegetation or conduct any other project-related activities on the project site, to avoid impacts to breeding/nesting birds from March 1st to September 1st, the recognized breeding, nesting and fledging season for most bird species in the San Gabriel Valley.

2. Prior to any project-related activities during the raptor nesting season, January 31st to August 1st, a qualified biologist shall conduct a site survey for active nests two weeks prior to any scheduled project-related activities. If breeding activities and/or an active bird nest(s) are located and concurrence has been received from the Department, the breeding habitat/nest site shall be fenced a minimum of 500 feet in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the project.

3. Be advised, migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918(50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA). This Agreement therefore does not allow the Applicant, any employees, or agents to destroy or disturb any active bird nest (§3503 Fish and Game Code) or any raptor nest (§3503.5) at any time of the year.

4. Due to the potential presence of arroyo chub, Santa Ana speckled dace, Santa Ana sucker, arroyo southwestern toad, California red-legged frog, mountain yellow-legged frog, southwestern pond turtle, San Diego horned lizard, black-crowned night heron, great blue heron, great egret, snowy egret, Cooper's hawk, southwestern willow flycatcher, California gnatcatcher loggerhead shrike, and least Bell's vireo, pre-restoration and enhancement field surveys for these species must be concluded no sooner than three-days prior to any site preparation, clearing, or other project-related activities. Findings, including negative findings, shall be submitted to the Department in written format prior to any site preparation activities.

5. If any of the species identified in condition 4 of this Agreement, any other threatened or endangered species or species of special concern are found within 150 feet of the Haines Canyon Creek or Big Tujunga Wash, the Applicant shall contact the Department immediately of the sighting and shall request an on-site inspection by Department representatives (to be done at the discretion of the Department) to determine if work shall begin/proceed. If work is in progress when sightings are made,

the Applicant shall cease all work within 500 feet of the area in which the sighting(s) occurred and shall contact the Department immediately, to determine if work shall recommence.

6. A qualified biological monitor, with all required collection permits, shall be required on site during clearing, enhancement and restoration activities, and shall conduct surveys sufficient to determine presence/absence for species identified as occurring, or potentially occurring, on site and immediately adjacent to the project location.

7. If any life stages of any native vertebrate species are encountered during clearing, enhancement or restoration activities, the monitor shall make every reasonable effort to relocate the species to a safe location. Exclusionary devices shall be erected to prevent the migration into or the return of species into the work site. If no biological monitor is available, project-related activities shall not begin, or shall be halted, until the biological monitor is present.

8. The Applicant shall have a qualified wildlife biologist and qualified botanists prepare for distribution to all Applicants contractors, subcontractors, project supervisors, and consignees a "Contractor Education Brochure" with pictures and descriptions of all sensitive, threatened, and endangered plant and animal species, known to occur, or potentially occurring, on the project site. Applicant's contractors and consignees shall be instructed to bring to the attention of the project biological monitor any sightings of species described in the brochure. A copy of this brochure shall submit to the Department for approval prior to any site preparation activities.

9. Electronic and written annual reports shall be required. An annual report shall be submitted to the Department by Jan. 1st of each year for 5 years after implementation of the FMMP for all plantings associated with the Applicants mitigation. This report shall include the survival, % cover, and height by species of both trees and shrubs. The number by species of plants replaced, an overview of the revegetation and exotic plant control efforts, and the method used to assess these parameters shall also be included. Photos from designated photo stations shall be included. If after several years it becomes apparent that plants are not surviving, additional mitigation shall be determined at that time, and Applicant shall be responsible for implementation and costs of additional mitigation. Annual reports shall include site enhancement and restoration progress, species encountered during biological surveys, and current conditions of all trails and trail activities. The Annual Report shall include graphics for vegetation communities and trails systems. Electronic reports shall be submitted to the Department no later than January 1st of each year and should be submitted to the following email address: jjackson@dfg.ca.gov. Hard copies shall be submitted to the address that appears on the header of this Agreement with the same deadline as electronic version.

10. If the Department determines that any threatened or endangered species will be impacted by the implementation of the FMMP, the Applicant shall contact Environmental Scientist Scott Harris at (626) 797-3170 to obtain information on applying for the State Take Permit for state-listed species, or contact the San Diego Regional office for the current point of contact. The Applicant certifies by signing this Agreement that the project site has been surveyed and shall not impact any state-listed rare, threatened or endangered species.

11. The Applicant shall install and use fully covered trash receptacles with secure lids (wildlife proof) in all work areas that may contain food, food scrapes, food wrappers, beverage containers, and other miscellaneous trash.

12. No hunting shall be authorized/permitted within the Big Tujunga Wash Conservation Area.

Work Areas and Vegetation Removal:

13. Disturbance or removal of vegetation shall not exceed the limits approved by the Department as stated in the FMMP.

14. The work area shall be flagged to identify its limits within the project footprint to avoid unnecessary impact to ephemeral streams and riparian habitat not included in the FMMP. Vegetation shall not be removed or intentionally damaged beyond these limits.

15. No vegetation with a diameter at breast height (DBH) in excess of three (3) inches, not previously described in the FMMP shall be removed or damaged without prior consultation and Department approval.

16. No living native vegetation shall be removed from the channel, bed, or banks of the stream outside the project footprint, except as otherwise provided for in this Agreement or as proposed in the FMMP.

Equipment and Access:

17. Vehicles shall not be driven or equipment operated in water covered portions of a stream or lake, or where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as otherwise provided for in the Agreement or as described in the FMMP, and as necessary to complete authorized work. It is understood that conditions may need to be revised or added based on new information, if the Department becomes aware of activities outside the FMMP.

18. Access to the work site shall be via existing roads and access ramps. If no ramps are available in the immediate area, the Applicant may construct a ramp in the footprint of the project. Any ramp shall be removed upon completion of the project.

Fill and Spoil:

19. This Agreement does not authorize the use of any fill.

Structures:

20. Any materials placed in seasonally dry portions of a stream or lake that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.

21. Areas of disturbed soils with slopes toward a stream or lake shall be stabilized to reduce erosion potential. Planting, seeding and mulching is conditionally acceptable. Where suitable vegetation cannot reasonably be expected to become established, non-erodible materials, such as coconut fiber matting, shall be used for such stabilization. Any installation of non-erodible materials not described in the original project description shall be coordinated with the Department. Coordination may include the negotiation of additional Agreement provisions for this activity.

22. Installation of bridges, culverts, or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade. Bottoms of permanent culverts shall be placed below stream channel grade.

23. This Agreement does not authorize the construction of any temporary or permanent dam, structure, flow restriction except as described in the FMMP.

Pollution, Sedimentation, and Litter:

24. The Applicant shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Applicant to insure compliance.

25. No equipment maintenance shall be done within or near any stream channel or lake margin where petroleum products or other pollutants from the equipment may enter these areas under any flow.

26. The clean-up of all spills shall begin immediately. The Department shall be notified immediately by the Applicant of any spills and shall be consulted regarding clean-up procedures.

27. Silty/turbid water from dewatering or other activities shall not be discharged into the stream. Such water shall be settled, filtered, or otherwise treated prior to discharge. The Applicant's ability to minimize turbidity/siltation shall be the subject of pre-construction planning and implementation of the FMMP.

28. Water containing mud, silt, or other pollutants from equipment washing or other activities, shall not be allowed to enter an ephemeral stream or flowing stream or placed in locations that may be subjected to high storm flows.

29. If a stream channel offsite or its low flow channel has been altered it shall be returned, as nearly as possible, to pre-project conditions without creating a possible future bank erosion problem, or a flat wide channel or sluice-like area. The gradient of the streambed shall be returned to pre-project grade unless such operation is part of a restoration project, in which case, the change in grade must be approved by the Department prior to project commencement.

30. Rock, gravel, and/or other materials shall not be imported to, taken from or moved within the bed or banks of the stream, except as otherwise addressed in this Agreement.

Permitting and Safeguards:

31. The Department believes that permits/certification may be required from the Regional Water Quality Control Board and the Army Corp of Engineers for this project, should such permits/certification is required, and a copy shall be submitted to the Department.

32. The Department requires that the 247-acre Big Tujunga Wash Conservation Area be preserved in perpetuity by way of a conservation easement (CE). The Department shall be listed as the sole third party beneficiary, if the Applicant retains fee title, on mitigation lands. The Applicant shall arrange to obtain the CE. Current templates for the Department's approved CE format, along with mitigation banking templates, can be downloaded from the Department's website, www.dfg.ca.gov . The legal advisors can be contacted at (916) 654-3821. The Conservation Easement process must be completed prior to December 31, 2010, or as extended by the Department, or the Applicant shall be in violation of the terms and conditions of this Agreement.

Administrative:

33. All provisions of this Agreement remain in force throughout the term of the Agreement. Any provisions of the Agreement may be amended or the Agreement may be terminated at any time provided such amendment and/or termination are agreed to in writing by both parties. Mutually approved amendments become part of the original Agreement and are subject to all previously negotiated provisions.

34. If the Applicant or any employees, agents, contractors and/or subcontractors violate any of the terms or conditions of this Agreement, all work shall terminate immediately and shall not proceed until the Department has taken all of its legal actions.

35. The Applicant shall provide a copy of this Agreement, and all required permits and supporting documents provided with the notification or required by this Agreement, to all contractors, subcontractors, and the Applicant's project supervisors. Copies of this Agreement and all required permits and supporting documents, shall be readily available at work site at all times during periods of active work and must be presented to any Department personnel, or personnel from another agency upon demand. All contractors shall read and become familiar with the contents of this Agreement.

36. A pre-enhancement restoration meeting/briefing shall be held involving all the contractors and subcontractors, concerning the conditions in this Agreement.

37. The Applicant shall notify the Department, in writing, at least five (5) days prior to initiation of restoration enhancement (project) activities and at least five (5) days prior to completion of enhancement and restoration (project) activities. Notification shall be sent to the Department at PO Box 92890, Pasadena, California, 91109. Attn: Jamie Jackson. FAX Number (626) 296-3430, Reference # 1600-2008-0253-R5.

38. The Applicant herein grants to Department employees and/or their consultants (accompanied by a Department employee) the right to enter the project site at any time, to ensure compliance with the terms and conditions of this Agreement and/or to determine the impacts of the project on wildlife and aquatic resources and/or their habitats.

39. The Department reserves the right to enter the project site at any time to ensure compliance with terms/conditions of this Agreement.

40. The Department reserves the right to cancel this Agreement, after giving notice to the Applicant, if the Department determines that the Applicant has breached any of the terms or conditions of the Agreement.

41. The Department reserves the right to suspend or cancel this Agreement for other reasons, including but not limited to, the following:

a. The Department determines that the information provided by the Applicant in support of this Agreement/Notification is incomplete or inaccurate;
b. The Department obtains new information that was not known to it in preparing the terms and conditions of this Agreement;
c. The condition of, or affecting fish and wildlife resources change; and
d. The Department determines that project activities have resulted in a substantial adverse effect on the environment.

42. Before any suspension or cancellation of the Agreement, the Department will notify the Applicant in writing of the circumstances which the Department believes warrant suspension or cancellation. The Applicant will have seven (7) working days from the date of receipt of the notification to respond in writing to the circumstances described in the Department's notification. During the seven (7) day response period, the Applicant shall immediately cease any project activities which the Department specified in its notification as resulting in a substantial adverse effect on the environment and which will

continue to substantially adversely affect the environment during the response period. The Applicant may continue the specified activities if the Department and the Applicant agree on a method to adequately mitigate or eliminate the substantial adverse effect.

CONCURRENCE

County of Los Angeles
Department of Public Works Water Resources Division
Represented by Mr. Christopher Stone
900 S. Fremont Avenue
Alhambra, California, 91803
(626) 458-6102

Name (signature) Date

Name (printed)

Title

California Department of Fish and Game

Helen R. Birss Date
Environmental Program Manager
South Coast Region

This Agreement was prepared by Jamie Jackson, Environmental Scientist, South Coast Region.

APPENDIX B

Public Outreach and Worker Education Brochure

Big-T's future depends on you!
Over time, small changes add up. Changing the Big-T habitat – making new trails, swimming in the stream, or leaving behind litter – adds up over time. In many cases, the changes are irreversible or require a great deal of time and money to return habitat to what it was like before. These are changes that harm Big-T's animals.

Protect Big-T for Future generations.
When people who visit Big-T act to protect its animals and their habitat, everyone wins. Help safeguard Big-T's future by sharing this information with a friend or becoming involved in community projects to preserve Big-T.

¡El futuro de Big-T depende de usted!
Con el tiempo, pequeños cambios se acumulan modificando el hábitat de Big-T por ejemplo: haciendo nuevos caminos, nadando en el arroyo, o dejando basura, la cual se acumula a lo largo del tiempo. En muchos casos, los cambios son irreversibles o requieren una gran inversión de tiempo y dinero para regresar el hábitat original. Estos son los cambios que perjudican a los animales de Big-T.

Proteja Big-T para las futuras generaciones.
¡Cuando las personas que visitan Big-T siguen las regulaciones que lo protegen, les comunican a otros acerca de la importancia de las regulaciones, o participan en proyectos comunitarios para preservar este lugar, los animales que viven en Big-T y la gente que lo visita ganan!

http://dpw.lacounty.gov/wrd/facilities/

All visitors must obey these regulations or a citation will be given:
a.Hours of Operation: Sunrise to Sunset
b. No fires of any kind
c. No swimming
d. No wheeled vehicles
e. No camping
f. Dogs must be on leashes.

Todos los visitantes del Big-T deben obedecer todas las reglas, los que no observan las reglas serán multados.
a. Horas de visita: Salida del sol al Atardecer
b. No fogatas de ningún tipo
c. No nadar
d. No vehículos
e. No acampar
f. Los perros deben estar con correas.

¿Preguntas? / Questions?

LADPW: Valerie De La Cruz
(626) 458-6126
Water Resources Division
County of Los Angeles
Department of Public Works
P.O. Box 1460
Alhambra, CA 91802

Big-T

PUBLIC WORKS

Did you know that the Big Tujunga Wash is a protected "forest"?
Big-T, as we like to call it is maintained by the ***County of Los Angeles Department of Public Works*** *(LADPW). Big-T is so unique that there are regulations to protect it from destruction and abuse. We hope that by learning more about Big-T, you'll agree that these regulations make sense.*

¿Sabía usted que el Big Tujunga Wash es un "bosque" protegido?
Big-T, como nos gusta llamarlo, es mantenido por el Departamento de **Obras Públicas del Condado Los Angeles** (LADPW). Big-T es tan único que hay regulaciones para protegerlo de la destrucción y el abuso. Estas regulaciones provienen del Gobierno Federal, el Estado de California, y del gobierno local. Esperamos que al aprender más sobre Big-T, estará de acuerdo en que estas regulaciones tienen sentido.

Big-T is like a small island

It is surrounded by a large city. Roads, highways, and houses can be found just outside of Big-T that are not suitable habitat for Big-T's animals.

The plants and many of the animals that live here stay here. For several species of birds, Big-T is an important resting place during their migration. For fish, Big-T is their only home.

Over time the island has gotten smaller and smaller. Big-T is sensitive to changes that come from altering or changing habitat. These changes can cause important habitat to disappear. When habitat disappears, animals disappear.

Big-T es como una isla pequeña

Está rodeado de una ciudad grande. Caminos, carreteras, y casas se pueden encontrar a los alrededores de Big-T que no ofrecen hábitat adecuado para los animales de Big-T.

Las plantas y muchos de los animales que habitan este lugar se quedan aquí. Para varias especies de aves, Big-T es un importante lugar de descanso durante su migración. Para los peces, Big-T es su único hogar.

Con el tiempo la isla se ha hecho más pequeña. Big-T es sensible a los cambios de su hábitat. Estos cambios pueden causar que un hábitat tan importante desaparezca. Cuando esto sucede los animales y las plantas también pueden desaparecer.

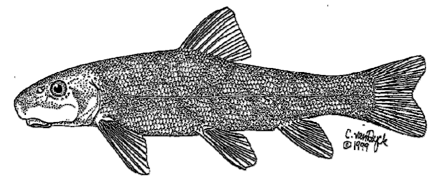
No dams/No presas

There is no place like Big-T

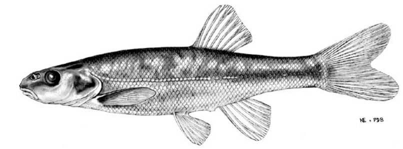
Big-T is unique because of the plants and animals that live here. Several of these animals are so rare that regulations have been made to protect where they live. This means that the plants, water, soil, and rocks that make up their homes (or habitat) must not be disturbed or altered.

No hay lugar como Big-T

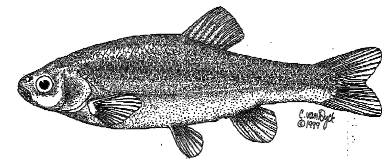
Big-T es único por las plantas y los animales que viven aquí. Varios de estos animales son tan únicos que se han hecho regulaciones para proteger el lugar donde viven. Esto significa que las plantas, el agua, la tierra, y las piedras que componen sus hogares (o hábitat) no debe ser dañado.



Santa Ana sucker
(*Catostomus santaanae*)

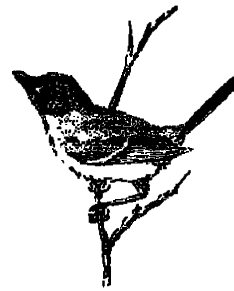


Santa Ana speckled dace / Carpita pinta
(*Rhinichthys osculus*)



Arroyo chub
(*Gila orcutti*)

Southwestern willow flycatcher
(*Empidonax traillii extimus*)



Bell's vireo
(*Vireo bellii*)

California Sycamore
(*Platanus racemosa*)

Black willow (*Salix nigra*)

Did you know that these plants and animals rely on each other to survive? And did you know that this community could one day disappear if we don't protect it?

¿Sabía usted que estas plantas y animales dependen de unos a otros para sobrevivir? ¿Y sabía usted que un día esta comunidad podría desaparecer si no la protegemos?

YES/Si

NO!

APPENDIX C

2010 Brown-headed Cowbird Trapping Report

2010 BIG TUJUNGA WASH

BROWN-HEADED COWBIRD CONTROL PROGRAM

GRIFFITH WILDLIFE BIOLOGY

2010 BIG TUJUNGA WASH

BROWN-HEADED COWBIRD CONTROL PROGRAM

prepared for:

ECORP Consulting, Inc
1801 Park Court Place, B-103
Santa Ana, California 92701
Attn: Mari (Schroeder) Quillman

prepared by:

Griffith Wildlife Biology
John T. Griffith and Jane C. Griffith
22670 M-203
P.O. Box 47
Calumet, Michigan 49913
www.griffithwildlife.com

Final Report 16 July 2010

Preferred citation:

Griffith Wildlife Biology 2010. 2010 Big Tujunga Wash Brown-headed Cowbird Control Program. Unpublished report prepared for ECORP Consulting, Santa Ana, California, by Griffith Wildlife Biology, Calumet, Michigan.

EXECUTIVE SUMMARY

Four cowbird traps were operated at Big Tujunga Wash in 2010. The traps were operated from 1 April to 30 June. Each trap contained at least one male and one female decoy cowbird as of 12 April, and the preferred 2-3 male and 3-5 female decoys as of 20 April and subsequently.

One hundred forty-six (146) cowbirds were removed, including 78 males, 67 females, and 1 juvenile, well above the 2001-2010 average of 110.4.

The male: female capture ratio was 1.16:1. Most of the adult cowbirds were captured in weeks 2-7: 55/78 males (70.5%) and 60/67 females (89.6%). No banded cowbirds or other banded birds were captured.

In addition to cowbirds, 466 non-target birds of 7 species were captured, of which all but 5 (1.1%) were released unharmed. This total includes the multiple capture, release, and recapture of a smaller number of individuals. No sensitive or endangered, threatened, or candidate non-target species were captured. No decoy or non-target birds died due to lack of food or water, or because of unclean conditions.

One incident of vandalism/ was recorded in 2010. Three male cowbirds were released. The trap was repaired immediately; no trap days were lost.

No changes to the number of traps, dates of operation, or operation protocol are recommended.

Key words: Big Tujunga Wash, brood parasitism, brown-headed cowbird (*Molothrus ater*), California, California gnatcatcher (*Polioptila californica californica*), coastal sage scrub, Hansen Dam, least Bell's vireo (*Vireo bellii pusillus*), riparian, southwestern willow flycatcher (*Empidonax traillii extimus*).

Table of Contents

List of Figures

List of Tables

List of Appendices

INTRODUCTION

The brown-headed cowbird (*Molothrus ater*, cowbird) is a small blackbird native to the Great Plains. Cowbirds are brood parasites; they do not make nests or raise young. Instead, cowbirds deposit their eggs into the nests of other birds, called hosts, which then incubate, hatch, and raise the cowbird chick. The first cowbird in California was documented at Borrego Springs in 1896 (Unitt 1984). By 1930, cowbirds were "well established" throughout the region (Willett 1933); by 1955 they had reached British Columbia (Flahaut and Schultz 1955). Cowbird numbers soared as the species occupied new year-round foraging areas (agricultural and grazing land and even suburban parks and lawns), while native bird stocks declined due to their dependence upon increasingly reduced, fragmented, and degraded native habitats in which they were less productive and more susceptible to predation and parasitism (Gaines 1974, Goldwasser et al 1980). This inverse relationship between cowbird and host numbers resulted in significant if not catastrophic impact upon hosts in the region.


Brown-headed cowbirds (male dark, female light).


Two cowbird eggs in a least Bell's vireo nest.

Female cowbirds establish and defend breeding territories (Darley 1968, 1983; Raim 2000) and lay 40-100 eggs during a two- to four-month breeding season (Scott and Ankney 1983, Holford and Roby 1993, Smith and Arces 1994). Even a single female cowbird can impact local host reproductive success. Cowbirds are extreme generalists and parasitize nearly every species (at least 220) with which they are sympatric (Friedmann 1963, Friedmann and Kiff 1985). This lack of host specificity allows the extirpation or extinction of host species without harm to the cowbird.

Cowbird eggs hatch sooner than host eggs (10-12 days versus 12-16 days) and cowbird young develop faster than host young. Large host species can raise a cowbird and most or all of their own young (Weatherhead 1989, Robinson et al. 1995). Small host species raise only the cowbird and none of their own young, which are simply smothered by the older, larger cowbird chick (Grzybowski 1995). Nest failure from predation or weather results in re-nesting and usually, ultimate reproductive success. Brood parasitism, however, consumes the time and energy of an entire breeding season and results in complete reproductive failure.

Decreased productivity caused by persistent cowbird parasitism has caused or contributed to the decline of several small host species, including the federally endangered least Bell's vireo (*Vireo bellii pusillus*, vireo) and southwestern willow flycatcher (*Empidonax traillii extimus*, flycatcher), and the federally threatened California gnatcatcher (*Polioptila californica californica*, gnatcatcher) (USFWS 1986, 1993, 1995).

Cowbird chick in California gnatcatcher nest.

Cowbird chick with smothered gnatcatcher chick.

It has been repeatedly demonstrated that parasitism can be dramatically reduced or eliminated, even over large areas, by removing cowbirds from targeted host habitat during the host breeding season using several traps spaced at roughly 1 km intervals within host habitat and at nearby cowbird foraging areas ("topical trapping") (Griffith and Griffith 2000). In areas where such topical trapping has been performed for several years, the abundance and diversity of all host species present (not just the intended beneficiary endangered species) has increased markedly (ibid).

The cowbird control project at Big Tujunga Wash was initiated in 2001 and performed in 2001-2006 and 2009-2010. Its purpose is to enhance reproductive success among the vireo and other host species by decreasing or eliminating cowbird brood parasitism by removing cowbirds from riparian habitat.

Cowbird traps have also been operated immediately downstream at Hansen Dam Basin in 1996, 1997, and 2001-2010 (GWB 2010), and immediately upstream of I-210 at Angeles National Golf Course in 2008-2010 (GWB 2010a).

STUDY AREA

Big Tujunga Wash is located in northwestern portion of the Los Angeles basin in Los Angeles County, California (Figure 1). The site has a typical Mediterranean climate with warm, dry summers and cool, wet winters. The wash supports healthy stands of high-quality willow-dominated habitat of the type preferred by the least Bell's vireo and southwestern willow flycatcher. Some coastal sage scrub of the type preferred by the California gnatcatcher is found in the wash and surrounding hills.

A growing population of least Bell's vireo is found immediately downstream within the Hansen Dam Basin. In 2009, 44 sites occupied by vireos (39 pairs, 5 single males) were detected (GWB 2009). Vireos are expanding slightly upstream from the basin, but have not yet occupied the Big Tujunga Wash study area upstream of the Hansen Dam Stables, downstream of I-210.

A complete natural history of the study area is available in Big Tujunga Wash master mitigation plan (Chambers Group, Inc 2000).

METHODS

Four cowbird traps were placed, activated, operated, serviced, disassembled, and stored per the *Brown-headed Cowbird Trapping Protocol* (GWB 1992, updates) and state and federal permit requirements (Figures 2-4). Trap 1 (Hansen Dam Stables) and T3 and T4 (Gibson Ranch) were in foraging areas. Trap 2 was within the Big Tujunga Wash Mitigation Bank adjacent to riparian and coastal sage habitat. The traps were placed and assembled on 28 March, activated 1 April, and operated from 1 April to 30 June 2010 (91days, 13 weeks).

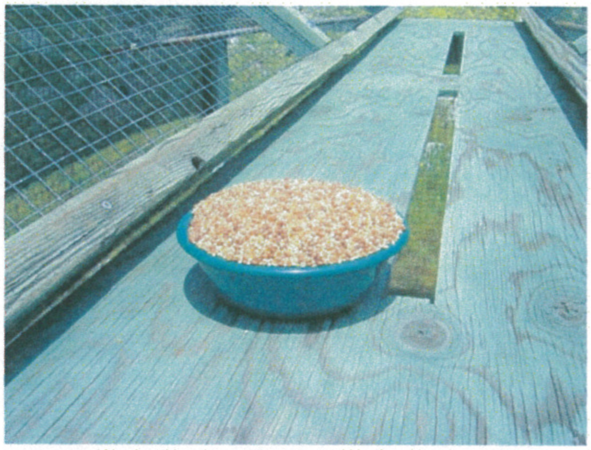
Each trap is 6' wide, 8' long, and 6' tall, with a 1 3/8" wide capture slot on top through which cowbirds can drop down and in but cannot fly up and out. The traps include: 1 floor, 2 side, 2 end (door and back), and 2 top panels, and a plywood slot board.

Transporting cowbird trap panels to the trap site.

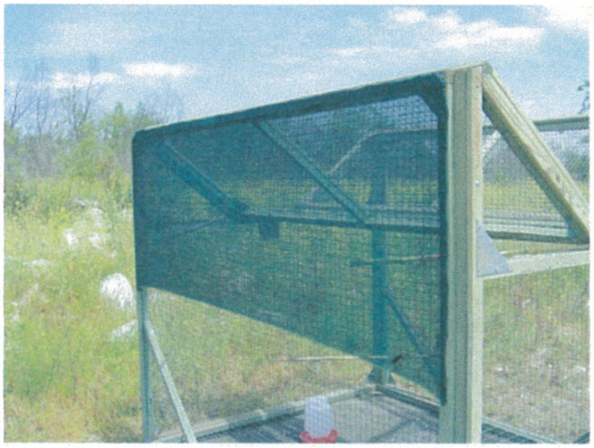
Cowbird trap placed and "flowered" for easy assembly.

Each trap was aligned in the field on a north-south axis. A foraging tray was placed on the front portion of the floor panel centered under the capture slot. Four perches made of dead giant reed (*Arundo donax*) stalks were installed in each trap: one in each trap corner at chest height (except above the door) and one in a rear corner at knee height (for subordinate birds). A warning/ informative sign was stapled to the front of each trap (Appendix 1). Shade cloth was applied to the west-facing side panel. Finally, a one-gallon water guzzler, approximately 1 lb of sunflower-free wild birdseed (on the foraging tray), and live decoy cowbirds were added to each trap, and the trap was locked.

Trap assembly supplies.



Bait seed ready to be added through the capture slot.



Shade cloth on the west-facing panel.

Adding live decoy cowbirds to trap from transport cage.

Male cowbirds are more active and vocal when at least 2 are present; female cowbirds are more likely to enter traps containing more females than males (GWB 1992). Therefore, at least 2 male and 3 female decoy cowbirds were utilized. Each trap contained at least 1 male and 1 female decoy cowbird as of 12 April, and the preferred 2-3 male and 3-5 female live decoys as of 20 April and subsequently. The right primary wing feathers of each female decoy were kept clipped to ensure their demise upon accidental release or escape. Many of the live decoys used to stock the traps in the early season were captured off-site.

The traps were serviced daily from 1 April to 30 June. Daily servicing consisted of releasing all non-target birds, adding bait seed, adding water and/or cleaning the water guzzler as needed, wing-clipping newly captured female cowbirds, adding or removing decoy cowbirds to maintain the preferred decoy ratio, repairing or replacing the perches, foraging pad, sign, shade cloth or lock as needed, repairing damage from vandals, if any, and recording all activities on a data sheet. Data sheets were faxed daily to the Project Manager.

The traps were deactivated, disassembled, and transported to off-site storage on 30 June.

The number of cowbirds removed is a net number calculated by subtracting from the gross number of cowbirds captured: the number of banded cowbirds released, cowbirds released by vandals, cowbirds accidentally released, and unexplained missing decoy cowbirds.

Captured cowbirds not utilized as decoys were euthanized with carbon monoxide and provided as forage to raptor rehabilitation/reintroduction facilities.

A complete cowbird trapping protocol is available (GWB 1992).

This project was performed under the authority of Federal Endangered Species Permit TE 758175-7 and a Memorandum of Understanding (MOU) from the California Department of Fish & Game. The Principal Investigator was J.T. Griffith. The Project Manager was J.C. Griffith. The Trap Technicians were J.T. Griffith, A. Gutierrez, M. Hagan, and W. Hagan.

RESULTS

One hundred forty-six (146) cowbirds were removed in 2010, including 78 males, 67 females, and 1 juvenile (Table 1, Table 2). The male: female capture ratio was 1.1:1. No banded cowbirds or other banded birds were captured.

The first cowbirds were captured on 13 April: 1 male in Trap 1; 2 males in Trap 4. Most of the adult cowbirds were captured in weeks 2-7 (8 April – 19 May): 55/78 males (70.5%) and 60/67 females (89.6%) (Figure 5). The lone juvenile was captured on 29 June in Trap 1.

In addition to cowbirds, 466 non-target birds of 7 species were captured, of which all but 5 (1.1%) were released unharmed. This total includes the multiple capture, release, and recapture of a smaller number of individuals. No sensitive or endangered, threatened, or candidate non-target species were captured. No decoy or non-target birds died due to lack of food or water, or because of unclean conditions.

One incident of vandalism/ was recorded in 2010. On 7 May, the Trap 2 hasp was broken. Three male cowbirds were released. The trap was repaired immediately and no trap days were lost.

The time spent at each trap each day, exclusive of travel time, ranged from 5 minutes to 60 minutes depending upon: the number of cowbirds and non-target birds captured and released, the number of live decoy transfers necessary to maintain the proper decoy ratio, the number of water guzzlers scrubbed, the number and severity of vandalism events, and other variables.

DISCUSSION AND CONCLUSIONS

The number of cowbirds removed from Big Tujunga Wash and from each trap site varies year to year, sometimes independently. The number of cowbirds removed in 2010 (146, including 78 males, 67 females, and 1 juvenile) was higher than the 2001-2010 average (110.4, including 49.6 males, 55.6 females, and 5.1 juveniles).

Female cowbirds are territorial and extremely fecund (40-60 eggs per season). Even a single female can significantly decrease the reproductive success of host species in a given area. Therefore, to reduce or eliminate parasitism, cowbird traps must be deployed at regular intervals throughout occupied host habitat, and with respect to target host density. Traps deployed solely at cowbird foraging or roosting areas might remove large numbers of cowbirds, but with little impact upon the rate of parasitism among nearby hosts. At Big Tujunga Wash, the foraging areas are immediately adjacent to the host habitat, so the foraging area traps are just as effective in decreasing parasitism as are the riparian traps. The removal of 67 females in 2010 precluded up to 2,680 parasitism events (40 per female) allowing the production of up to 10,720 songbird young (4 per otherwise parasitized nest) in the study area. Because not all parasitism events are viable, the actual numbers of cowbird eggs and songbird young are likely much lower but still significant.

Locally raised cowbirds are easily and quickly captured after fledging, and are therefore good indicators of the efficacy of a trapping program. Only 1 juvenile was captured in 2010, suggesting that cowbird parasitism was essentially eliminated in the study area in 2010.

The use of multiple cowbird traps deployed at regular intervals throughout targeted host habitat during the breeding season (topical trapping) is highly successful in reducing or eliminating brood parasitism among targeted host species and other incidentally protected host species (Griffith and Griffith 2000). Despite such annual success, however, topical trapping does not appear to be reducing the regional cowbird population. If it were, the number of cowbirds captured each year would gradually decline, as would the need for cowbird control. However, the number of cowbirds removed each year has not declined (in fact, 2009 and 2010 were the highest capture totals ever, even with only 4 traps and a 91 day trapping season vs 7 traps and 122 days). If cowbirds were not removed each year, the parasitism rate among hosts would likely immediately return to pre-trapping levels.

In the absence of proven regional cowbird control, the Big Tujunga Wash cowbird control project will be required indefinitely to reduce or eliminate cowbird parasitism and enhance reproductive success among host species.

MANAGEMENT RECOMMENDATIONS

1. No changes in the number of traps (4), operation dates (1 April to 30 June), or operation protocol are recommended.

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Figure 1. 2010 Big Tujunga brown-headed cowbird control project study area.

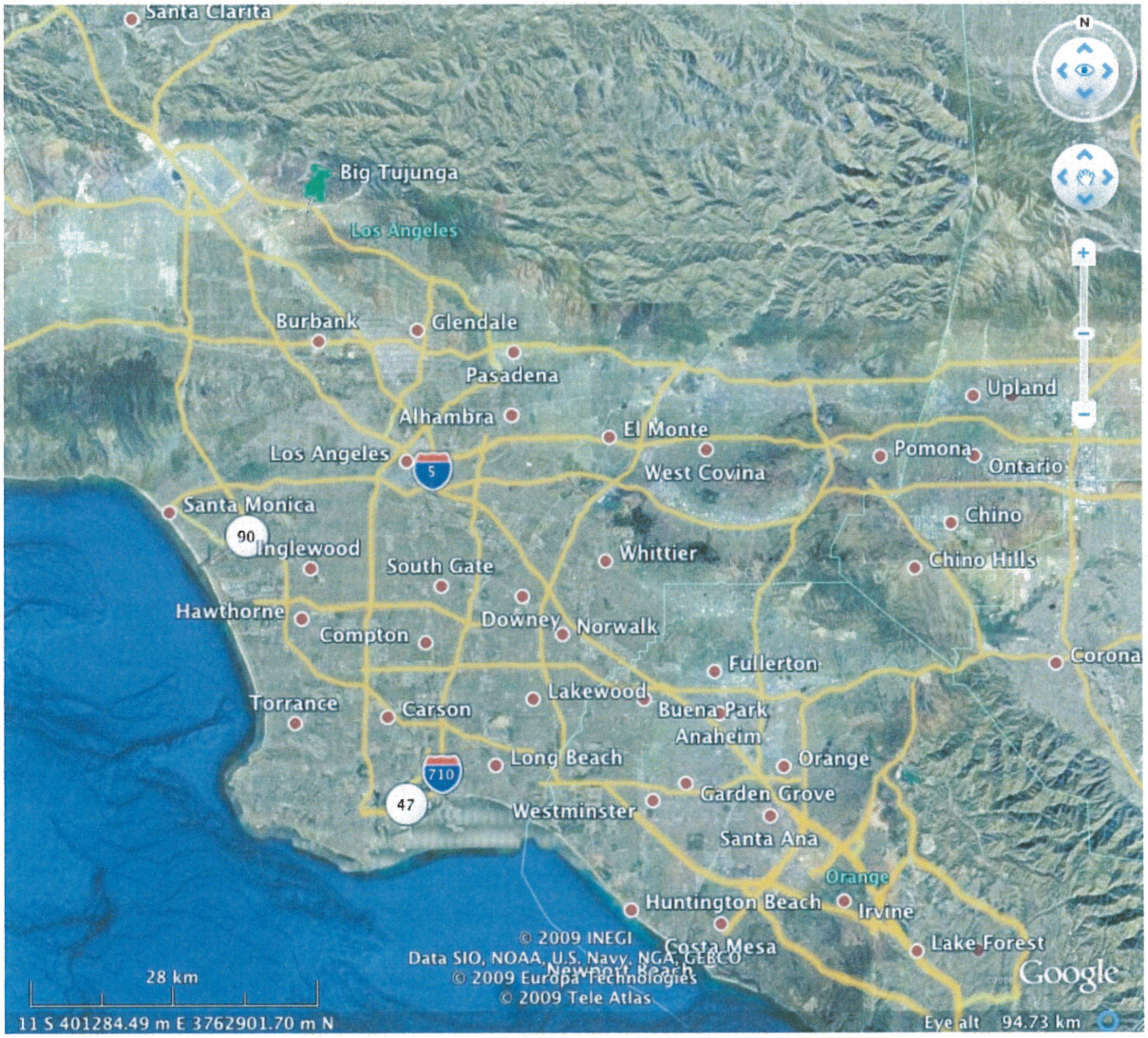
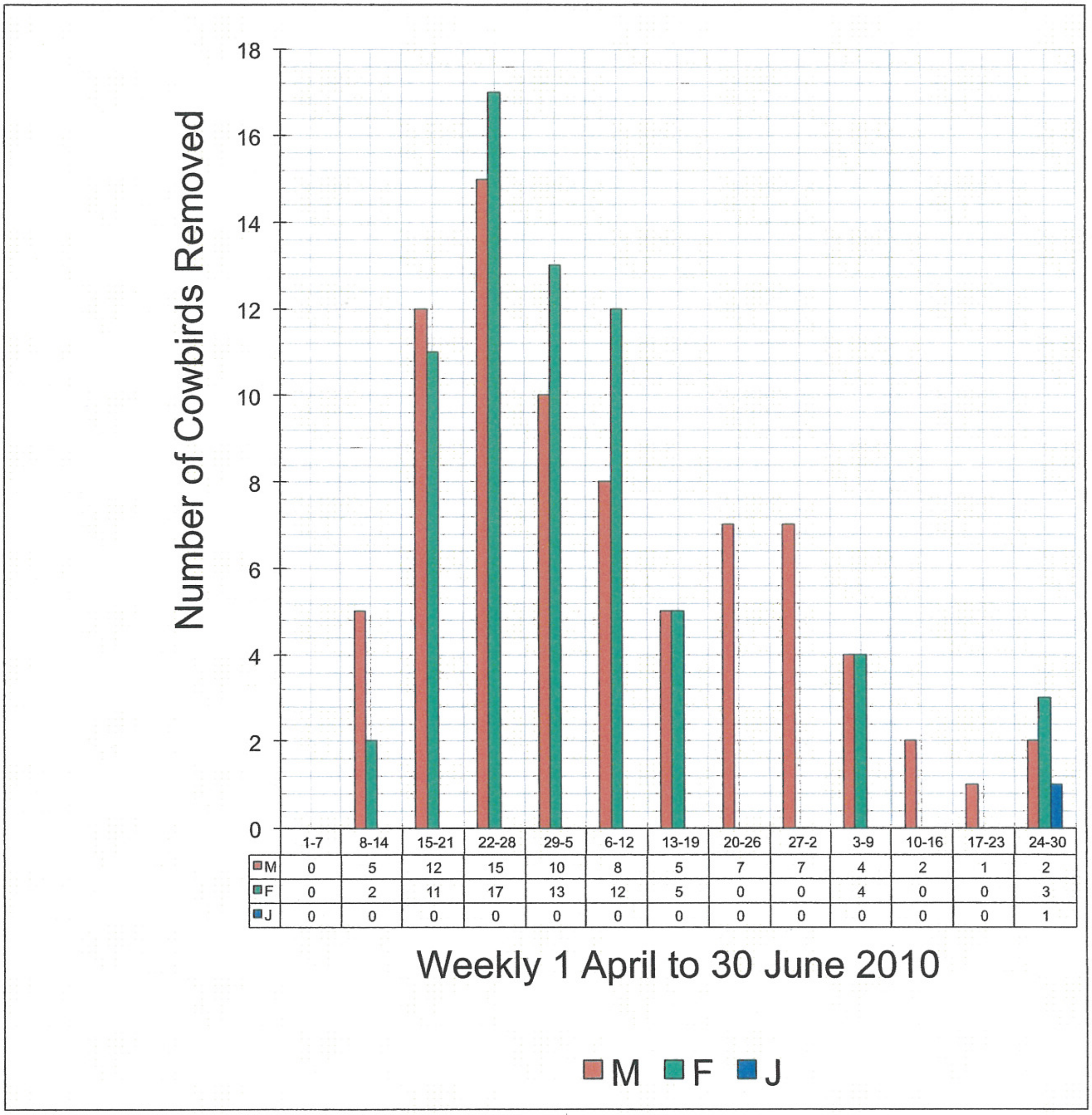


Figure 2. 2010 Big Tujunga brown-headed cowbird trap locations.

Figure 3. 2010 Big Tujunga brown-headed cowbird Trap 1 (top) and Trap 2 (bottom).

Figure 4. 2010 Big Tujunga brown-headed cowbird Trap 3 (top) and Trap 4 (bottom).

Figure 5. Number of male, female, and juvenile cowbirds removed per week at Big Tujunga in 2010.



	1-7	8-14	15-21	22-28	29-5	6-12	13-19	20-26	27-2	3-9	10-16	17-23	24-30
M	0	5	12	15	10	8	5	7	7	4	2	1	2
F	0	2	11	17	13	12	5	0	0	4	0	0	3
J	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 1. Number of brown-headed cowbirds captured at Big Tujunga, 2001-2010.

Year	Number of Traps	Trapping Period	Number of Cowbirds Captured: Male	Female	Juvenile	Total	Number Per Trap	M:F Ratio
2001	7	3/15 - 7/15	37	24	9	70	10.00	1.54
2002	7	3/15 - 7/16	66	105	2	173	24.71	0.63
2003	7	3/15 - 6/19	9	11	0	20	2.86	0.82
2004	7	3/15 - 7/15	46	37	6	89	12.71	1.24
2005[a]	7	3/30 - 8/1	53	66	18	137	19.57	0.80
2006[b,c]	4	4/6 - 6/29	30	24	2	56	14.00	1.25
2009	4	4/1 - 6/30	78	111	3	192	48.00	0.70
2010	4	4/1 - 6/30	78	67	1	146	36.50	1.16
TOTAL	47		397	445	41	883	18.79	0.89
AVG	5.875		49.63	55.63	5.13	110.38	18.79	0.89

a: Chambers Group, Inc. 2005
b: GWB 2006
c: Trap 4 operated 2-29 June only

Table 2. Number of male, female, and juvenile cowbirds captured per day, per week, per trap, and total at Big Tujunga Golf Course in 2010.

Date	Trap 1			Trap 2			Trap 3			Trap 4			TOTAL		
	M	F	J	M	F	J	M	F	J	M	F	J	M	F	J
Apr 1													0	0	0
2													0	0	0
3													0	0	0
4													0	0	0
5													0	0	0
6													0	0	0
7													0	0	0
wk 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8													0	0	0
9													0	0	0
10													0	0	0
11													0	0	0
12													0	0	0
13		1								3	1		3	2	0
14							1			1			2	0	0
wk 2	0	1	0	0	0	0	1	0	0	4	1	0	5	2	0
15							2	2		2			4	2	0
16		2					1			2			3	2	0
17										1			1	0	0
18										3			3	0	0
19		3						1					0	4	0
20										1	2		1	2	0
21								1					0	1	0
wk 3	0	5	0	0	0	0	3	4	0	9	2	0	12	11	0
22		1					1	1		3	3		4	5	0
23							1			2	1		3	1	0
24		1					2						2	1	0
25								1			2		0	3	0
26								2		3			3	2	0
27								3		1	1		1	4	0
28								1		2			2	1	0
wk 4	0	2	0	0	0	0	4	8	0	11	7	0	15	17	0
29							1						1	0	0
30		1					1	1					1	2	0
May 1								1		2	2		2	3	0
2								1		1	2		1	3	0
3	3	2					1	3		1			5	5	0
4													0	0	0
5													0	0	0
wk 5	3	3	0	0	0	0	3	6	0	4	4	0	10	13	0
6								1			1		0	2	0
7		2		-3			2			3	1		2	3	0
8				1				1					1	1	0
9	1												1	0	0
10							1						1	0	0
11					1					3	4		3	5	0
12											1		0	1	0
wk 6	1	2	0	-2	1	0	3	2	0	6	7	0	8	12	0
13	1	1		1			1				1		3	2	0
14													0	0	0
15								1					0	1	0
16													0	0	0
17		1					1						1	1	0
18		1											0	1	0
19	1												1	0	0
wk 7	2	3	0	1	0	0	2	1	0	0	1	0	5	5	0
20										1			1	0	0
21										1			1	0	0
22				1			2						3	0	0
23	1									1			2	0	0
24													0	0	0
25													0	0	0
26													0	0	0
wk 8	1	0	0	1	0	0	2	0	0	3	0	0	7	0	0
27													0	0	0
28	1						1						2	0	0
29													0	0	0
30							1			1			2	0	0
31													0	0	0
Jun 1							1						1	0	0
2	2												2	0	0
wk 9	3	0	0	0	0	0	3	0	0	1	0	0	7	0	0
3		1											0	1	0
4	1						1						2	0	0
5							1	1					1	1	0
6				1									1	0	0
7		2											0	2	0
8													0	0	0
9													0	0	0
wk 10	1	3	0	1	0	0	2	1	0	0	0	0	4	4	0
10							1						1	0	0
11													0	0	0
12										1			1	0	0
13													0	0	0
14													0	0	0
15													0	0	0
16													0	0	0
wk 11	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0
17													0	0	0
18										1			1	0	0
19													0	0	0
20													0	0	0
21													0	0	0
22													0	0	0
23													0	0	0
wk 12	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
24										1			1	0	0
25													0	0	0
26											2		0	2	0
27													0	0	0
28										1			1	0	0
29		1	1										0	1	1
30													0	0	0
wk 13	0	1	1	0	0	0	0	0	0	2	2	0	2	3	1
TOTAL	11	20	1	1	1	0	24	22	0	42	24	0	78	67	1

Table 3. Number of non-target species captured & released or preyed upon in cowbird traps at Big Tujunga Golf Course in 2010.

Species	Week 1		Week 2		Week 3		Week 4		Week 5		Week 6		Week 7	
	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU
EUST									2					
BLPH														
RWBL											1		1	
YHBL													1	
CATO	10		18	2	37	1	31		34		37	1	17	
HOFI							1						1	
HOSP	18		27		7		5		4		3		6	
TOTAL	28	0	45	2	44	1	37	0	40	0	41	1	26	0

Species	Week 8		Week 9		Week 10		Week 11		Week 12		Week 13		**TOTAL**	
	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	**C&R**	**PU**
EUST			1		3								**6**	**0**
BLPH											1		**1**	**0**
RWBL					7		1	1	7		4		**21**	**1**
YHBL													**1**	**0**
CATO	21		19		12		8		8		9		**261**	**4**
HOFI					1		8		6		4		**21**	**0**
HOSP	8		6		5		10		18		33		**150**	**0**
TOTAL	29	0	26	0	28	0	27	1	39	0	51	0	**461**	**5**

EUST European starling
BLPH black phoebe
RWBL red-winged blackbird
YHBL yellow-headed blackbird
CATO California towhee
HOFI house finch
HOSP house sparrow

Appendix 1. Warning/informational sign placed on cowbird traps at Big Tujunga in 2010.

PLEASE DO NOT DISTURB

ENDANGERED SPECIES MANAGEMENT PROGRAM

This trap is operated by GWB under authority of the U.S. Fish & Wildlife Service and the California Department of Fish & Game. The purpose of the trap is to remove brown-headed cowbirds from the breeding habitat of endangered songbirds during the nesting season (April - July) to allow normal reproduction. Cowbirds are non-native, artificially abundant blackbirds. Cowbirds never build nests. Instead, they lay their eggs (one every other day for 80-120 days) in the nests of other birds (hosts). This is called brood parasitism. The host parents then raise a single cowbird; their own chicks are smothered. This trap contains live decoy male (shiny black body, brown head) and female (plain brown) cowbirds. THIS TRAP IS SERVICED DAILY to care for the decoy birds, release all non-cowbirds, and add fresh seed and water. Please do not interfere with the operation of this trap. For each female cowbird removed, up to 240 more native songbird young are raised in this area. If you have questions about the operation of this trap, please call 906.337.0782 or visit www.griffithwildlife.com

THANK YOU FOR YOUR COOPERATION

GRIFFITH WILDLIFE BIOLOGY

APPENDIX D

Exotic Plant Removal Memos, Photographs, and CDFG Notification

Exotic Plant Removal Memos

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

April 2, 2010
(2007-110/C/C2)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 TASK C2 – Exotic Plant Removal and Maintenance (January through March 2010) in the Riparian Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Kwan:

This letter serves as a notice of completion on the combined plant removal and maintenance at the Big Tujunga Wash Mitigation Area (Mitigation Area) between January and March 2010. Exotic plant removal activities did not occur in the Mitigation Area during this period.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 4/2/2010

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
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Phone: (714) 648-0630 ● Fax: (714) 648-0935 ● Email: Ecorp@ecorpconsulting.com

June 30, 2010
(2007-110/C/C2)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 TASK C2 – Combined Exotic Plant Removal (April-June 2010) in the Riparian Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Kwan;

This letter serves as a notice of the continuation of invasive exotic plant removal effort and maintenance at the Big Tujunga Wash Mitigation Area during the fourth quarter of year 3 (April-June 2010).

Fourth quarter Task C2 activity began with pre-construction surveys to identify bird activity (nesting and territorial/courtship behavior) that would preclude exotic plant removal effort. Those surveys took place on April 28 and April 30. Areas that were determined to contain breeding and nesting birds were flagged off so that the exotic Nature's Image personnel.

The invasive exotic plant removal was performed by Nature's Image personnel between April 29 and May 5. Removal effort was performed on the restoration sections within the Mitigation Area. Natures Image personnel focused on new growth of invasive exotic species such as eupatory, giant reed, and castor bean. Invasive exotic deciduous trees that had emerged from dormancy (e.g., Ash species) were also treated for removal throughout the riparian area.

During the removal process the following protocols were conducted to minimize disturbance to sensitive habitat and species. Only water-soluble herbicide was used in areas within a 5-meter distance from all water sources. Water sources include Haines Canyon Creek, The Big Tujunga Ponds, and any ephemeral body of water. Outside of the 5-meter distance, oil-based and water-based herbicides were used. In the limited cases when field technicians and ECORP biologists entered Haines Canyon Creek, crossings were made only at established creek crossings to minimize disturbance to sensitive habitat and species.

Exotic plant removal activities were not conducted on the site during the month of June 2010.

Prior to any work, all Natures Image field technicians received an onsite orientation and instruction on the Mitigation Area's regulations and concerns relating to the Area's sensitive species and habitat by a qualified ECORP biologist.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: June 30, 2010

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

October 1, 2010
(2007-110/C/C2)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 TASK C2 – Exotic Plant Removal and Maintenance (July through September 2010) in the Riparian Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Kwan:

This letter serves as a notice of completion on the combined plant removal and maintenance at the Big Tujunga Wash Mitigation Area (Mitigation Area) between July and September 2010. Exotic plant removal activities did not occur in the Mitigation Area during this period. ECORP biologists conducted site visits on September 4 and 11, 2010, however, exotic plant issues were not addressed during these site visits.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 10/1/2010

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
1801 Park Court Place, Building B Suite 103, Santa Ana, California 92701
Phone: (714) 648-0630 ● Fax: (714) 648-0935 ● Email: Ecorp@ecorpconsulting.com

December 30, 2010
(2010-116/C/C2)

Valeria De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 4 TASK C2 – Second Quarter (October-December 2010) Exotic Plant Removal in the Riparian Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

This letter serves as a notice of the continuation of invasive exotic plant removal effort and maintenance at the Big Tujunga Wash Mitigation Area during the 2nd quarter of year 4 (October through December 2010).

Second quarter exotic plant removal activity began with pre-construction surveys to identify locations that required treatment and removal. The surveys served the following two purposes: First, identifying locations containing understory species (such as tree of heaven and castor bean); and second, identifying tree species that would require girdling. The data collected during the preconstruction survey was essential in planning the combined effort to take place later in the month, since both classes of exotic plants (understory and tree) require different treatment protocols. The preconstruction surveys took place on October 11th, 2010.

The invasive exotic plant removal was performed by Nature's Image personnel on the following dates: October 25 through 28, 2010. The first two days involved girdling and treatment of exotic trees (e.g., Ash species, eucalyptus). The second two days were dedicated to understory plant species (e.g., tree of heaven, giant reed, and castor bean tree).

During the removal process the following protocols were conducted to minimize disturbance to sensitive habitat and species. Only water-soluble herbicide was used in areas within a 5-meter distance from all water sources. Water sources include Haines Canyon Creek, The Big Tujunga Ponds, and any ephemeral body of water. Outside of the 5-meter distance, oil-based and water-based herbicides were used. In the limited cases when field technicians and ECORP biologists entered Haines Canyon Creek, crossings were made only at established creek crossings to minimize disturbance to sensitive habitat and species.

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Exotic plant removal activities were not conducted on the site during the months of November and December 2010.

Prior to any work, all Natures Image field technicians received an onsite orientation and instruction on the Mitigation Area's regulations and concerns relating to the Area's sensitive species and habitat by a qualified ECORP biologist.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: ______________________ DATE: 12/30/2010

Gregorio Benavides
Biologist

Exotic Plant Removal Photographs

Figure D-1. Castor bean plants removed from Mitigation Area and piled away from the trails.

Figure D-2. Natures Image exotic plant removal crew working in the Mitigation Area.

Figure D-3. Giant reed stalks that have been cut and treated with herbicide.

Figure D-4. Exotic tree stumps treated with herbicide.

Figure D-5. Giant reed stalks treated with herbicide.

Figure D-6. Homeless encampment observed during exotic plant removal activities.

CA Department of Fish and Game Notification

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

October 22, 2010
(2010-116/C/C2)

Ms. Jamie Jackson
California Department of Fish and Game
South Coast Region
4949 Viewridge Avenue
San Diego, CA 92123

RE: Notification No. 1600-2008-0253-R5 – Big Tujunga Wash Mitigation Area Exotic Plant Removal

Dear Ms. Jackson:

The purpose of this letter is to provide notification that exotic plant removal activities will potentially begin on October 26, 2010 at the Los Angeles County Department of Public Works' Big Tujunga Mitigation Area near the City of Sunland in Los Angeles County. The start date is conditioned on suitable weather conditions. The activities will begin with the biologists conducting a pre-construction survey and they will flag exotic plants that need to be removed. The exotic plant removal program has expanded to include the removal of ornamental trees in addition to arundo, tamarisk, water hyacinth, eupatory, and castor bean. Once the biologists have determined that no sensitive resources will be affected by the activities and after they have completed the flagging, the removal and maintenance activities will begin. A biological monitor will be on site during the removal and maintenance activities.

If you have any questions regarding the activities or the project in general, please contact me at (714) 648-0630.

Sincerely,

ECORP Consulting, Inc.

Mari Quillman

Mari (Schroeder) Quillman
Principal Biological Resources Program Manager

APPENDIX E

Exotic Wildlife Removal Memos and 2010 Report

Exotic Wildlife Removal Memos

March 8, 2010
(2007-110 / D / D1)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: **Exotic Aquatic Species Removal Effort #1 of 2009/2010, in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. Kwan:

This letter serves as an update on the exotic aquatic species removal efforts conducted by ECORP Consulting, Inc. (ECORP) for the Big Tujunga Wash Mitigation Area (Mitigation Area). The purpose of the program is to remove exotic aquatic wildlife from the Tujunga Ponds and Haines Canyon Creek to reduce the negative impacts to sensitive native species. Those negative effects on native aquatic wildlife include, but are not limited to, the following: food and habitat competition, predation of native fishes, amphibians, and reptiles and their young by exotic species, and the potential to transmit harmful pathogens and parasites to native wildlife.

The first exotic aquatic species removal effort of the 2009/2010 contract year took place on March 2nd and continued through March 4th, 2010. The primary species targeted during the removal effort were the American bullfrog (*Rana catesbeiana*), red swamp crayfish (*Procambarus clarkii*), and largemouth bass (*Micropterus salmoides*). Fisheries biologists Brian Zitt, Gregorio Benavides, and Terrance Wroblewski utilized multiple sampling methods during this effort. During the day, Haines Canyon Creek was surveyed on foot to identify areas of where exotic species may reside. Baited minnow traps were then deployed into these areas and allowed to set for approximately 24 hours prior to being checked.

Snorkeling reconnaissance surveys were conducted in both ponds to identify underwater features, the presence of nests, and best suited placement sites for traps. Two fyke nets were deployed, one in the channel of the West Pond leading into Haines Canyon Creek and the other in the channel connecting the East and West Ponds. Baited turtle traps were deployed in the West and East Ponds, and minnow/crayfish traps were deployed around the fyke net in the connecting channel and in the East and West

Ponds. All traps and nets were set for approximately 24 hours prior to being checked. Night spearfishing surveys were conducted in East and West Ponds for the purpose of targeting exotic adult fishes. In addition to the spearfishing surveys, bullfrog gigging surveys were conducted around the perimeter of the ponds and in the upper portions of Haines Canyon Creek.

Minnow/crayfish traps continue to be effective at removing red swamp crayfish, with the backwater pools in the creek being a more productive placement site than the ponds. The high visibility in the ponds favors spearfishing as the most effective method of removing larger bass, bluegill, and green sunfish. Snorkel surveys continue to be an effective method of identifying and exotic fish nests and targeting exotic turtles for capture.

During the snorkeling surveys, five red-eared sliders (*Chrysemys scripta elegans*) and one common snapping turtle (*Chelydra serpentina*) were removed from the ponds. Several exotic fish nests were also destroyed in both ponds. All of the captured turtles were transported offsite and donated to the Orange County Turtle and Tortoise Club for adoption. Two adult bullfrogs were captured during night surveys along the perimeter of both ponds. No bullfrog egg masses were observed; however, a number of bullfrog tadpoles were observed in the East Pond. During this effort a single native fish species, arroyo chub (*Gila orcutti*), was captured in two separate minnow traps in the creek. The animals were identified, measured, and released back in the creek.

The Station Fire and the subsequent heavy rain events in the watershed have had a considerable effect on Haines Canyon Creek, which may have had an impact on the recent survey results. Heavy flows from the Big Tujunga Wash have carried turbid waters into the creek, thus increasing the suspended sediment load. This greatly decreased the visibility during our visual surveys of the creek. The higher water velocity combined with the additional sediment has filled in many previously identified deep water pool habitats typically inhabited by exotic species.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 3/8/10

Gregorio Benavides
Biologist

March 16, 2010
(2007-110 / D / D1)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: **Exotic Aquatic Species Removal Effort #2 of 2009/2010, in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. Kwan:

This letter serves as an update on the exotic aquatic species removal efforts conducted by ECORP Consulting, Inc. (ECORP) for the Big Tujunga Wash Mitigation Area (Mitigation Area). The purpose of the program is to remove exotic aquatic wildlife from the Tujunga Ponds and Haines Canyon Creek to reduce the negative impacts to sensitive native species. Those negative effects on native aquatic wildlife include, but are not limited to, the following: food and habitat competition, predation of native fishes, amphibians, and reptiles and their young by exotic species, and the potential to transmit harmful pathogens and parasites to native wildlife.

The second exotic aquatic species removal effort of the 2009/2010 contract year took place on March 10th and 11th, 2010. The primary species targeted during the removal effort were the American bullfrog (*Rana catesbeiana*), red swamp crayfish (*Procambarus clarkii*), and largemouth bass (*Micropterus salmoides*). Fisheries biologists Manna Warburton, Brian Zitt, Gregorio Benavides, and Terrance Wroblewski utilized multiple sampling methods during this effort. It should be noted that sediment deposits are beginning to become evident within Haines Canyon Creek, a direct result of the recent Station Fire and subsequent heavy rainfall within the watershed.

Haines Canyon was surveyed in the following manner. First, the entire portion of Haines Canyon Creek within the Mitigation Area was surveyed on foot to identify areas where exotic species may reside. Deep pool habitats within the creek were snorkeled in an attempt to locate and remove exotic species (primarily fish and red swamp crayfish). No exotic species were observed in Haines Canyon Creek. Only one Santa Ana sucker (*Catostomus santaanae*) was observed in the lower part of Haines Canyon Creek.

Second, baited minnow traps were deployed in the upper portions of Haines Canyon Creek and were allowed to set for approximately 24 hours prior to being checked.

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Baited traps were set in slow-moving waters with dense riparian bank cover, which are the areas where red swamp crayfish are typically found.

The Tujunga Ponds were surveyed in the following manner. First, two fyke nets were simultaneously deployed, one in the channel of the West Pond leading into Haines Canyon Creek and the second in the channel connecting the East and West Ponds. Baited minnow/crayfish traps were set adjacent to both fyke nets and along the banks of both the East and West Pond. Baited turtle traps were deployed in the West and East Ponds. All traps and nets were set for approximately 24 hours prior to being checked.

Next, day and night spearfishing surveys were conducted in the East and West Ponds to target exotic adult fishes. During the spearfishing effort, bullfrog surveys were conducted around the perimeter of the ponds and in the upper portion of Haines Canyon Creek. In addition, snorkeling surveys were conducted in both of the ponds to identify and remove nests of exotic fish.

The high visibility in the ponds favors the spearfishing and snorkeling methods for controlling exotics. Spearfishing continues to be the most effective method of removing larger bass, bluegill, and green sunfish in both ponds; while snorkel surveys continued to be an effective method of identifying and disrupting exotic fish nests, as well as targeting exotic turtles for capture.

During the snorkeling surveys, three red-eared sliders were removed from the ponds and several exotic fish nests were destroyed. All turtles were transported off site for adoption. One gravid female bullfrog was captured in the connecting channel fyke net. No bullfrog egg masses were observed; however, a number of bullfrog tadpoles were observed in the East Pond.

On both days of surveying in the East Pond, a native southwestern pond turtle (*Actinemys marmorata pallida*) was observed and its general condition was recorded. This southwestern pond turtle appears to be a different one than has been seen previously. The same resident southwestern pond turtle that has been captured in the ponds on numerous occasions has distinct markings. The southwestern pond turtle captured this time did not have the same distinct markings.

The Station Fire and the subsequent heavy rain events in the watershed have had a considerable effect on Haines Canyon Creek, which may have had an impact on the recent survey results. Heavy flows from the Big Tujunga Wash have carried turbid waters into the creek, thus increasing the suspended sediment load. This greatly decreased the visibility during our visual surveys of the creek. The higher water velocity combined with the additional sediment has filled in many previously identified deep water pool habitats typically inhabited by exotic species.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 3/16/10

Gregorio Benavides
Biologist

June 25, 2010
(2010-074/D/D1)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: **Exotic Aquatic Species Removal Efforts in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. Kwan,

This letter serves as a summary of the exotic aquatic species removal efforts conducted by ECORP Consulting, Inc. (ECORP) for the Big Tujunga Wash Mitigation Area (Mitigation Area). The purpose of this program is to remove exotic aquatic wildlife from the Tujunga Ponds and Haines Canyon Creek to reduce the negative impacts to sensitive native species. Those negative effects on native aquatic wildlife include, but are not limited to, the following: food and habitat competition, predation of native fishes, amphibians, and reptiles and their young by exotic species, and the potential to transmit harmful pathogens and parasites to native wildlife.

The exotic aquatic species removal efforts took place on June 21^{th} to 23^{th}, 2010. The primary species targeted during the removal effort were largemouth bass (*Micropterus salmoides*), the American bullfrog (*Rana catesbeiana*), and red swamp crayfish (*Procambarus clarkii*). Fisheries biologists Brian Zitt, Manna Warburton, Bonnie Rogers, and Terrance Wroblewski utilized multiple sampling methods during this effort.

During this effort, ECORP biologists set two fyke nets, twenty minnow/crayfish traps, and four turtle traps. Traps were baited and allowed to set for approximately 24 hours prior to being checked. One fyke net was set in the channel connecting the West and East Tujunga Ponds (connecting channel), while the other was set across the middle of the West Pond. Floats were placed within each fyke net's cod end to prevent the possibility of turtle or bird mortality. Baited minnow/crayfish traps were deployed in the East Pond, the connecting channel, and the upper portions of Haines Canyon Creek. Baited turtle traps were set in ideal basking areas of the East Pond.

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Visibility in both ponds was good, ranging from 5 to 10 feet, which allowed snorkel surveys to be conducted. Snorkeling surveys were conducted in both ponds to identify and remove nests of exotic fish. In addition to snorkeling the ponds, the entire portion of Haines Canyon Creek, within the Mitigation Area, was surveyed on foot to identify areas where exotic species may reside. Deep pool habitats within the creek were snorkeled in an attempt to locate and remove exotic species (primarily fish and red swamp crayfish). Day and night spearfishing efforts were conducted in both the East and West Ponds targeting large exotic fishes. In addition to the night spearfishing, night bullfrog gigging surveys were conducted around the perimeter of the East and West Ponds and on foot through the upper portion of Haines Canyon Creek.

During the survey of Haines Canyon Creek several red swamp crayfish were captured and removed by hand. Native fish species, Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus* spp. 3), and arroyo chub (*Gila orcutti*) were observed throughout the creek in all size classes.

The high visibility in the ponds continues to favor spearfishing and snorkeling methods for controlling exotics. Spearfishing continues to be one of the most effective method of removing larger bass, bluegill, and green sunfish in both ponds; while snorkel surveys continued to be an effective method of identifying and disrupting exotic fish nests, as well as targeting exotic turtles for capture.

During the snorkeling surveys, one red-eared slider turtle was removed from the ponds while a native southwestern pond turtle (*Actinemys marmorata pallida*) was observed and its general condition was recorded. Based on the distinct markings, the southwestern pond turtle appears to be the same resident pond turtle that has been captured in the ponds on numerous occasions. The exotic turtle was transported off site for adoption.

The fyke nets were effective at capturing exotic fishes and bullfrogs (adults and tadpoles). Bullfrog tadpoles are still present in relatively high numbers in the East Pond; however, during the snorkeling surveys no bullfrog egg masses were observed. Minnow/crayfish traps were effective at capturing red swamp crayfish and bullfrog tadpoles.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED:___________________________ DATE: 6/25/10

Brian Zitt
Fisheries Biologist

October 14, 2010
(2010-116/D/D1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: **Exotic Aquatic Species Removal Efforts in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. De La Cruz:

This letter serves as a summary of the exotic aquatic species removal efforts conducted by ECORP Consulting, Inc. (ECORP) for the Big Tujunga Wash Mitigation Area (Mitigation Area). The purpose of this program is to remove exotic aquatic wildlife from the Tujunga Ponds and Haines Canyon Creek to reduce the negative impacts to sensitive native species. Those negative impacts on native aquatic species include, but are not limited to, the following: food and habitat competition, predation, and the potential to transmit harmful pathogens and parasites.

The exotic aquatic species removal took place on October 11 to 13, 2010. The primary species targeted during the removal effort were largemouth bass (*Micropterus salmoides*), the American bullfrog (*Lithobates catesbeianus*), and red swamp crayfish (*Procambarus clarkii*). Fisheries biologists Todd Chapman, Brian Zitt, and Terrance Wroblewski concentrated their removal efforts in Haines Canyon Creek to specifically survey for these target species which were observed throughout the Creek during the last removal effort in June 2010.

Electrofishing was utilized throughout Haines Canyon Creek in areas containing habitat features (i.e. large pools and undercut banks) typically associated with exotic aquatic species. Electrofishing crews consisted of one biologist carrying a backpack electrofisher unit, and two biologists (dip-netters) equipped with long-handled dip nets and fish carrier buckets. The electrofishing crew worked from the downstream boundary of the Mitigation Bank upstream in short segments (reaches) that spanned no more than 100 meters in length, concluding at the confluence of the West Pond. This was accomplished by an ECORP biologist carrying the backpack electrofisher unit, working in an upstream direction, slowly creating a zig-zag pattern back and forth across the Creek. Dip-netters followed immediately adjacent to or just behind the electrofisher unit, netting stunned fish and other aquatic species. This sampling technique enabled the removal of fish, amphibians, and invertebrates from pools, isolated riffles, and runs. The electrofishing crew typically sampled 25-50 meter reaches before stopping to process the catch. Electrofishing was also used in tandem with blocking and seine nets which were set as barriers to limit fish escapement during the electrofishing efforts.

Exotic aquatic species collected and removed during this effort included: red swamp crayfish, largemouth bass, green sunfish (*Lepomis cyanellus*), goldfish (*Carassius auratus*), black bullhead (*Ameiurus melas*), and the American bullfrog. During the collection and removal of these exotic aquatic species, several rock dams and foot bridges were observed within Haines Canyon Creek. These features reduce the normal flow of the Creek and are adversely impacting the native species of Big Tujunga. These features were carefully removed to allow the Creek to return to its normal course.

While conducting removal efforts, all three species that make up the native fish assemblage of Haines Canyon Creek were collected. These species include the Santa Ana sucker (*Catostomus santaanae*), a federally listed as threatened species, and the Santa Ana speckled dace (*Rhinichthys osculus* spp.3) and arroyo chub (*Gila orcutti*), which are both California Species of Concern. All native fishes were recorded and released back into the Creek unharmed. Based on field observations these native fishes appeared to be robust.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED:________________________ DATE: 10/14/10

Brian Zitt
Fisheries Biologist

December 6, 2010
(2010-116/D/D1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: **Exotic Aquatic Species Removal Efforts in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. De La Cruz:

This letter serves as a summary of the exotic aquatic species removal efforts conducted by ECORP Consulting, Inc. (ECORP) for the Big Tujunga Wash Mitigation Area (Mitigation Area). The purpose of this program is to remove exotic aquatic wildlife from the Big Tujunga Ponds and Haines Canyon Creek to reduce the negative impacts to sensitive native species. Those negative impacts on native aquatic species include, but are not limited to, the following: food and habitat competition, predation, and the potential to transmit harmful pathogens and parasites.

The exotic aquatic species removal took place on November 17th to 19th, 2010. The primary species targeted during the removal effort were largemouth bass (*Micropterus salmoides*), the American bullfrog (*Lithobates catesbeianus*), and red swamp crayfish (*Procambarus clarkii*). Aquatic biologists Terrance Wroblewski, Gregorio Benavides Philip Wasz, and Jesse Byrd conducted removal efforts in the Tujunga Ponds and Haines Canyon Creek using a suite of sampling methods.

During this removal effort, ECORP biologists set four fyke nets, seventeen minnow/crayfish traps, and four turtle traps. Traps were baited and allowed to set for approximately 24 hours prior to being checked. One fyke net was set in the channel connecting the West and East Tujunga Ponds (connecting channel), one was set in the channel from the West Pond and the connection to Haines Canyon Creek, while the other two were set across the middle of the West and East Tujunga Ponds. Floats were placed within each fyke net's cod end to prevent the possibility of turtle or bird mortality. Baited minnow/crayfish traps were deployed in the East Pond, the connecting channel, and the upper portions of Haines Canyon Creek. Baited turtle traps were set in ideal basking areas of the East Pond.

Visibility in both ponds was good, ranging from 5 to 15 feet, which allowed snorkel surveys to be conducted. Day spearfishing efforts were conducted in the West Pond targeting large exotic fishes. Two-person seining was conducted throughout the upper portion of Haines Canyon Creek.

Exotic aquatic species collected and removed during this effort included: red swamp crayfish, largemouth bass, green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus)*, and American bullfrog tadpoles.

While conducting removal efforts, one of the three species that make up the native fish assemblage of Haines Canyon Creek was collected, the arroyo chub (*Gila orcutti*), a California Species of Special Concern. All native fishes were recorded and released into the creek unharmed. Based on field observations these native fishes appeared to be of good health.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED:________________________ DATE:__12/6/10________

Terrance Wroblewski
Fisheries Biologist

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

December 16, 2010
(2010-116/D/D1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: **Exotic Aquatic Species Removal Efforts in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. De La Cruz:

This letter serves as a summary of the exotic aquatic species removal efforts conducted by ECORP Consulting, Inc. (ECORP) for the Big Tujunga Wash Mitigation Area (Mitigation Area). The purpose of this program is to remove exotic aquatic wildlife from the Tujunga Ponds and Haines Canyon Creek to reduce their negative impacts on sensitive native species. These negative impacts on native aquatic species include, but are not limited to, the following: food and habitat competition, predation, and the potential to transmit harmful pathogens and parasites.

The exotic aquatic species removal effort took place December 1 through 3, 2010. The primary species targeted during the removal efforts were largemouth bass (*Micropterus salmoides*), the American bullfrog (*Lithobates catesbeianus*), and red swamp crayfish (*Procambarus clarkii*). Fisheries biologists Brian Zitt, Terrance Wroblewski, Philip Wasz, and Jesse Byrd conducted removal efforts in the Tujunga Ponds and Haines Canyon Creek using a suite of sampling methods.

During this removal effort, ECORP biologists set a total of twenty-eight baited minnow/crayfish traps and one fyke net in habitats suitable for catching and removing exotic aquatic species. Twenty of the minnow/crayfish traps were set in the upper portions of Haines Canyon Creek, nearest the West Tujunga Pond. The remaining minnow/crayfish traps were set in the East Tujunga Pond and the channel connecting the West and East Tujunga Ponds (Connecting Channel). Each of the minnow/crayfish traps were baited and allowed to set for approximately 24 hours prior to being checked. The single fyke net was set in the Connecting Channel and allowed approximately 24 hours prior to being checked. Floats were placed within the fyke net's cod end to prevent the possibility of turtle or bird mortality.

Seine nets of various sizes (10 and 18 feet in length) were used to capture exotic aquatic fishes and crayfish out of the upper reaches of Haines Canyon Creek. Seine hauls targeted undercut banks and side pools with slower moving water. At night, bullfrog gigging surveys were conducted around the perimeter of the Tujunga Ponds and the upper portion of Haines Canyon Creek. While conducting the bullfrog gigging surveys at night, spearfishing efforts were also conducted in the Tujunga Ponds. Spearfishing primarily targeted the removal of large exotic fishes, although it has proven to be an effective method of removing other exotic aquatic species (e.g. turtles, American bullfrogs, and red swamp crayfish).

The exotic aquatic species captured and removed during this effort included: red swamp crayfish, largemouth bass, green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus)*, black bullhead (*Ameiurus melas*), and American bullfrogs (adult and tadpoles). In addition to collecting exotic aquatic species during the removal effort, three arroyo chub (*Gila orcutti*) were collected in Haines Canyon Creek. This fish is a California Species of Special Concern and based on field observations each individual appeared to be of good health. The three arroyo chub were immediately recorded and released into the creek unharmed.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED:____________________ DATE: 12/16/10

Brian Zitt
Fisheries Biologist

2010 Exotic Wildlife Removal Report

2010 Exotic Aquatic Wildlife Species Removal Report for The Big Tujunga Wash Mitigation Area

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CONTENTS

2010 Exotic Aquatic Wildlife Species Removal Report for the Big Tujunga Wash Mitigation Area

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

ECORP Consulting, Inc. (ECORP) was contracted by the Los Angeles County Department of Public Works (LACDPW) in July 2007 to continue the exotic aquatic species removal program that was set forth in the Master Mitigation Plan (MMP) for the Big Tujunga Wash Mitigation Area (Mitigation Area). The MMP was created to serve as a five-year guide for the implementation of various enhancement programs and to fulfill the California Department of Fish and Game's (CDFG's) requirement for the preparation of a management plan for the mitigation area. The MMP includes multiple strategies to enhance and protect existing habitat for wildlife and to create additional natural areas that could be utilized by native wildlife and numerous user (recreational) groups. It also provides specific direction for the capture and removal of exotic aquatic species from the various watercourses located within the Mitigation Area to relieve some of the negative impacts that these species have on native species. Implementation of the MMP initially began in August 2000, and a Long-term Maintenance and Management Plan (LTMMP) is currently being prepared to address the continuation of this program into the future.

Historically, all southern California coastal freshwater fish species have experienced demographic and ecological impacts by habitat alteration and dewatering and thus are greatly reduced in their distribution and abundances (Moyle 2002; Swift et al. 1993). These impacts are further compounded by the effects exotic aquatic species have on native fish species assemblages. One such native freshwater fish species assemblage in southern California is the South Coast Minnow-Sucker fish community (Ellison 1984), which is known to occur in the Mitigation Area. This assemblage consists of the following native fish species: Santa Ana sucker (*Catostomus santaanae*), a federally listed as threatened species; Santa Ana speckled dace (*Rhinichthys osculus* spp. 3), a California Species of Special Concern (SSC); and arroyo chub (*Gila orcutti*), also a California SSC. Compared with historical distribution records, the current distribution for each of these species has been severely reduced. The Mitigation Area remains an important refuge from habitat alteration and dewatering and is considered to be one of the last remaining locations in the Los Angeles River Drainage where these three species of fish can still be found (Swift et al. 1993). Despite this fact, the threat of ecological and demographic effects generated by exotic aquatic species remains a great concern.

The Mitigation Area currently provides suitable habitat for two native reptile species, the western pond turtle (*Actinemys marmorata*) and the two-striped garter snake (*Thamnophis hammondii*). These species are both listed as California SSC and have are known to occur within the site. Historically, the Mitigation Area supported suitable habitat for native amphibian species such as the arroyo toad (*Anaxyrus californicus*) and California red-legged frog (*Rana draytonii*). Known populations of arroyo toad are located upstream of the Mitigation Area in Big Tujunga Wash and several of its tributaries. The mountain yellow-legged frog (*Rana muscosa*) was also historically known to occur in the upper reaches of Haines Canyon Creek, which flows directly into the Mitigation Area; however, both the arroyo toad and the mountain yellow-legged frog are not known to occur within or immediately adjacent to the Mitigation Area.

The purpose of implementing the exotic aquatic species removal program in the Mitigation Area is to restore, create, and maintain suitable habitat for native aquatic species and to remove and eliminate the pressures created by these species. The removal program focuses on the removal of exotic fishes, reptiles, amphibians, and invertebrates from all suitable habitat within the Mitigation Area using a suite of proven sampling techniques. This report provides the results of the exotic aquatic species removal effort conducted during 2010.

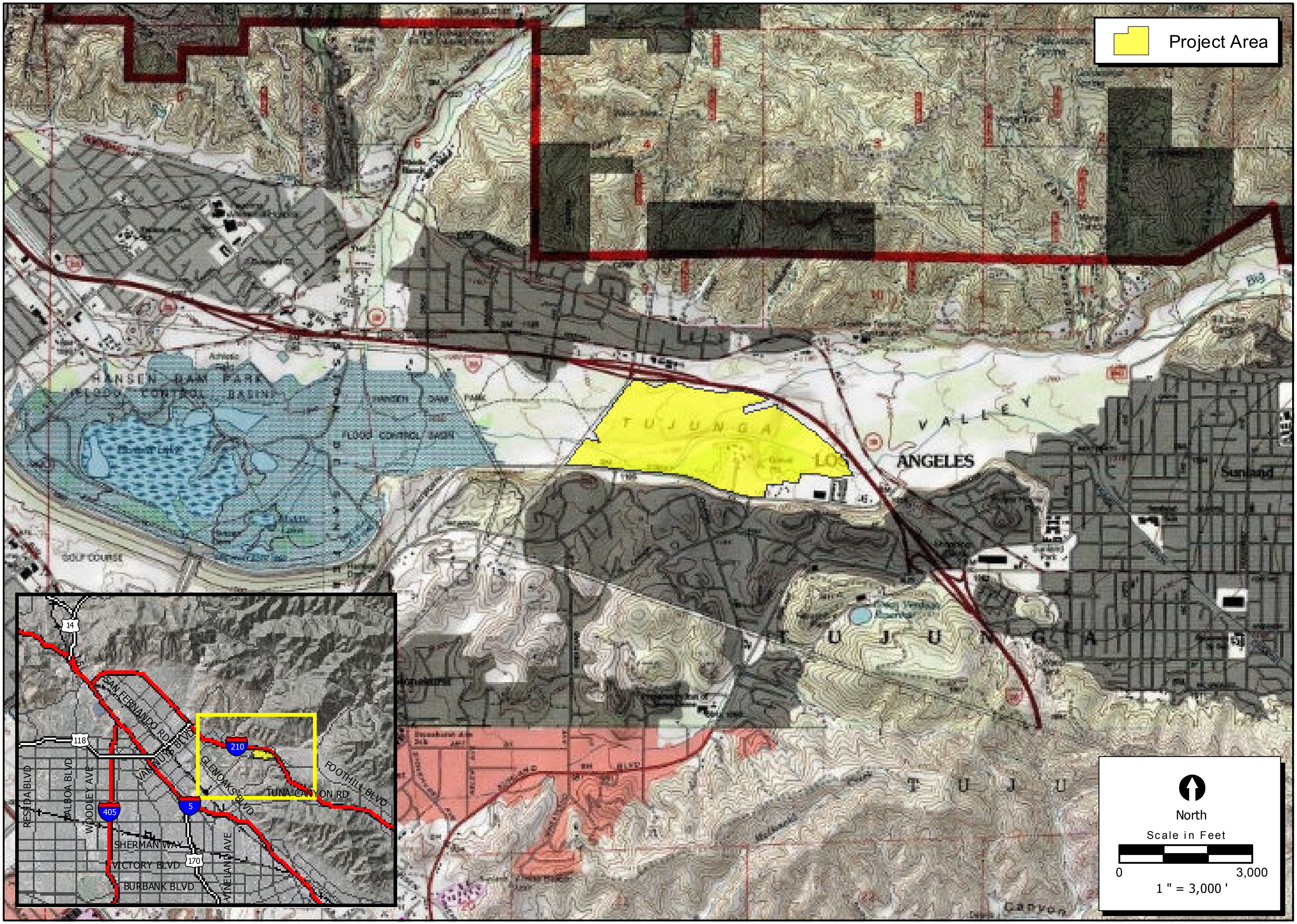
1.1 Location and Setting

The Mitigation Area is located in Big Tujunga Wash, just downstream of the Interstate 210 (I-210) Freeway overcrossing, in the Sunland area near the City of Los Angeles within the San Fernando Valley, Los Angeles County, California (Figure 1-1). The area is bordered on the north and east by I-210 and on the south by Wentworth Street. The western boundary is contiguous with high power lines crossing the Big Tujunga Wash just upstream of Hansen Dam Park and Recreation Area. The Mitigation Area is located within a state-designated Significant Natural Area (LAX-018) and the biological resources are of local, regional, state, and federal significance.

The Mitigation Area supports three watercourses (Figure 1-2): Big Tujunga Wash, Haines Canyon Creek (Haines Canyon Creek), and the Big Tujunga Ponds (Ponds). The Big Tujunga Wash (Wash) is located in the northern portion of the mitigation area. Water flow within the Wash is dependent on controlled releases from the Big Tujunga Dam (approximately 12 miles to the northeast) and from local rainfall. Flow within the Wash is therefore intermittent, leaving it dry for large portions of the year.

Haines Canyon Creek, a relatively narrow and densely vegetated perennial stream with flow originating from the Ponds, is located on the south side of the Mitigation Area and is situated between the Ponds and Hansen Dam. The creek contains a wide array of aquatic habitats that can range from slow moving (<0.3 meters/second [m/s]), deep pools (>1.5 m) to fast-flowing riffles and runs (>0.3 m/s) flowing over mud, cobble, and boulder substrates. The banks along the creek provide an equally diverse set of habitats, ranging from deep (>1.5 m) vegetated overhangs and undercuts, to shallow (<0.5 m) sandy beaches suitable for native juvenile fishes and amphibians. Haines Canyon Creek maintains a dense riparian buffer which provides an intact canopy cover throughout a majority of the mitigation area, helping to keep dissolved oxygen levels near saturation and water temperatures cool during the warm summer months. This riparian buffer also provides a source of woody debris, in-stream vegetation, and bank stability. Water flowing into creek originates from an underground spring that first supplies water to the Ponds. Haines Canyon Creek currently supports exotic aquatic species such as green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), red swamp crayfish (*Procambarus clarkii*), and American bullfrog (*Lithobates catesbeianus*).

The Ponds and surrounding riparian habitat were originally created as part of the mitigation measures initiated during the construction of the I-210 Freeway. The Ponds are located in the northeast corner of the mitigation area and consist of two large interconnected bodies of water each being approximately 50 m across at their widest point. The Ponds are divided into three distinct water features: West Pond, East Pond, and Connecting Channel.



Location: -116 Big Tujunga Wash Mitigation Area\MAPS\Site_Vicinity\Tujunga_ProjectVicinity_v3.mxd

Figure 1-1. Project Location

2010-116 Big Tujunga Wash Mitigation Area

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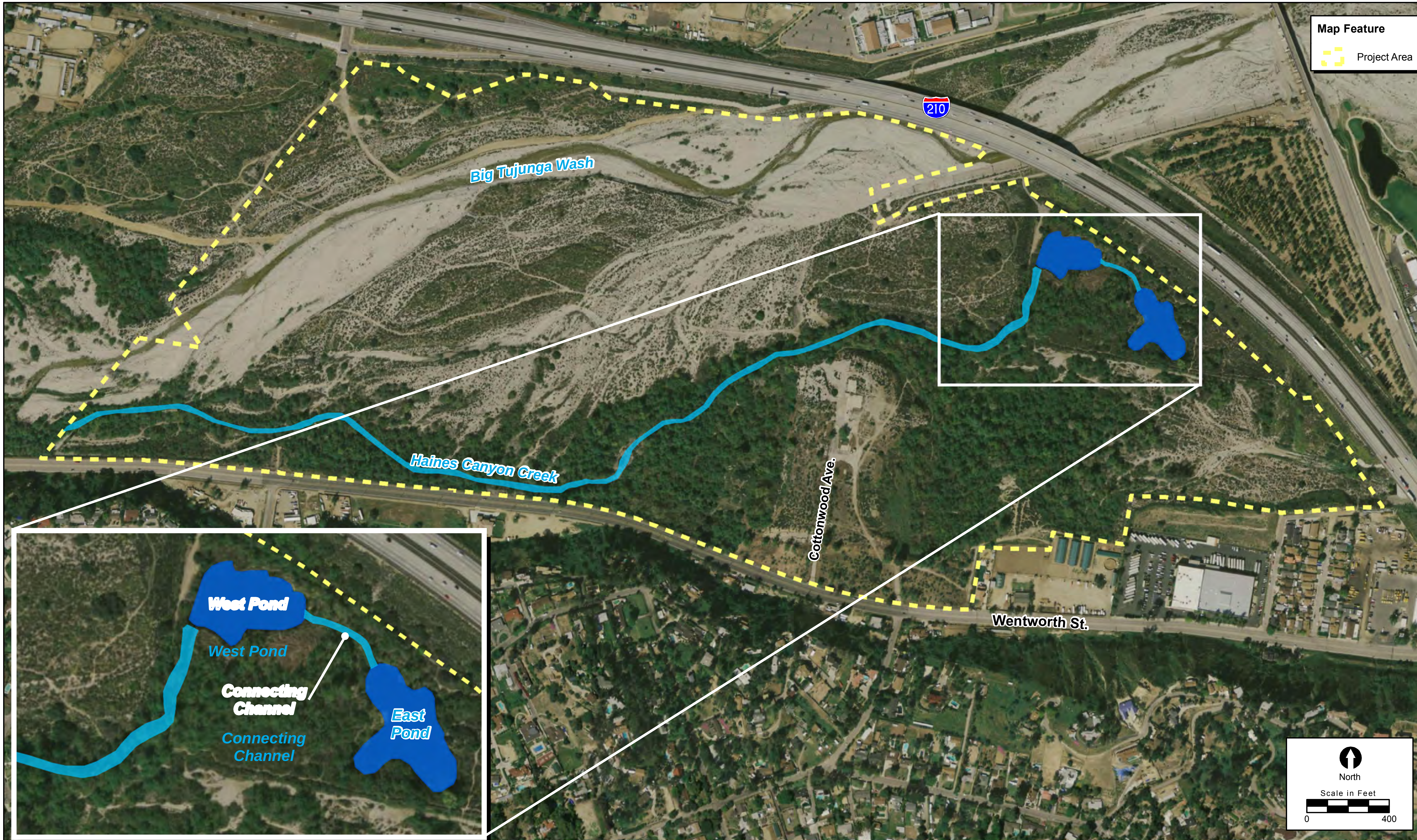

Aerial Date: DigitalGlobe March 2008

Figure 1-2. Project Area Watercourses

2010-116 Big Tujunga Wash Mitigation Area

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The West Pond lies adjacent to I-210, approximately 60 m to the south, and connects directly to Haines Canyon Creek. The West Pond has a surface area of approximately 3,200 m^2 and it provides a complex, heterogeneous space for many aquatic species. The water depths range from 1.8 to 3.7 m and the substrate consists mainly of fine silts and sands in the middle of the pond with cobble and gravel areas along portions of the perimeter. The West Pond is oblong in shape with a relatively uniform and less convoluted bank. The banks are heavily lined with native and non-native trees and plants that provide both submerged and overhanging habitat and refuge for many exotic aquatic species. Variation in algal and aquatic plant growth along the banks fluctuates according to seasonal weather changes, and contributes to the habitat complexity within the West Pond.

The Connecting Channel is an approximately 70 m long, narrow channel that connects the West and East Ponds. The Connecting Channel has a maximum width of 5 m, with dense riparian vegetation along the banks. The channel is shallow (<1 m) where it connects with the East Pond, becoming deeper (up to 1.5 m) when it reaches the West Pond.

The East Pond lies adjacent to I-210, approximately 65 m to the south. The East Pond has a surface area of approximately 3,300 m^2 and, like the West Pond, it provides a diverse combination of aquatic habitats. Water depths in this pond range from 1.8 to 3.7 m and the substrate consists mainly of fine silts and sands in the middle of the pond with cobble and gravel areas along portions of the perimeter. The banks are also heavily lined with native and non-native trees and plants that provide both submerged and overhanging habitat and refuge for many exotic aquatic species. Unlike the West Pond, the East Pond possesses a more complex bank with many shallow water coves. The East Pond also experiences seasonal fluctuations in algal and aquatic plant growth according to seasonal weather changes.

Haines Canyon Creek and the Ponds are part of the same watercourse. But when taking into consideration the ecological requirements of the South Coast Minnow-Sucker assemblage, these two systems are extremely different in the amount of suitable habitat they can provide for these native fish species. Historically, perennial deep-water habitats (i.e., ponds and lakes) were uncommon in southern California and thus this habitat is not typically suited for native southern California fish species, particularly the South Coast Minnow-Sucker fish assemblage. This habitat does favor the exotic aquatic species currently present in the Mitigation Area. The deep, silty substrates in the Ponds provide an excellent nesting area for largemouth bass and other exotic Centrarchid species. The heavily vegetated banks also provide refugia and forage for the larval and juvenile life stages of these exotic aquatic species. Due to the perennial nature of the ponds, they will continue to act as nurseries where the exotic fish species can produce offspring that could eventually move down into Haines Canyon Creek.

1.2 Exotic Aquatic Species Ecology in Mitigation Area

The extremely favorable habitat conditions in the Ponds (clear, slow moving water; abundant vegetation; availability of prey items – both native and introduced) have allowed several exotic aquatic species to become established after deliberate introductions or natural range expansions from other locations. Several of these species adapt well to varying conditions, and have persisted in the absence of natural predators and competitors. Together these factors have increased success of exotic aquatic species in the Mitigation Area, while potentially having direct and indirect negative effects on resident native aquatic species.

One of the most notable and predictable effects of exotic species on native species is predation of both adults and their young (Minckley et al. 1991). Largemouth bass spawning can occur from late spring to late fall, coinciding with the spawning period of Santa Ana sucker, Santa Ana speckled dace, and arroyo chub. Largemouth bass are known to cease feeding during their actual spawning period, but in the weeks leading up to spawning they feed voraciously in shallow waters and along vegetated banks (Moyle 2002). There is therefore a high risk of predation on gravid female and mature male native fishes during this pre-spawning period. Following the spawning period the threat remains for both adult and juvenile native fishes when largemouth bass resume normal feeding activity.

Santa Ana sucker, Santa Ana speckled dace, and the arroyo chub feed primarily on filamentous algae, crustaceans, insects, and detritus. Their diets place them in direct competition for food with many of the exotic fish species found within the Mitigation Area. Juvenile bluegill feed on both algae and zooplankton, green sunfish eat insects and zooplankton, and mosquitofish (*Gambusia affinis*) feed upon zooplankton. Even the early life stages of largemouth bass feed primarily on zooplankton and small aquatic invertebrates, such as red swamp crayfish, prior to their conversion to eating other fish. In freshwater fisheries, competition during the juvenile life stage can force what is termed a "juvenile bottleneck," wherein competition between juveniles of different species can cause a reduction in the successful transition from juvenile to pre-adult, thus affecting number of individuals that reach adulthood (Traxler and Murphy 1995).

The transmission of pathogens or parasites by exotic aquatic species is another potential threat to native species (Moyle and Nichols 1973), especially in instances where they are deliberately introduced from different waterways or regions. One example of this is the largemouth bass virus (LMBV), which is currently known to only affect largemouth bass (Grant et al. 2003). Genetic variations within LMBV have been observed from various populations, and these newly identified strains often manifest different symptoms within each affected population (Goldberg et al. 2003). This genetic variability suggests that although LMBV currently only affect largemouth bass, novel mutations of this virus could eventually pose a threat to native fish species.

1.3 Summary of Exotic Aquatic Species in the Mitigation Area

Three exotic aquatic species (red swamp crayfish, American bullfrog, and largemouth bass) have been identified as posing the greatest threat to the native aquatic species inhabiting the Mitigation Area. These species are described below.

Red swamp crayfish is a freshwater crustacean native to the southeastern United States. This species has become established in the western United States via deliberate introductions and natural range extensions. Red swamp crayfish have an average life span of to 5 years, with the ability to tolerate a wide range of environmental conditions. Once established in a system, their resilience to changes in environmental conditions and ability to maintain a flexibly diet feeding on available resources, give them the ability to continually alter naturally occurring food-webs. They are opportunistic feeders, often consuming (fish, amphibians, plants, or insects). This species is a major prey item for both largemouth bass and American bullfrog, thus helping to sustain the viability of these exotic aquatic species within affected systems.

American bullfrog (bullfrog) originally had a distribution restricted to the eastern and mid-western United States. It was introduced to the western states (including California and Colorado) during the early twentieth century, where it has become established in many types of waterways, especially those modified by humans. They can be found in lakes, ponds, creeks, and rivers typically along vegetated banks, although they have even been known to cross overland during rainy periods. Some environmental factors that favor bullfrog populations include: high nutrient or low water oxygen levels, elevated water temperatures, and overgrown bank vegetation. They are voracious predators, with the ability to consume anything that can fit into their mouth, including crayfish, frogs, turtles, toads, fish, snakes, birds, and even small mammals.

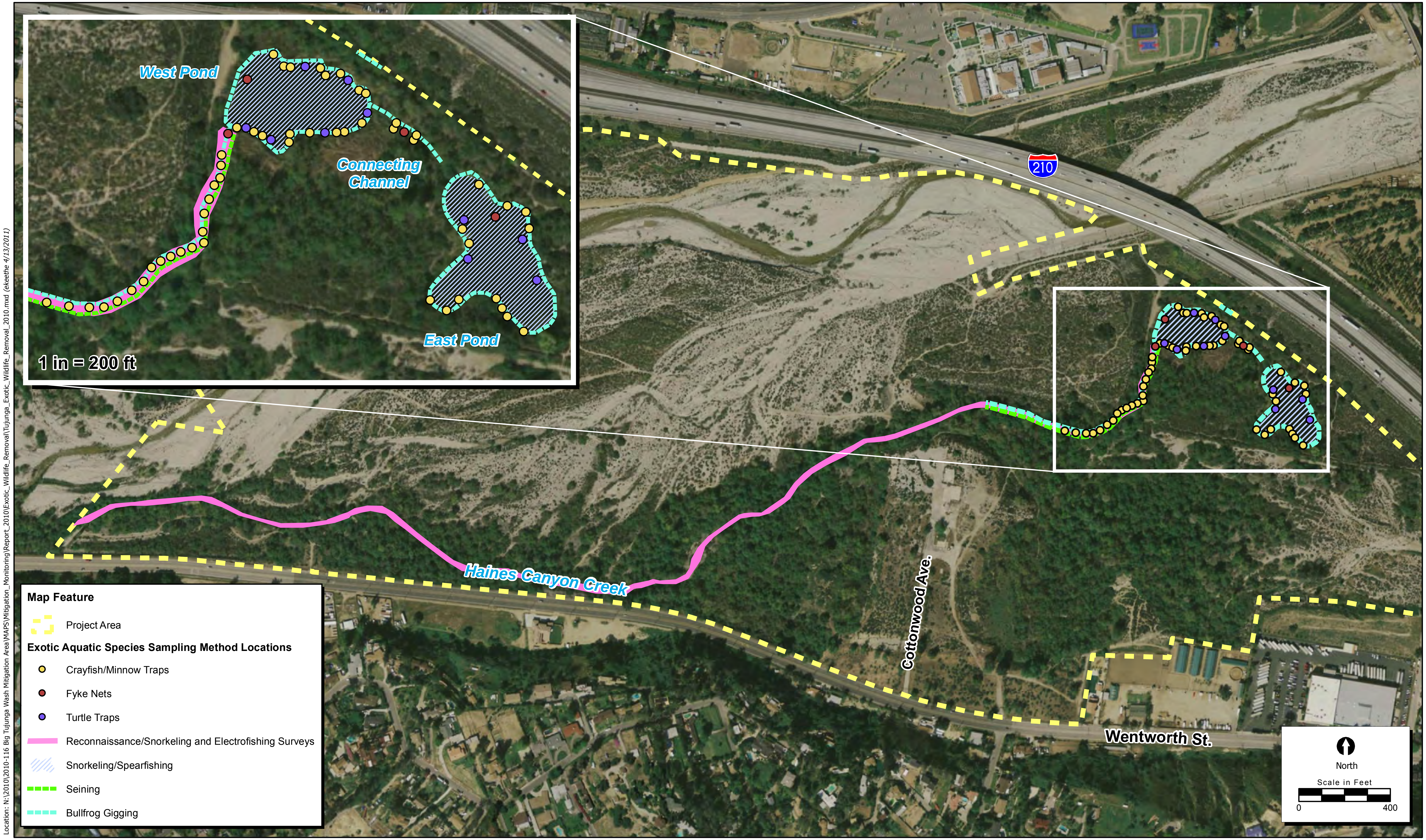
Largemouth bass are native to portions of eastern North America. Its original distribution extended from southern Canada to northern Mexico and from the Atlantic coast to the mid-west region of the United States. During the early twentieth century largemouth bass were widely introduced across the United States for their value as game fish. Currently, largemouth bass populations are distributed throughout the continental United States. Largemouth bass are typically found in clear lakes, ponds, reservoirs, rivers, creeks, or channels with vegetated banks or other forms of structural habitat complexity. Juvenile largemouth bass often utilize vegetated banks for both refuge and foraging on smaller fishes, zooplankton, and other invertebrates. Adult largemouth bass eat a wide variety of prey items, including insects, crayfish, fish, frogs, and birds. Although the predation of largemouth bass on native fishes is not well documented, in October 2007 after a largemouth bass was captured and removed from Haines Canyon Creek it was observed regurgitated an adult Santa Ana sucker.

2.0 METHODOLOGY

A wide range of sampling techniques was utilized during the exotic aquatic species removal efforts. The sampling approaches were adapted to the various site conditions encountered during each sampling session. The following methods were utilized to capture and remove exotic aquatic species: fyke-net trapping; backpack electrofishing; spearfishing (day and night); hand capture/snorkel surveys; bullfrog surveys; two-person seining; minnow trapping; and turtle trapping. Sampling locations and various sampling methods utilized are shown in Figure 2-1.

2.1 General Sampling Methods

Prior to each exotic aquatic species removal effort, the available sampling methods were evaluated to determine which of them would be most effective. The site conditions (access points, water visibility, presence of submerged aquatic vegetation, and crew safety) were taken into consideration prior to any final decisions on which methods would be utilized. Below is a description of each method used during these sampling efforts.



Aerial Date: DigitalGlobe March 2008

Figure 2-1. Exotic Aquatic Species Sampling Locations

2010-116 Big Tujunga Wash Mitigation Area

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Fyke-net Trapping

Fyke-net traps are basically large hoop nets with wings attached to the throat. These wings provide the ability to block off channels or areas on each side of the traps, which forces fish to swim into the trap. Fyke net traps were set in both the Connecting Channel, and across the outlet of the West Pond leading into Haines Canyon Creek. In an attempt to reduce the potential for theft, or vandalism of the equipment, they were strategically deployed into areas that were mostly inaccessible to the public. The traps were checked on a daily basis following a period of at least 12 hours in the water. The Fyke net traps were utilized as a sampling method for eight days during all sampling efforts, except effort #4.

Backpack Electrofishing

Smith-Root model (LR-20B) backpack electrofisher was utilized for sampling in Haines Canyon Creek. Sampling in the creek was accomplished using a three person crew consisting of one biologist carrying the electrofisher unit and two biologists equipped with long-handled dip-nets and fish carrier buckets. The biologist carrying the electrofisher unit worked in an upstream direction, creating a zigzag pattern back and forth across the channel. Dip-netters followed immediately adjacent to, or just behind the electrofisher unit. Their job was to net the stunned fish and other aquatic species. Electrofishing was utilized as a sampling method for three days during sampling effort #4.

As a condition of Todd Chapman and Manna Warburton's Federal Fish and Wildlife 10(a)(1)(A) permits (TE-110094-2 and TE-106908-1, respectively) for Santa Ana sucker, sampling must be conducted in a manner that avoids all impacts to the species during the spawning season and to any young-of-the-year (YOY). The condition states that "no electrofishing shall be conducted in areas where Santa Ana suckers are known to exist between March 1 and July 31." This stipulation limits the sampling methods available for use in the creek during this time period. Electrofishing was conducted in several locations throughout the Mitigation Area outside of the limited time period listed in the biologists' permits.

Day and Night Spearfishing

Banded spear guns and pole spear slings equipped with barbed, 5-prong trident tips were used during both day and night snorkeling surveys to capture adult fishes. Since most fish are inactive at night, they are less elusive and thus easier to capture. Night snorkel surveys involving spearfishing has proven to be an extremely effective tool for capturing and removing large adult fishes. Day and night spearfishing surveys were utilized as a sampling method for ten days during all sampling efforts, except effort #4.

Hand Capture

Day snorkeling reconnaissance surveys were conducted in order to identify underwater habitat features and to determine the relative locations of exotic aquatic species. Exotic aquatic species observed that could be captured by hand (i.e., red swamp crayfish, turtles, bullfrog tadpoles) were removed from the site. It was also during these day snorkeling surveys that all exotic fish (Centrarchid) nests and bullfrog egg masses were either destroyed or removed from the Ponds. Hand captures during snorkeling surveys were utilized as a sampling method for three days during sampling efforts #1, #2, and #3.

Bullfrog Gigging

Bullfrog removal efforts (gigging) were conducted in conjunction with the night spearfishing efforts. At night, adult bullfrogs were located by using a flashlight and searching for eye shine and/or listening for calls from the water. The perimeter of the Ponds were patrolled using an inflatable boat and by walking along the banks of both ponds and Haines Canyon Creek. Bullfrog removal efforts were utilized as a sampling method for six nights during sampling efforts #1, #2, #3, and #6.

Two-person Seining

Two-person seining was accomplished through the use of both (8 and 10 m) un-bagged (0.32 millimeter [mm] delta weave mesh) seines mounted on poles, within the upper portions of Haines Canyon Creek. Seine hauls were pulled by hand through all suitable and seineable habitats. The locations for effective two-person seining were limited due to the presence of numerous underwater snags and hazards. Two-person seining was utilized as a sampling method for two days during sampling efforts #5 and #6.

Minnow Trapping

Minnow traps were baited with cat food or sardines prior to being deployed around the perimeter of both ponds and the upper portions of Haines Canyon Creek. The deeper pool habitats containing red swamp crayfish were the areas that were targeted with this method. The minnow traps were checked on a daily basis following a period of at least 12 hours in the water. Minnow traps were utilized as a sampling method for eight days during all sampling efforts, except effort #4.

Turtle Trapping

Turtle traps were baited with sardines and set in the most suitable habitat along the perimeter of the Ponds. The turtle traps were checked daily following a period of at least 12 hours in the water. Turtle traps were utilized as a sampling method for six days during sampling efforts #1, #2, #3, and #5.

2.1.1 Wildlife Processing Protocol

All of the animals captured were identified to species, measured to length, and examined for any observable health conditions (i.e., parasites, lesions, fin erosion). All native species captured were also photographed prior to being returned unharmed to their original point of capture.

2.2 Site-specific Sampling Methods

Due to the differing topographic features and accessibility at each water feature within the Mitigation Area, different removal methods were utilized at each sampling site. The methods employed at each sampling location are discussed individually below.

2.2.1 Haines Canyon Creek

Six sampling methods were utilized in Haines Canyon Creek; fyke-net trapping, backpack electrofishing, hand capturing, minnow trapping, seining, and bullfrog gigging.

2.2.2 West Pond

In the West Pond, biologists performed fyke-net trapping, bullfrog gigging, minnow trapping, and turtle trapping.

2.2.3 Connecting Channel

Three methods were employed in the Connecting Channel to remove non-native aquatic species; fyke-net trapping, backpack electrofishing, bullfrog gigging, and minnow trapping.

2.2.4 East Pond

Biologists utilized five sampling methods in the East Pond; spearfishing, fyke-net trapping, minnow trapping, turtle trapping, and bullfrog gigging.

3.0 RESULTS

In 2010, ECORP biologists sampled Haines Canyon Creek and the Ponds during six sampling efforts: March 2–4 (effort #1); March 10–11 (effort #2); June 21–23 (effort #3); October 11–13 (effort #4); November 18–19 (effort #5); and December 1–3 (effort #6).

A total of 2,389 exotic aquatic species were removed during the six sampling efforts (Table 3-1). Captures in Haines Canyon Creek accounted for the highest proportion of this total (79.6%), followed by the East Pond (10.4%), West Pond (7.8%), and Connecting Channel (2.1%). An incidental capture (an adult bullfrog) was taken in the freeway drainage accounting for less than 1% of the total exotic aquatic species captured.

The six exotic aquatic species removal efforts resulted in the capture and removal of 1,455 red swamp crayfish, 645 largemouth bass, 97 green sunfish, 65 mosquitofish, 63 bullfrog tadpoles, 19 goldfish (*Carassius auratus*), 18 bluegill, 9 red-eared sliders *(Trachemys scripta),* 8 black bullhead (*Ameiurus melas*), 6 adult bullfrog, 2 juvenile bullfrog, 1 common carp, and 1 common snapping turtle (*Chelydra serpentina*).

A complete listing of all aquatic species captured during the 2010 sampling effort is included in Appendix A. Representative site and species photographs taken during the 2010 sampling year are included in Appendix B. The exotic aquatic species abundances collected by various removal methods are summarized for each sampling location in the subsequent sections.

3.1 Haines Canyon Creek

A total of 1,902 individuals, consisting of 7 exotic and 3 native species, were captured from Haines Canyon Creek during the 2010 sampling efforts (Table 3-2). The majority of exotic species captured in Haines Canyon Creek were taken by backpack electrofisher (n=1,354), accounting for 71.2% of the exotic aquatic species captured at this location. Two-person seining accounted for 14.6% of the exotic aquatic species captured (n=277), while minnow trapping accounted for 12.6% (n=240). Hand capture efforts accounted for the remaining 1.6% of the exotic aquatic species captured.

Red swamp crayfish was the most abundant species captured (n=1,387) in Haines Canyon Creek, making up 72.9% of the exotic aquatic species captured at this location. Backpack electrofishing was the most effective method for capturing red swamp crayfish (56.7% of the exotic aquatic species captured at this location). The backpack electrofishing efforts also yielded the highest numbers of exotic fishes collected (225 largemouth bass, 26 green sunfish, 16 goldfish, and 6 black bullhead). Two-person seining efforts within Haines Canyon Creek captured 166 largemouth bass, 65 mosquitofish, 42 red swamp crayfish, and 4 green sunfish. The minnow traps yielded 235 red swamp crayfish, 3 green sunfish, and 2 largemouth bass.

Three species of native fish (Santa Ana sucker, Santa Ana speckled dace, and arroyo chub) were collected in Haines Canyon Creek. Of these, 96.7% of these species were captured during the backpack electrofishing efforts (Santa Ana sucker [n=150], Santa Ana speckled dace [n=14], and arroyo chub [n=13]). The minnow traps captured six arroyo chub in March, November, and December; while the two-person seining did not yield a single native fish species in Haines Canyon Creek.

3.2 West Pond

A total of 186 individuals, consisting of 6 exotic species were captured from the West Pond during the 2010 sampling efforts (Table 3-3). The majority of exotic species were captured during the night spearfishing efforts (50.0%). Day spearfishing accounted for 29.0% of the exotic aquatic species captured, fyke-net trapping accounted for 18.8%, hand captures accounted for 1.6%, and bullfrog gigging accounted for the remaining 0.5%.

Largemouth bass was the most abundant species captured in the West Pond (n=146), accounting for 78.5% of the total exotic aquatic species captured at this location. Both day and night spearfishing yielded the most exotic fish (126 largemouth bass, 11 bluegill, 8 green sunfish, and 2 goldfish) totaling 81.7% of the fish captured in the West Pond. The fyke-net traps which captured exotic fish (n=33), accounting for 18.3% of the fish captures. Three red-eared sliders were captured by hand during the snorkel surveys, and three adult bullfrogs were captured with fyke-net traps and bullfrog gigging. Neither minnow traps nor turtle traps yielded any captures in the West Pond. No native fishes were observed or captured in the West Pond.

Table 3 - 1. Summary of Exotic Species Removal Efforts, Contract Year 2009-2010.

		Exotic Species													Native				
Sampling Location	**Sampling Dates**	**Goldfish**	**Black bullhead**	**Mosquitofish**	**Green sunfish**	**Bluegill sunfish**	**Common carp**	**Largemouth bass**	**Red swamp crayfish**	**Bullfrog adult**	**Bullfrog juvenile**	**Bullfrog tadpole**	**Red-eared slider**	**Common snapping turtle**	**Arroyo chub**	**Santa Ana speckled dace**	**Santa Ana sucker**	**South Western pond turtle**	**GRAND TOTAL**
HAINES CANYON CREEK																			
Sampling Session #1	March 2 – March 4, 2010								31						2				33
Sampling Session #2	March 10 – March 11, 2010							1	40										41
Sampling Session #3	June 21 – June 23, 2010								49										49
Sampling Session #4	October 11 – October 13, 2010	16	6		26			225	1,079		2				13	14	150		1,531
Sampling Session #5	November 18 – November 19, 2010				3			99	50						1				153
Sampling Session #6	December 1 – December 3, 2010			65	4			68	138						3				278
	Subtotal	**16**	**6**	**65**	**33**			**393**	**1,387**		**2**				**19**	**14**	**150**		**2,085**
WEST POND																			
Sampling Session #1	March 2 – March 4, 2010				3	1		21		1			1						27
Sampling Session #2	March 10 – March 11, 2010				1	2		43		1			2						49
Sampling Session #3	June 21 – June 23, 2010	2			13	8		58		1									82
Sampling Session #5	November 18 – November 19, 2010							4											4
Sampling Session #6	December 1 – December 3, 2010				2	2		20											24
	Subtotal	**2**			**19**	**13**		**146**		**3**			**3**						**186**
CONNECTING CHANNEL																			
Sampling Session #1	March 2 – March 4, 2010							1	9										10
Sampling Session #3	June 21 – June 23, 2010							20	1			5							26
Sampling Session #5	November 18 – November 19, 2010							10											10
Sampling Session #6	December 1 – December 3, 2010							2				3							5
	Subtotal							**33**	**10**			**8**							**51**
EAST POND																			
Sampling Session #1	March 2 – March 4, 2010	1			19	2		11	4			5	4	1					47
Sampling Session #2	March 10 – March 11, 2010		1		15	1		16	4			8	1					1	47
Sampling Session #3	June 21 – June 23, 2010				4		1	29	24	1		31	1						91
Sampling Session #5	November 18 – November 19, 2010					2		1	1			9							13
Sampling Session #6	December 1 – December 3, 2010		1		7			16	25	1		2							52
	Subtotal	**1**	**2**		**45**	**5**	**1**	**73**	**58**	**2**		**55**	**6**	**1**				**1**	**250**
FREEWAY DRAINAGE																			
Sampling Session #1	March 2 – March 4, 2010									1									1
	Subtotal									**1**									**1**
Grand Total		**19**	**8**	**65**	**97**	**18**	**1**	**645**	**1,455**	**6**	**2**	**63**	**9**	**1**	**19**	**14**	**150**	**1**	**2,573**

Table 3 - 2. Species Abundance Summary by Removal Method, Haines Canyon Creek.

		Exotic Species								Native Species				
Sampling Method	**Sampling Date**	**Goldfish**	**Black bullhead**	**Mosquitofish**	**Green sunfish**	**Largemouth bass**	**Red swamp crayfish**	**Bullfrog juvenile**	**Exotic Species Total**	**Arroyo chub**	**Santa Ana speckled dace**	**Santa Ana sucker**	**Native Total**	**GRAND TOTAL**
BY HAND	6/22/2010						31		**31**					**31**
	Subtotal						31		**31**					**31**
ELECTROFISHING	10/11/2010	9			4	60	263	1	**337**		10	71	**81**	**418**
	10/12/2010	5	6		15	64	340		**430**	3	4	36	**43**	**473**
	10/13/2010	2			7	101	476	1	**587**	10		43	**53**	**640**
	Subtotal	16	6		26	225	1,079	2	**1,354**	13	14	150	**177**	**1,531**
SEINE	11/18/2010				2	99	14		**115**					**115**
	12/2/2010			65	2	67	28		**162**					**162**
	Subtotal			65	4	166	42		**277**					**277**
MINNOW TRAPPING	3/3/2010						8		**8**	1			**1**	**9**
	3/4/2010						23		**23**	1			**1**	**24**
	3/11/2010					1	40		**41**					**41**
	6/23/2010						18		**18**					**18**
	11/18/2010				1		21		**22**	1			**1**	**23**
	11/19/2010						15		**15**					**15**
	12/2/2010						74		**74**	3			**3**	**77**
	12/3/2010				2	1	36		**39**					**39**
	Subtotal				3	2	235		**240**	6			**6**	**246**
Grand Total		**16**	**6**	**65**	**33**	**393**	**1,387**	**2**	**1,902**	**19**	**14**	**150**	**183**	**2,085**

3.3 Connecting Channel

A total of 51 individuals, consisting of 3 exotic species were removed from Connecting Channel during the 2010 sampling efforts (Table 3-4). The majority of these species were captured during the fyke-net trapping efforts (n=41), accounting for 80.4% of the exotic aquatic species captured. Largemouth bass was the most abundant species captured in the Connecting Channel (n=33), followed by red swamp crayfish (n=10), and bullfrog tadpole (n=8). No native fishes or reptiles were captured at this location.

Minnow trapping efforts in the Connecting Channel accounted for 19.6% of the total catch. This sampling method captured 10 red swamp crayfish. No additional species were captured using this sampling method.

3.4 East Pond

A total of 249 exotic aquatic species were removed from East Pond during the 2010 sampling efforts (Table 3-5). The majority of these species were captured during night spearfishing efforts (n=115), accounting for 46.2% of the exotic aquatic species captured. The largemouth bass (n=65) and green sunfish (n=39) captured with this method, accounted for 41.6% of exotic fish captured in the East Pond. Day spearfishing efforts accounted for 7 largemouth bass and 3 red swamp crayfish. The remaining fish captures were from day spearfishing (n=7), minnow traps (n=6), and fyke-net traps (n=3). Minnow trapping was the most effective method for capturing red swamp crayfish in the East Pond, accounting for 87.9% of the captures for this species.

A total of 55 bullfrog tadpoles were captured in the East Pond. Bullfrog gigging (n=34) and minnow trapping (n=12), combined accounted for 83.6% of the bullfrog tadpoles captured in the East Pond. A total of 8 aquatic reptiles were captured by hand in the East Pond: 6 red-eared sliders, 1 western pond turtle, and 1 common snapping turtle.

3.5 Native Species Captures

The native species captured during the 2010 exotic aquatic species removal efforts included 150 Santa Ana sucker, 19 arroyo chub, 14 Santa Ana speckled dace, and one western pond turtle. Once these individuals were recorded, weighed, and measured they were released unharmed into the area where they were captured. All of the native fish species captured during the 2010 removal efforts came from Haines Canyon Creek, and the single western pond turtle *(Clemmys marmorata)* was captured in the East Pond.

Table 3 - 3. Species Abundance Summary by Removal Method, West Pond.

Sampling Method	Sampling Date	Goldfish	Green sunfish	Bluegill sunfish	Largemouth bass	Bullfrog adult	Red-eared slider	Exotic Species Total	GRAND TOTAL
BULLFROG GIGGING	3/2/2010					1		1	**1**
	Subtotal					**1**		**1**	**1**
BY HAND	3/3/2010						1	1	**1**
	3/11/2010						2	2	**2**
	Subtotal						**3**	**3**	**3**
SPEARFISHING - DAY	3/11/2010				13			13	**13**
	6/22/2010				5			5	**5**
	6/23/2010	2	1	3	26			32	**32**
	11/18/2010				1			1	**1**
	11/19/2010				3			3	**3**
	Subtotal	**2**	**1**	**3**	**48**			**54**	**54**
SPEARFISHING - NIGHT	3/3/2010		3	1	20			24	**24**
	3/10/2010		1	2	30			33	**33**
	6/21/2010		1		4			5	**5**
	6/22/2010			3	4			7	**7**
	12/1/2010		2	2	20			24	**24**
	Subtotal		**7**	**8**	**78**			**93**	**93**
FYKE-NET TRAPPING	3/4/2010				1			1	**1**
	3/11/2010					1		1	**1**
	6/23/2010		11	2	19	1		33	**33**
	Subtotal		**11**	**2**	**20**	**2**		**35**	**35**
Grand Total		**2**	**19**	**13**	**146**	**3**	**3**	**186**	**186**

Table 3 - 4. Species Abundance Summary by Removal Method, Connecting Channel.

		Exotic Species				
Sampling Method	Sampling Date	Bullfrog tadpole	Largemouth bass	Red swamp crayfish	Exotic Species Total	Grand Total
FYKE-NET TRAPPING	3/3/2010		1		1	**1**
	6/23/2010	5	20		25	**25**
	11/18/2010		4		4	**4**
	11/19/2010		6		6	**6**
	12/2/2010	2	1		3	**3**
	12/3/2010	1	1		2	**2**
	Subtotal	8	33		41	**41**
MINNOW TRAPPING	3/3/2010			4	4	**4**
	3/4/2010			5	5	**5**
	6/23/2010			1	1	**1**
	Subtotal			10	10	**10**
Grand Total		**8**	**33**	**10**	**51**	**51**

Table 3 - 5. Species Abundance Summary by Removal Method, East Pond.

		Exotic Species												Native Species		
Sampling Method	**Sampling Date**	**Goldfish**	**Black bullhead**	**Green sunfish**	**Bluegill sunfish**	**Common carp**	**Largemouth bass**	**Red swamp crayfish**	**Bullfrog adult**	**Bullfrog tadpole**	**Common snapping turtle**	**Red-eared slider**	**Exotic Species Total**	**South Western pond turtle**	**Native Total**	**GRAND TOTAL**
BULLFROG GIGGING	3/3/2010									5			5			**5**
	3/10/2010									8			8			**8**
	6/21/2010									21			21			**21**
	6/22/2010								1				1			**1**
	12/2/2010								1				1			**1**
	Subtotal								**2**	**34**			**36**			**36**
BY HAND	3/3/2010										1	4	5			**5**
	3/11/2010											1	1	1	1	**2**
	6/22/2010											1	1			**1**
	Subtotal										**1**	**6**	**7**	**1**	**1**	**8**
FYKE-NET TRAPPING	11/19/2010				2		1			9			12			**12**
	Subtotal				**2**		**1**			**9**			**12**			**12**
MINNOW TRAPPING	3/4/2010							1					1			**1**
	6/23/2010							24		10			34			**34**
	11/19/2010							1					1			**1**
	12/2/2010							12					12			**12**
	12/3/2010			6				13		2			21			**21**
	Subtotal			**6**				**51**		**12**			**69**			**69**
SPEARFISHING - DAY	3/3/2010							3					3			**3**
	6/22/2010						4						4			**4**
	6/23/2010						3						3			**3**
	Subtotal						**7**	**3**					**10**			**10**
SPEARFISHING - NIGHT	3/3/2010	1		19	2		11						33			**33**
	3/10/2010		1	15	1		16	4					37			**37**
	6/21/2010			3			18						21			**21**
	6/22/2010			1		1	4						6			**6**
	12/2/2010		1	1			16						18			**18**
	Subtotal	**1**	**2**	**39**	**3**	**1**	**65**	**4**					**115**			**115**
Grand Total		**1**	**2**	**45**	**5**	**1**	**73**	**58**	**2**	**55**	**1**	**6**	**249**	**1**	**1**	**250**

4.0 DISCUSSION

A dynamic sampling approach during the 2010 efforts yielded the removal of 11 exotic aquatic species totaling 2,389 individuals. While the results were comparable between five of the six sampling efforts, the sampling effort which was primarily focused in Haines Canyon Creek produced approximately 80% of the total exotic aquatic species captured. This fact underscores the following points: 1) electrofishing is the most effective method for capturing and removing exotic aquatic species within suitable habitat, 2) Haines Canyon Creek is currently acting as a sink for recruits from source populations of exotic aquatic species moving downstream from the Ponds and upstream from the Big Tujunga Wash, the lower portions of Haines Canyon Creek, and the Hansen Dam Recreational Area which currently supports a 9-acre recreational lake.

Haines Canyon Creek is situated directly downstream from the West Pond. Thus any exotic species (fish or invertebrates) inhabiting the Ponds have the ability to move downstream into available habitat in the creek. One of the most effective methods for removing exotic fishes from Haines Canyon Creek was backpack electrofishing. Currently, there are populations of native species Santa Ana sucker, Santa Ana speckled dace, and arroyo chub in Haines Canyon Creek. As a condition of Todd Chapman and Manna Warburton's Federal Fish and Wildlife 10(a)(1)(A) permits (TE-110094-2 and TE-106908-1, respectively) for Santa Ana sucker, sampling must be conducted in a manner that avoids all impacts to the species during the spawning season and to any young-of-the-year (YOY). The condition states that "no electrofishing shall be conducted in areas where Santa Ana suckers are known to exist between March 1 and July 31." This stipulation limits the sampling methods available for use in the creek during this time period, therefore, electrofishing was not conducted in Haines Canyon Creek during this time of year. When electrofishing was not conducted, ECORP surveyed the entire length of Haines Canyon Creek on foot to identify potential sampling areas. Simultaneously, snorkel surveys were also conducted in waters deeper than 20 centimeters (cm) providing field biologists insight into existing underwater habitat features, species specific habitat preferences, and locations of exotic aquatic species. Using this method, biologists were also able to identify and remove large numbers of exotic aquatic species from these habitats.

In addition to exotic aquatic species removal efforts in the creek, efforts were also made to remove rock dams and foot bridges. Rock dams and foot bridges impair the normal flow of the creek and can adversely impact the native fish species in Haines Canyon Creek. They can change the stream habitat (from riffle, rapid, or glide to deep pools or runs) and stream habitat complexity (i.e., filamentous algae, aquatic macrophytes, and overhanging vegetation). In addition, these disturbances to natural flow often provide suitable foraging and breeding habitat for exotic aquatic species, making it favorable for their establishment and overall success in these areas.

The aquatic species assemblage within the Ponds almost exclusively comprises exotic fish, reptiles, amphibians, and macro-invertebrates. These species use the Ponds as a site to forage, breed, and shelter. As such, they act as a source population of exotic aquatic species that have the ability to migrate and become established downstream within Haines Canyon Creek.

During Sampling Efforts #1, #2, #3, #5, and #6, the West Pond was sampled using a variety of methods. Of those methods, spearfishing at night proved to be the most effective at capturing the highest number of individuals, accounting for 50.0 percent of the total catch in the West Pond. Day spearfishing and fyke-net trapping were effective at removing 29.0 percent and 18.8 percent of West Pond catches, respectively, while captures by hand and bullfrog gigging were the least effective methods used and accounted for 1.6 percent of the total West Pond catch. Seining was not conducted in the West Pond because of the presence of numerous underwater snags and hazards. This year electrofishing was also not conducted in the West Pond due to the lack of suitable sampling areas (lack of shallow-water habitat areas), and due to the low number of individuals captured per level of effort. Both day and night spearfishing and fyke-net trapping provided for the most effective means of removing exotic aquatic species from the West Pond.

Of the three areas comprising the Big Tujunga Ponds system, the Connecting Channel accounted for the least amount of catch per effort. In the previous year, fyke-net trap totals were nearly double that of the West or East Pond. This year's catch was very low (41 individuals) captured with the fyke-net traps. Minnow traps were also less effective than in previous years with a total of 10 individuals captured. One possible explanation for this decrease in the catch could be related to the apparent increase in the amount of emergent vegetation within the Connecting Channel, and an increase in the density of Cattails (*Typha* sp.) growing along the perimeter of the East and West Ponds at either end of the channel. This increased density and amount of vegetation could possibly be inhibiting the migration of individuals between the two ponds via the Connecting Channel. Both the total catch and species diversity were low this year (only three species collected in the Connecting Channel), however it is important to point out that 64.7 percent of the captures in the Connecting Channel were largemouth bass.

During Sampling Efforts #1, #2, #3, #5, #6, six sampling methods were utilized in the East Pond (day and night spearfishing, minnow trapping, bullfrog surveys, fyke-net trapping, and capture by hand). Night spearfishing proved to be the most effective removal method, capturing the highest number of individuals and accounting for 46.0 percent of the total East Pond catch. Day spearfishing was less productive than previous years, resulting in just 4.0 percent of the total East Pond catch. One possible explanation for this finding is that fish are typically less active at night and are more easily approached than they are during the day. Minnow trapping proved to be a suitable method for capturing benthic species, such as red swamp crayfish and bullfrog tadpoles. Equally effective in capturing tadpoles was the gigging effort. The bottom topography of the East Pond's substrate is suitable for supporting large aggregations of bullfrog tadpoles, as it provides plenty of flat resting and foraging areas. It should be noted these large groups of bullfrog tadpoles persisted even in the presence of adult largemouth bass, which may corroborate the results of palatability studies showing tadpoles to be the least preferred food item of largemouth bass (Kruse and Francis 1977). Turtle traps were also deployed into the East Pond but they were not productive. A single common snapping turtle was captured by hand in the East Pond. It weighed over 8 kilograms (kg) and was removed during a night spearfishing survey during Sampling Effort #1 in March, 2010. Once this turtle was processed, it was released to an organization dedicated to fostering stray and abandoned turtles.

In Haines Canyon Creek, red swamp crayfish was the most abundant species captured. It comprised 66.5 percent of the total Haines Canyon Creek captures, most of which were captured during Sampling Effort #4 in October, 2010. Exotic fish captures in the creek were also high, with a total of 513 individuals accounting for 60.1 percent of the total 2010 catch. These results seem to indicate that exotic fishes are continually emigrating from the Ponds and into the creek.

Backpack electrofishing and two-person seining efforts in Haines Canyon Creek were effective in capturing over 500 exotic fishes, the majority of which were captured during the late fall and early winter months. Due to the sampling restrictions administered by the U.S. Fish and Wildlife Service (USFWS), during the breeding season for the Santa Ana sucker, removal efforts within Haines Canyon Creek were very limited in order to minimize impacts to this species during this vulnerable period. During the breeding season, minnow traps were the only method utilized in Haines Canyon Creek and were clearly not as productive as the other sampling methods suitable for this type of aquatic habitat. A combination of visual (snorkel) surveys and the use of seine nets and dip-nets may yield higher capture rates during the breeding season when electrofishing in Haines Canyon Creek is not permitted.

In 2010, a balanced sampling effort was implemented within the Mitigation Area. Of the six sampling efforts, five were comparable with respect to capture numbers and sampling methods used to achieve those captures. The exception was Sampling Effort #4, which took place in October, 2010. During this effort, which was exclusively focused in Haines Canyon Creek, backpack electrofishing was utilized as the primary sampling method. This method proved to be quite effective in capturing red swamp crayfish, and equally effective for capturing exotic fishes.

In areas where the backpack electrofisher could not be used, primarily due to unsuitable water depth (ponds), spearfishing was the second most effective method. Night spearfishing surveys produced more captures than day-time spearfishing, since fish are easier to approach. Minnow trapping has also continued to be a valuable removal method in the Ponds and in Haines Canyon Creek. Fyke-net traps and hand captures have also consistently produced captures throughout the year, although at a much lower level than the other methods. The use of two-person seining was effective for removing both red swamp crayfish and exotic fishes in Haines Canyon Creek, providing incentive for its continued use throughout the year. The turtle traps have not been as successful as once envisioned. Although continuously deployed through the 2010 removal efforts, they did not record a single capture. One possible explanation for this could be that all of the turtles captured during 2010 were captured by hand during the spearfishing removal efforts.

4.1 Problems Encountered During Sampling

During each sampling effort, care was taken regarding the presence of the public in and around Haines Canyon Creek and the Ponds. Trapping and sampling locations were generally chosen based upon the ability to conceal the traps and nets. The traps/nets were situated out of reach of the public at each of the sampling locations. On several occasions, ECORP field staff encountered "locals" using the area for camping, fishing, cooking, and drinking alcoholic beverages. For the most part, these encounters were friendly, non-confrontational, and often they were informative. On several occasions, biologists noticed rock dams and foot bridges constructed across Haines Canyon Creek. These obstructions were removed, restoring the natural flow.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The current exotic aquatic species control program utilizes an adaptive approach to efficiently and effectively remove exotic aquatic species posing the greatest potential impact to native species in the Mitigation Area. These species include the largemouth bass, red swamp crayfish, and adult bullfrog. However, due to the complexities of the habitat in the ponds, total eradication of exotic aquatic species will likely not be possible. In order to maintain reduced levels of these species, current control activities will need to be continued. The keys to enhancing and maintaining a successful exotic aquatic species removal program are: 1) provide continuous monitoring efforts to keep exotic aquatic species in check and, 2) maintain a dynamic sampling approach with regard to changing site conditions and seasonal variations. In the early spring through the summer months, surveys to disrupt fish nests and remove bullfrog egg masses may prove to be an effective way to limit recruitment of these species. Night bullfrog surveys around the perimeter of the Ponds and in areas of Haines Canyon Creek are best conducted in the early spring and through the summer months when they are most active.

Efforts should continue to target and remove red swamp crayfish and largemouth bass from Haines Canyon Creek in the late winter and early spring months to minimize any impacts to young native fishes which are vulnerable during their early life stages. Largemouth bass typically become inactive in the winter with decreasing daylight and decreasing water temperatures. These seasonal changes also cause a die off in the submerged aquatic vegetation, which greatly increases the water visibility. Therefore, additional spearfishing efforts should be conducted in the Ponds to target larger fishes during these months. Due to the presence of known populations of special status fishes in Haines Canyon Creek, efforts to survey the creek to locate large pools and undercut banks where exotic aquatic species congregate are essential and should continue.

Vegetation control efforts should be conducted along a shallow concrete channel located on the California Department of Transportation (Caltrans) easement at the toe of the slope along the eastbound lanes of the I-210 freeway, north of the West Pond. This channel holds water throughout the year, and the dense trees and shrubs are helping to provide shelter for exotic aquatic species. LACDPW could work with Caltrans to either eliminate the source of the standing water or to determine what vegetation thinning could be done to decrease the suitability of this channel for exotic aquatic species.

ECORP remains committed to providing an effective and scientifically-based exotic aquatic species removal program and will continue to strive to conduct efficient, targeted, and humane removal of targeted species from the Mitigation Area.

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APPENDIX A

Species Captured during the Exotic Aquatic Species Removal Efforts, 2010

COMMON NAME	SCIENTIFIC NAME
MALOCOSTRACANS	**MALOCOSTRACA**
Freshwater Crayfishes	**Cambaridae**
* red swamp crayfish	* *Procambarus clarkii*
RAY-FINNED FISHES	**ACTINOPTERYGII**
Carps and Minnows	**Cyprinidae**
* goldfish	* *Carassius auratus*
* common carp	* *Cyprinus carpio*
arroyo chub	*Gila orcuttii*
Santa Ana speckled dace	*Rhinichthys osculus* spp. 3
Suckers	**Catostomidae**
Santa Ana sucker	*Catostomus santaanae*
North American Catfishes	**Ictaluridae**
* black bullhead	* *Ameiurus melas*
Livebearers	**Poeciliidae**
* mosquitofish	* *Gambusia affinis*
Sunfishes	**Centrarchidae**
* green sunfish	* *Lepomis cyanellus*
* bluegill	* *Lepomis macrochirus*
* largemouth bass	* *Micropterus salmoides*
AMPHIBIANS	**AMPHIBIA**
True Frogs	**Ranidae**
* American bullfrog	* *Lithobates catesbeiana*
REPTILIANS	**REPTILIA**
Snapping Turtles	**Chelydridae**
* common snapping turtle	* *Chelydra serpentina*
Box and Water Turtles	**Emydidae**
southwestern pond turtle	*Clemmys marmorata*
* red-eared slider	* *Trachemys scripta*

* *indicates exotic species*

APPENDIX B

Exotic Aquatic Species Removal Photographs

Photo A: Largemouth bass captured in Haines Canyon Creek during electrofishing surveys.

Photo B: Green sunfish captured in the Connecting Channel using a fyke-net trap.

Exotic Aquatic Species Removal Photographs

Photo C: Bluegill captured in the West Pond during daytime spearfishing efforts.

Photo D: Brown bullhead captured in the Connecting Channel using a fyke-net trap.

Exotic Aquatic Species Removal Photographs

Photo E: Goldfish captured in the West Pond during daytime spearfishing efforts.

Photo F: Common snapping turtle captured in the East Pond during nighttime spearfishing efforts.

Photo G: Surface of the West Pond covered in macrophytes during the November and December 2010 removal efforts.

Photo H: Turtle trap set in the West Pond during the November 2010 removal effort.

Photo I: Santa Ana sucker captured and released in Haines Canyon Creek during electrofishing efforts.

Photo J: Santa Ana speckled dace captured and released in Haines Canyon Creek during electrofishing efforts.

APPENDIX F

Trails Maintenance and Monitoring Quarterly Reports and Trail Closure Sign

Trails Maintenance and Monitoring Memos

March 30, 2010
(2007-110/E/E1-E2)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 Tasks E1 and E2 - Third Quarter (January – March 2010) Trails Closure, Clearing, and Maintenance Monitoring Report for the Big Tujunga Wash Mitigation Area, Los Angeles County, California (Revised)

Dear Ms. Kwan;

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting Inc. (ECORP) has continued the trails maintenance and monitoring efforts for the third quarter of Year 3, January through March 2010. Task E1 and E2 surveys were conducted on January 4th and 5th and on March 5th and 16th. Trails surveys were not conducted during February 2010.

In January 2010, ECORP biologist Gregorio Benavides conducted several trail inspections during exotic plant species removal in the Mitigation Area. The entire trail system within the Mitigation Area was surveyed for the following issues: trash, refuse/debris, and the presence of newly formed trails (on land or across the Haines Canyon Creek). Trails were found to be free of obstructions (garbage and debris) and plant and tree overgrowth. Evidence of trailblazing was absent during the surveys. Trail conditions did not warrant immediate remediation action by Nature's Image (Figures 1 and 2).

In March 2010, ECORP biologists Kristen Mobraaten and Gregorio Benavides conducted two surveys to assess trail conditions following post-Station Fire rains. Large sections of the trail system within the Mitigation Area were affected by increased rain runoff via the Haines Wash in the following manner. First, sections of the trail were either completely flooded (Figure 3) or exhibited impacts from overland runoff. These impacts included trail erosion; widening of trail width (as a result of scouring of trail-side vegetation); debris, garbage, and sediment deposition onto trails; and obstruction of trails by felled trees caused by overland runoff (Figures 4 through 7).

Trailblazing was also evident along the perimeter of the Tujunga Ponds. ECORP biologists closed off these newly made paths to discourage their continued use using flagging tape. These new paths were presumably made to access the Tujunga Ponds (Figures 8 and 9).

Problem areas were recorded with GPS and digital photography.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Kristen Mobraaten _______________ DATE: ___3/30/10______

Kristen Mobraaten
Biologist

Figure 1. Representative trail conditions in Restoration Section 3. Vegetation and debris along were not obstructing established trails.

Figure 2. Creek crossing in Restoration Section 1 was clear of debris or other objects providing a clear path across Haines Canyon Creek.

Figure 3. Example of flooded trail following post-Station Fire rains. This location is in Restoration Section 4.

Figure 4. This trailhead (in Restoration Section 2) exhibited severe erosion caused by overland runoff from the post-Station Fire rains. Exposed tree roots and debris have made this part of the trail impassable.

Figure 5. A large dead tree that had been situated about one meter from the trail edge was felled by intense overland water flow following the rains.

Figure 6. Overland runoff was responsible for transporting and depositing large amounts of trash and debris on the trail and along trail edges as pictured here.

Figure 7. This crossing (in Restoration Section 4) at Haines Canyon Creek was obstructed by organic debris resulting from increased creek water flow.

Figure 8. Openings through vegetation along the perimeter of the Tujunga Ponds were closed to discourage further use.

Figure 9. This path leads to an area between the ponds that have been experiencing a greater amount of foot traffic, which necessitated trail closure.

July 1, 2010
(2010-116/E/E1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 Task E1 - Fourth Quarter (April – June 2010) Trails Closure, Clearing, and Maintenance Monitoring Report for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting Inc. (ECORP) has continued the trails maintenance and monitoring efforts for the fourth quarter of Year 3, April through June 2010.

The following is a summary of the fourth quarter activity for Task E1. During exotic plant species removal in the Mitigation Area (April 28-30 and May 4-5), and during four outreach efforts in June 2010 (19th, 23th, 26th, and 27th), ECORP biologists conducted several trail inspections to document problem areas throughout the existing trail system (along the restoration areas and around the Tujunga Ponds). The entire trail system within the Mitigation Area was surveyed for the following issues: trash, refuse/debris, and the presence of newly formed trails (on land or across the Haines Canyon Creek).

During the exotic plant removal effort in April and May, trails were cleared of both debris and tree branches growing into the trail, ensuring safe and unimpeded passage for both hikers and equestrians. Photographs were taken to document the current state of the trails (Figure 1). Of note is an unauthorized equestrian trail that leads from the northern-most portion of the upland area directly to the riparian trail (Figure 2). Despite repeated attempts to discourage passage through this trail (block trail using large boulders and large tree branches), some equestrians have continued to use this unauthorized access point, which continues to become wider and deeper.

During the outreach effort in June, photographs were taken to document the state of the trails. A short diversion around a dead tree (located 200 meters west of the Upland area) has begun to take a more permanent form (Figure 3). ECORP will schedule the removal of this large tree to prevent further use of the diversion. Of note is the unauthorized use the riparian area by equestrians, specifically at the Wheatland Ave pond (Figure 4). ECORP biologists have in the past observed riders allowing their horses

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to wade in the Wheatland Ave pond. Figure 4 clearly shows tracks leading into the pond. Directly across the pond (northward) appears to be a newly formed trail leading towards the Big Tujunga Wash (Figure 5). This trail leads into a fairly dense patch of trees, making this trail unattractive, yet increased traffic through and unauthorized live branches clearing of this area will result in a passable trail.

No new trailblazing was observed along the perimeter of the Big Tujunga Ponds. During the exotic invasive plant removal effort, the trail around the Ponds was cleared of overgrowth both on the ground and atop to keep trails clear for normal foot and equestrian traffic.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 7/1/2010

Gregorio Benavides
Biologist

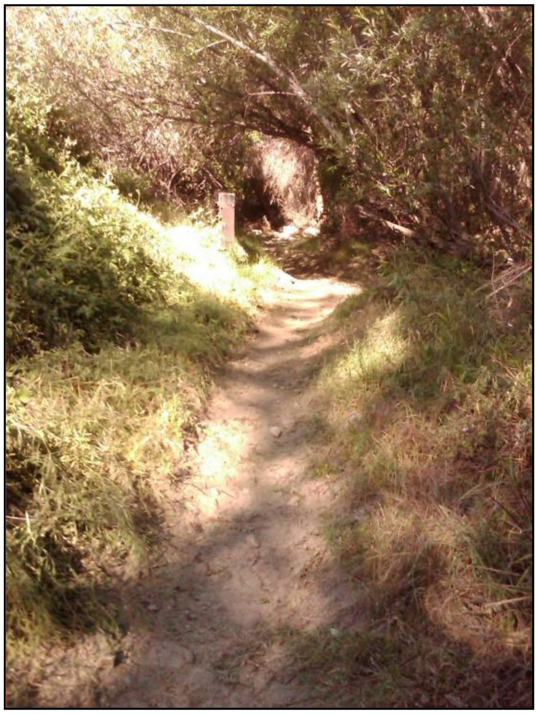

Figure 1. Trail just north of the upland area (facing east) showing clear, unimpeded passage for both hikers and equestrians.

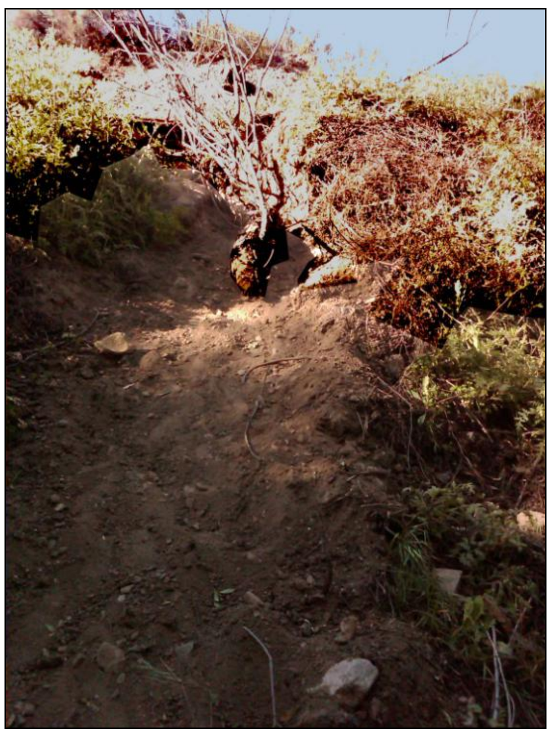

Figure 2. Photograph (taken from the perspective of the riparian trail) showing the degree of erosion from unauthorized use of this trail by equestrians.


Figure 3. A diversion trail has begun to form around this large dead tree in the trail.


Figure 4. Fresh horse tracks at the Wheatland Ave pond in the Haines Canyon Creek.
Equestrians often bring their horses to wade in the Haines Canyon Creek to wade.

Figure 5. Arrow is pointing at the newly cut trail just at the Wheatland Ave pond. The trail leads towards the Big Tujunga Wash. The rock dam may be serving as a crossing point for visitors.

October 4, 2010
(2010-116/E/E1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: Task E1 - First Quarter (July - September 2010) Trails Closure, Clearing, and Maintenance Monitoring Report for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting Inc. (ECORP) has continued the trails maintenance and monitoring efforts for the period covering July through September 2010.

The following is a summary of the first quarter activity for Task E1. ECORP biologists did not conduct any site visits during the months of July and August. During outreach efforts in the Mitigation Area on September 4th and 11th, ECORP biologists conducted trail inspections to document problem areas throughout the existing trail system. The entire trail system within the Mitigation Area was surveyed for the following issues: trash, refuse/debris, and the presence of newly-formed trails (on land or across the Haines Canyon Creek).

Issues in the trail system were as follows:

- Low-hanging tree branches along the trail where the Tujunga Ponds and Haines Canyon Creek meet;
- Large branches along the trail just east of the upland area and north of Gibson Ranch;
- Continued use of a trail-blazed path from the northern tip of the upland area extending down to the main trail by equestrians in spite of our efforts to block it with boulders and branches;
- Low-hanging tree branches along the west side of the upland area;
- Substantial erosion (bank reduced to mud) at a creek crossing just northwest of the upland area due to equestrian activity;
- Evidence of equestrian activity along a portion of the Haines Canyon Creek that lies just north of the upland area; and
- Poison oak growth just east of the Wheatland Ave entrance.

The aforementioned trails problems are slated to be addressed by Nature's Image in October, with the exception of those issues associated with Haines Canyon Creek. No new trailblazing was observed along the perimeter of the Tujunga Ponds.

Trash and debris were not observed, except in locations where trash receptacles were overflowing or had been vandalized or scavenged by animals.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 10/4/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

December 17, 2010
(2010-116/E/E1-E2)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: Task E1 – Second Quarter (October - December 2010) Trails Closure, Clearing, and Maintenance Monitoring Report for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting Inc. (ECORP) has continued the trails maintenance and monitoring efforts for the period covering October through December 2010.

The following is a summary of the first quarter activity for Task E1. During the exotic plant removal and treatment effort that took place from October 25th to 28th, trails were maintained by Nature's Image. ECORP biologists Terrance Wroblewski, Phil Wasz, and Gregorio Benavides monitored the exotic vegetation removal activities. During this effort, the following were performed throughout the entire trail system:

- Tree branches on trail were cleared off of the trail;
- Overhanging tree branches, located at hiker and equestrian-height, were trimmed by machete;
- Large logs were moved out of the trail; and
- Unauthorized trails were blocked with branches to discourage use;

No garbage or non-organic debris was observed during trails maintenance.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 12/17/10

Gregorio Benavides
Biologist

July 2010 Trail Closure Sign

TEMPORARY TRAIL CLOSURE

CIERRE DE CAMINO TEMPORAL

**PLEASE KEEP OFF TRAIL OR
CITATION WILL BE GIVEN**

*POR FAVOR NO USE EL CAMINO
O SE LE DARÁ UNA CITACIÓN*

(17.04.330 & 17.04.250 LACC)

APPENDIX G

Stakeholder Mailing List

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APPENDIX H

Newsletters

A Publication of the
County of Los Angeles
Department of Public Works

Please note that the next Community Advisory Committee (**CAC**) meeting, previously scheduled for Thursday, April 22, 2010, has been changed to **Thursday, April 29, 2010**. The time (6:30 pm to 8:30 pm) and location (Hansen Yard, 10179 Glenoaks Blvd., Sun Valley, CA) remain the same.

The **CAC** meets in the Fall and Spring to provide an opportunity for the community to learn about the activities at the Big Tujunga Wash Mitigation Area. For more information on the CAC, please contact Valerie De La Cruz, LADPW, at (626) 458-6126.

What's All That Green Stuff???
Exotic Plant Eradication Program Continues

Have you noticed that there are areas with a lot of "green stuff" scattered around in the riparian area? The "green stuff" is applied on exotic or non-native plant species that are targeted for removal. The methods for exotic plant removal differ from plant to plant; some are cut while others receive a treatment of herbicide, which is the "green stuff" that can be seen in the riparian areas.

The purpose of exotic plant removal and eradication program at the Big Tujunga Mitigation Area is to eliminate the non-native plant species that outcompete the native plants for essential resources (water, food, and sunlight). By removing the non-native, exotic plants, openings in the tree and shrub canopies are created where seedlings of the native plants can grow and flourish. As the native plants begin to fill in these openings, wildlife species will also benefit because there will be more food, cover, and nesting resources available. The exotic plant removal program is targeted at the riparian habitats in and around Haines Canyon Creek, Big Tujunga Wash, and the Tujunga ponds.

(Continued on page 2)

ABOUT THE BIG TUJUNGA WASH MITIGATION AREA

The County of Los Angeles Department of Public Works' implementation of the Final Master Mitigation Plan for the Big Tujunga Wash Mitigation Area (Big T) has been under way since April 2000.

Big T is a parcel of land located in the City of Los Angeles' Sunland area (see Page 6). Big T covers an area of approximately 210 acres of sensitive habitat. The site was purchased by the Los Angeles County Department of Public Works in 1998 for the purpose of compensating for habitat loss for other County of Los Angeles Public Works projects.

Big T protects one of the most rapidly -diminishing habitat types found in Southern California—willow riparian woodland. Big T is home to several protected species of fish (Santa Ana sucker, Santa Ana speckled dace, arroyo chub) and birds (least Bell's vireo, southwestern willow flycatcher).

The purpose of this newsletter is to provide an update of ongoing programs and to explain the upcoming enhancement measures that will be implemented on the site in the next few months. Newsletters will be published on a bi-annual basis (Spring and Fall).

More information can be found at

http://www.ladpw.org/wrd/facilities

Exotic Plant Eradication Program Continues

(Continued from page 1)

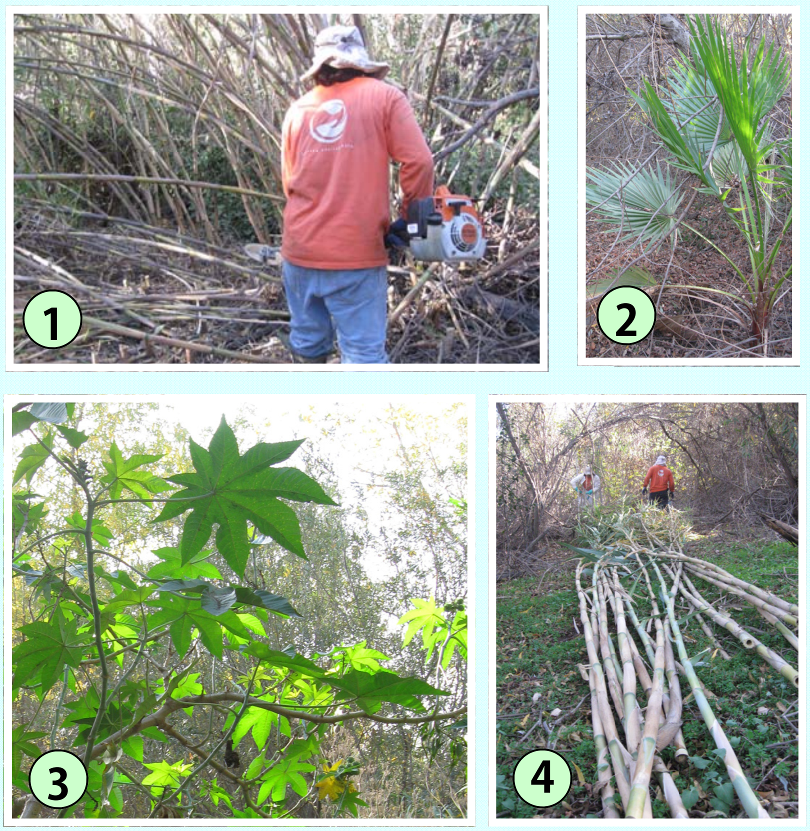
The actual removal and treatment of exotic plants began in late 2009. The primary exotic plant species targeted at the Big Tujunga Mitigation Area riparian areas during 2009 included giant reed, tamarisk, eupatory, castor bean, eupatory, and ash. Other species that were targeted include tree of heaven, tree tobacco, palm tree, and pepper tree.

Sometime during the early spring, the landscape contractor's crew and the biologist will be conducting another sweep through the riparian habitat to treat or remove the exotic plants that have re-sprouted. The landscape contractor's crews will also continue weeding activities in the upland oak/ sycamore area near the Cottonwood entrance. It appears that the ongoing weeding efforts have allowed the native plants to thrive and to naturally recruit seedlings into the areas where the weeds were removed.

Part of the restoration process involved herbicide treatment of exotic plants. Here, the stumps of castor bean are being treated to prevent re-growth.

Ornamental plants and trees, such as this fig, were removed during the restoration effort. Removing large-leaved exotic plants such as fig and castor bean opens up patches of light for native plants.

Eupatory was removed throughout Big T. Patches once dominated by this species are now available to native plants. This is especially evident along the banks of Haines Canyon Creek.



(1) Giant reed (*Arundo donax*) removal in process. (2) Palm trees are not native and do not provide habitat for native birds. (3) Castor bean is a fast-growing exotic shrub that was targeted for removal. (4) *Arundo* cuttings being stacked away from trails.

2009 Trail Maintenance Day

The 5th and 6th Trail Maintenance Days were conducted on May 2 and November 14, 2009 respectively. The focus of the events was trash removal in the upland, riparian, and creek areas. Community volunteers, ECORP's biologists, and Los Angeles County Department of Public Works' (LADPW) staff attended the event. ECORP's biologists provided guidance and support during maintenance activities to ensure safety and protection for the threatened and sensitive fish in Haines Canyon Creek. Thanks to all that participated in this important effort.

It was decided during the Fall CAC meeting that the Annual Trail Maintenance Day would be moved from the Spring season to the Fall season to avoid impacts to nesting birds during the bird breeding season. Please look for the next Trail Maintenance Day event in our Fall 2010 newsletter or on our website (http://www.ladpw.org/wrd/facilities).

(LEFT) Volunteer Terry Kaiser uses his horse to haul trash from Big T on Trail Maintenance Day. (Center) Volunteers Patricia Davenport (left) and Andrea Gutman (right) remove a blanket during Trail Maintenance Day. (Right) A cleaner Big T!

Announcements

- The next **Community Advisory Committee (CAC)** meeting is scheduled for Thursday, **April 29, 2010** from 6:30 pm to 8:30 pm at Hansen Yard, 10179 Glenoaks Blvd., Sun Valley, CA.
- During your visit to Big T please watch out for **debris and garbage** brought by the recent rains. Parts of the trails were also flooded and eroded after the recent rains. Be careful!
- **It's breeding season at Big T!** This means that visitors must stay on trails and be careful not to disturb trees and shrubs, which may contain bird nests.
- **It's also fish breeding season!** Please tread lightly when crossing Haines Canyon Creek. Our three native fish (see 'Kid's Corner' on page 5) use the rocks and sand as nests, and baby fish like to aggregate over the sandy creek floor in shallow water.

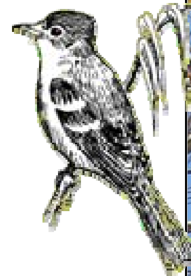
Native Plant Profile: *Ceanothus*

Ceanothus shrubs are in full bloom at Big T! Look for them on the upland near the Cottonwood entrance. *Ceanothus* are native to North and Central America and belong to the buckthorn family Rhamnaceae. *Ceanothus* have evolved a symbiotic relationship with bacteria. The plant provides a home in the roots of the plant while the bacteria take nitrogen from the air and give it to the plant. The plant uses this nitrogen to make proteins, DNA, vitamins and hormones! Now that's a good exchange!

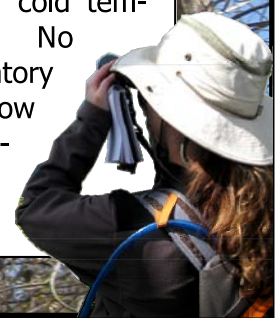
Results of Focused Sensitive Species Surveys

Arroyo Toad. Six focused surveys for arroyo toad were conducted in Haines Canyon Creek and the surrounding suitable riparian habitats during spring and early summer 2009. Daytime and nighttime surveys were conducted between April and June on days that had weather conducive to observing arroyo toads (new or partial moons, air temperature greater than 55°F). No eggs, larval, juvenile, or adult arroyo toads were observed.

Least Bell's Vireo. Eight focused surveys were conducted for least Bell's vireo in the riparian habitats at Big T from mid-April through mid-June. The surveys were conducted on foot through suitable habitat while listening for least Bell's vireo vocalizations and scanning the canopy (tree line) with binoculars to identify bird species. No least Bell's vireos were found during the surveys.



Southwestern Willow Flycatcher. Five focused surveys for southwestern willow flycatcher were conducted in suitable riparian habitat at Big T during the 2009 breeding season. Surveys were conducted during weather that was conducive to high levels of bird activity (i.e. no surveys were conducted during rain events, high winds, cold temperatures, etc.). No breeding or migratory southwestern willow flycatchers were observed during these surveys.



Post Station Fire Concerns

The Station Fire that began in late August 2009 stayed north of Interstate 210 (Foothill Freeway) and out of the Big T Mitigation Bank; however, there is a high potential for debris-laden flows because the Station Fire burned most of the watershed and the dam is being rehabilitated.

In addition, Haines Creek is in the trajectory of major debris flow and Highways 2 and 39 may become blocked. The threat of post fire damage (debris runoff, siltation of Big Tujunga sensitive areas) will exist for the next three to five years.

Rain Warning!

Please do not visit Big T during rain events due to the high potential for debris flows from the Station Fire.

The LADPW is making an effort to maintain the upstream debris basins during this storm season and will continue to monitor flows and the basins in the coming years. Up to date information on fires, road closures, and post fire flood flow protection is available on the County Public Works website (www.ladpw.org) or by calling (800) 214-4020.

Public Outreach Effort Continues in the Big Tujunga Mitigation Area

In 2009 ECORP's biologists mounted an information and outreach campaign directed at Big Tujunga's visitor groups who picnic, hike, and recreate near the creek and ponds. LADPW and ECORP realized that an onsite outreach effort was needed to inform these visitor groups of the sensitive plants and animals that live within the Mitigation Area.

In order to reach out to a wide audience, ECORP and LADPW developed a bilingual (English and Spanish) information brochure that describes the reason for the Mitigation Area, the sensitive natural resources, and the activities that are allowed in the Mitigation Area.

Regular outreach activities were conducted on numerous weekends during August and September of 2009. A bilingual ECORP biologist spoke to both the Spanish and English speaking visitors during these outreach sessions. The biologist received very positive feedback from most of the recreational users who were approached. Many expressed a genuine concern and appreciation for the Mitigation Area and its natural resources. Outreach may continue in 2010 so keep an eye out for biologists doing outreach!

Kid's Corner

South Coast
Minnow-Sucker
fish community

Very important fish (V.I.F.) live in Big T!

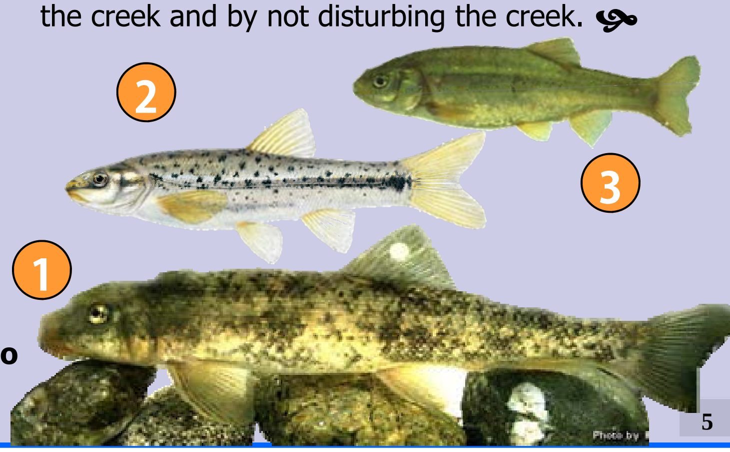
Three very important species of fish call **Big T** their home. These three fish form a group called the **"South Coast Minnow-Sucker fish community"**.

Why is this group so important? This group is found in only two places in the world. They live in the **San Gabriel River** and the other place is...you guessed it! **BIG T!**

Long ago this group was found in many rivers and streams in California. Today they are **so rare** that they are protected by law. This is why these three fish are **V.I.F.!**

Let's meet the V.I.F. First, we have the **Santa Ana sucker** (1), and it belongs to the sucker family. Its mouth is on the underside of the head. It uses its mouth like a vacuum to suck food off rocks and boulders. Next we have the **Santa Ana speckled dace** (2). It feeds on algae and insects that live around rocks and plants. Lastly, we have the **arroyo chub** (3). Arroyo means "stream" in Spanish and chub refers to its thick body and chunky tail. It likes to eat algae, insects, and shrimp-like creatures. Dace and chubs belong to the minnow family. Together these three V.I.F. are called the South Coast Minnow-Sucker fish community!

These three fish live in Haines Canyon Creek. The creek is also very important because it is the only place at Big T where these three fish can live. So the best way to protect our V.I.F. is by not swimming in the creek and by not disturbing the creek.



Water Resources Division
County of Los Angeles
Department of Public Works
900 S. Freemont Avenue
Alhambra, CA 91803

Where is Big T?

Downstream of Big Tujunga Canyon, right in the heart of Sun Valley south of the 210 freeway, you'll find a native riparian (water loving plant) natural area filled with cottonwoods, willows and pools of water that support many native aquatic species. Check out the Big T website for more information at:

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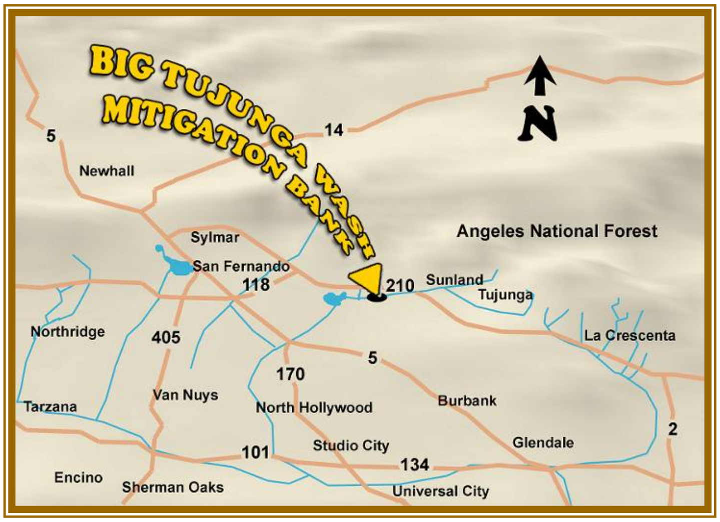

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- In the case of an emergency situation (those where 911 is involved) please make a follow up call to the Department of Public Works as soon as possible at the numbers listed below.*
- Do not attempt to enforce regulations. Contact LAPD to handle the situation/incident.

* For emergency follow up or to report minor incidents, obtain information, or get questions answered during weekday work hours (8:00 a.m. to 5:50 p.m., Monday through Thursday**), please contact:

Belinda Kwan or Valerie De La Cruz
Water Resources Division
County of Los Angeles Department of Public Works
900 S. Freemont Avenue
Alhambra, CA 91803
Phone: (626) 458-6135/(626) 458-6126
Fax: (626) 979-5436
Email: bkwan@dpw.lacounty.gov, vdelacruz@dpw.lacounty.gov

** After work hours or on weekends, please contact the Department of Public Works at (626) 458-HELP.

Big T Wash Line

SEPTEMBER 2010

A Publication of the
County of Los Angeles
Department of Public Works

Announcements

- The next **Community Advisory Committee (CAC)** meeting is scheduled for Thursday, **September 23, 2010** from 6:30 pm to 8:30 pm at Hansen Yard, 10179 Glenoaks Blvd., Sun Valley, CA.
- **REMAIN VIGILANT.** While no new incidences have been reported, on June 16, 2010, a local equestrian avoided a certain accident when the equestrian spotted a snare designed to harm rider and horse. The equestrian removed the snare in the nick-of-time, but also spotted another snare near the Big T ponds. Three men were responsible for this "prank" and were not seen again. Please call County Sheriffs Department at 1-800-834-0064 to report any suspicious activity.
- **Breeding season is ending at Big T.** While this is indeed the case, continue to tread lightly while on your rides and hikes. Post-breeding season means Big T is serving as a giant nursery for new birds and fish.
- Be on the look-out for **loose dogs at Big T** ECORP biologists and Big T visitors have reported sightings of unleashed and unfriendly dogs on Big T property. Do not approach them or their owners. DPW is consulting with the County agencies (**Sheriffs Department** and **Department of Animal Care and Control**) to correlate a procedure for reporting unleashed dogs. Please report any confrontation with unleashed dogs to the County Sheriff's Department.

Aquatic Exotics

The effort to remove and control aquatic exotic species continues at the Big T ponds and in Haines Canyon Creek. Please do not disturb traps or nets; they are checked on a daily basis.

The removal effort is crucial in controlling exotic fish and invertebrate populations. This last season was exceptional: a large snapping turtle was captured in the ponds (pg 2).

Big T Gets its Own 2010 Census!

In late June, a team of ECORP biologist conducted an extensive plant survey throughout the mitigation property. The team recorded just under 100 unique species belonging to 39 families of plants. One third of the indentified plants are non-native; the rest belong at Big T.

ABOUT THE BIG TUJUNGA WASH MITIGATION AREA

The County of Los Angeles Department of Public Works' implementation of the Final Master Mitigation Plan for the Big Tujunga Wash Mitigation Area (Big T) has been under way since April 2000.

Big T is a parcel of land located in the City of Los Angeles' Sunland area (see Page 6). Big T covers an area of approximately 210 acres of sensitive habitat. The site was purchased by the County of Los Angeles Department of Public Works (DPW) in 1998 for the purpose of compensating for habitat loss for other County of Los Angeles Public Works projects.

Big T protects one of the most rapidly -diminishing habitat types found in Southern California—willow riparian woodland. Big T is home to several protected species of fish (Santa Ana sucker, Santa Ana speckled dace, arroyo chub) and birds (least Bell's vireo, southwestern willow flycatcher).

The purpose of this newsletter is to provide an update of ongoing programs and to explain the upcoming enhancement measures that will be implemented on the site in the next few months. Newsletters will be published on a bi-annual basis (Spring and Fall).

More information can be found at

http://www.ladpw.org/wrd/facilities

Native Plant Profile: *Hesperoyucca whipplei*

Hesperoyucca whipplei has many common names. It is known as chaparral yucca, our Lord's candle, Spanish bayonet, Quixote yucca, common yucca, or more appropriately, the foothill yucca.

This species is native to southern California and to the south in Baja California, Mexico. It occurs mainly in chaparral, coastal sage scrub, and oak woodland plant communities at altitudes ranging from 1,000 to just over 8,000 feet (Big T is about 1,300 feet above sea level). At Big T, it is found conspicuously in the wash.

The plant takes approximately 5 years to begin flowering, at which time it has reached maturity. When it does, it usually dies. (It only has one pollinator: the Yucca moth).

Unfortunately, Big T's specimens have been targeted for their spectacular flowers. Visitors have cut away the flowers, presumably for their aesthetic value. The flowers serve for reproduction, so removing them only harms Big T's local population.

We would like to invite everyone to witness what literally occurs once in the lifetime of this beautiful native plant, but to think twice of the potential harm to Big T's population of native yucca by just removing their ever important flowers.

Exotic Species News: *Chelydra serpentina*

In March, a large **common snapping turtle** was removed from the east Tujunga pond during a night snorkel survey. ECORP aquatic biologists *carefully* removed the 15-20 lb specimen and donated him to a local turtle-rescue organization.

They are not native to California. Their natural range is from southern Canada to eastern United States. How did this behemoth find Big T? It is very likely that this individual was once an exotic pet but was abandoned by its owner. As expected, this species competes with native turtle species for resources, such as food and habitat.

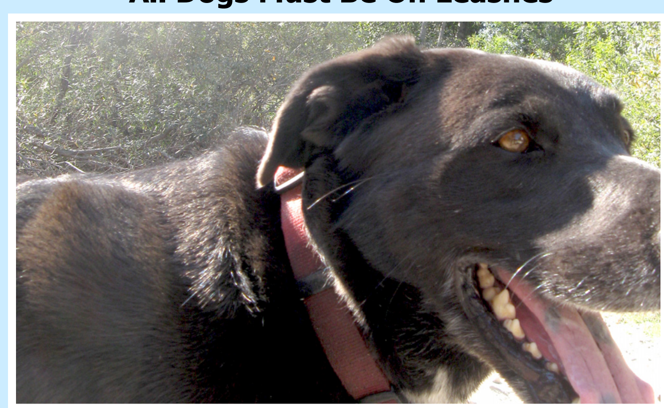
This capture exemplifies the importance of properly relinquishing unwanted aquatic pets rather than releasing them into Big T.

Station Fire: One Year Anniversary

August 2010 marked the one year anniversary of the Station Fire. Fortunately the fire stayed north of Interstate 210 and out of the Big T Mitigation Bank. However, as expected, the '09 storm season brought debris flow and trash through the Big Tujunga Wash Area.

Trails throughout Big T were effected causing trail erosion and undermined vegetation. Even though a year has passed there is still a high potential for debris flows which will stay in effect for the next 4 years until the burned watershed recovers. Please do not visit Big T during rain events.

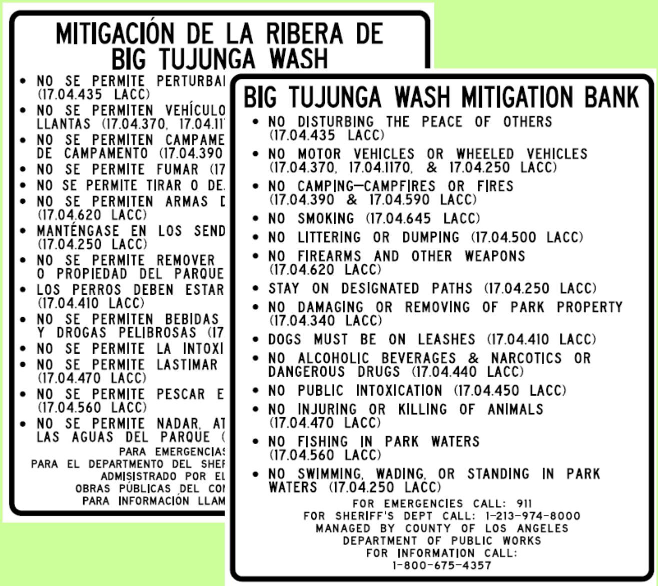
All Dogs Must Be On Leashes



Dogs love Big T. In fact, there is no better place than Big T for a peaceful walk with your canine buddy. Dogs need a daily dose of physical and mental stimulation, so Big T is perfect. However, we would like to remind everyone that while we encourage dog walks at Big T, **all dogs on Big T property must be on leashes**. It is of utmost importance that regulations are followed **for the safety of other hikers, equestrians, and for other pets visiting Big T.**

Big-T

New Signs and Law Enforcement at Big T



You will find the New Signs in both English and Spanish posted at all designated entrances listed below:

- North and South Wheatland Ave.
- Mary Bell Ave.
- Gibson Ranch
- Pond Area

The new signs are posted to help maintain the safety and protection for habitat and all Big T visitors.

The Los Angeles County Sheriffs Department, Parks Bureau, was recently formed to patrol and protect the **Big T** area and its visitors.

If there is an **emergency, as always, please call 911**.

If there is unlawful or suspicious activity occurring, please contact the Sheriff's Department Dispatch:

1-800-834-0064.

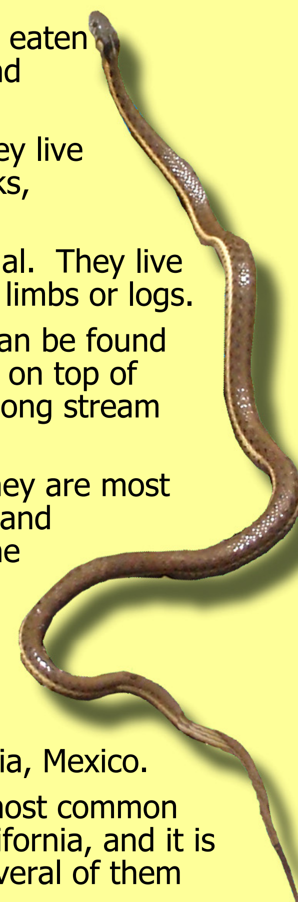
Kid's Corner

Two-Striped Garter Snake

Perhaps you've seen a **two-striped garter snake** at Big T. You might be surprised to learn that a garter snake is not dangerous to people. They like to be in the water or near water. Here are some facts about our native two-striped garter snake.

- The two-striped garter snake gets its name from the two yellow stripes on each side of its body. It is olive green, brown, or dark gray, and it has a red tongue. They can grow to be 18 to 30 inches long. Their bellies are yellow, orange, or red.
- The two-striped garter snake is not venomous to people. Their bite might hurt, but it is not dangerous. Garter snakes have toxins in their saliva that can be deadly to their prey.

- Since these snakes live mostly in the water, they eat fish, fish eggs, small frogs and toads, tadpoles, insect larvae, and sometimes worms or leeches. They may also eat small mammals like mice.



- Garter snakes may be eaten by hawks, coyotes, and raccoons.
- They are aquatic. They live around streams, creeks, ponds, and lakes.
- They are also terrestrial. They live in holes or under tree limbs or logs.
- During the day they can be found basking (sun bathing) on top of streamside rocks or along stream banks.
- During the summer they are most active in the morning and afternoons. During the cooler months, they are active only during warm afternoons.
- They live from central California to as far south as Baja California, Mexico.
- This is probably the most common snake in southern California, and it is not unusual to see several of them at one time.

Water Resources Division
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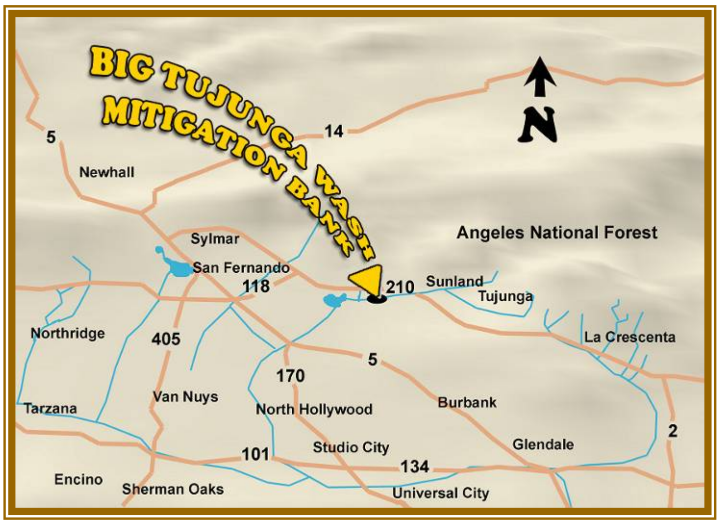

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Valerie De La Cruz or Cindy Rowlan
Water Resources Division
County of Los Angeles Department of Public Works
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Alhambra, CA 91803
Phone: (626) 458-6126 / (626) 458-6132
Fax: (626) 979-5436
Email: vdelacruz@dpw.lacounty.gov, crowlan@dwp.lacounty.gov

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APPENDIX I

Community Advisory Committee Meeting Agendas and Minutes

Big Tujunga Wash Mitigation Bank Project

Community Advisory Committee Agenda

Date: Thursday, April 29, 2010

Time: 6:30 to 8:30 p.m.

Location: Hansen Yard
10179 Glenoaks Boulevard
Sun Valley, CA 91352

Panel: County of Los Angeles Department of Public Works
ECORP Consulting, Inc.

I. Welcome/Introduction

II. Review of Meeting Agenda

III. Site Maintenance Issues
Discussion of Action Items from Previous Meeting

IV. Current Status of Programs

1. Exotic Plant Eradication Program
2. Riparian Habitat Restoration
3. Exotic Wildlife Removal/Monitoring
4. Water Quality Analysis
5. Trail Restoration/Maintenance
6. New Public Outreach Activities

V. Discuss and Schedule Next Trail Maintenance Day

VI. Schedule Next CAC Meeting

VII. Comments, Questions, and Answers

Big Tujunga Wash Mitigation Area Project
Community Advisory Committee Minutes
Thursday, April 29, 2010
At Hansen Yard

I. Welcome/Introduction

Meeting attendance sign-in sheet attached.

II. Review of Meeting Agenda

Valerie De La Cruz reviewed the meeting agenda

III. Discussion of Action Items from the April 29, 2010 Meeting

Action items from the last meeting were reviewed:

- The CAC Group determined that a representative from Lakeview Terrace should attend the CAC meetings. Terry Kaiser suggested Heidi Paul. He or Pat Davenport will contact her about attending the meetings.
    - Mary Benson suggested that Michael Carpenter should be the Lakeview Terrace representative for the CAC meetings. Mary will contact him. It was also suggested that All Nations Church have a representative for the CAC meetings.
- ECORP will modify the Spanish/English flyer to put the English descriptions before the Spanish translations.
    - Flyer was modified. ECORP will send the modified flyer to Cindy Rowlan and Valerie De La Cruz.
- LADPW to reschedule trash pickup from the site on Mondays.
    - Trash pickup was rescheduled to Mondays.
- Terry Kaiser will contact Bill and Sheila Meers (San Fernando Rangers) to inform them about the need for an access permit if their poker rides go on the County property.
    - Terry Kaiser was not present at the meeting. Valerie De La Cruz will contact Terry about Bill and Sheila Meers to talk about access permits for the site. Valerie stated that she will look into posting permitting information regarding organized poker events online at LADPW's website.
- LADPW will contact Dale Gibson regarding setting up an information booth at the day of the Ride for a Cure events.
    - The 2010 Ride for a Cure event will be held October 2, 2010. ECORP and LADPW would still like to set up an informational booth again to get more people to help on trail clean-up day.
- LADPW to check phone numbers on County signs and clarify who will be responsive to emergencies on the County property.
    - New phone numbers were announced.
- LADPW will check into setting up an agreement with the Park Rangers to patrol the County property.
- ECORP/LADPW will begin formulating an equestrian focused flyer and then circulate that to the CAC members for review.

    - This task has been deferred because there was a concern that too many flyers are in circulation right now. The CAC would like to keep efforts focused on public outreach right now. When the flyer is developed, it will be in English and Spanish.
- LADPW will check with the company who cleans the portable toilets about throwing away new rolls of toilet paper.
    - LADPW will check with the portable toilet company to make sure they are not throwing away new rolls of toilet paper.
- LADPW will remove the downed chain link fence on the east side of the ponds.
    - Still has not been removed, but LADPW stated they will remove it. LADPW will work with Parks and Recreation to contact Caltrans to fix the fence between the pond and the freeway. There is a section of fence that always gets cut for an opening, so LADPW will work with Los Angeles County Parks and Recreation to leave an opening in the fence.
- Terry Kaiser will talk to Valerie De La Cruz about a permit to construct the internal gate at the Wheatland/Wentworth entrance.
    - Terry did not contact Valerie about the internal gate construction. Terry was not present at the meeting.
- The CAC group will encourage equestrians to bring their horses out to haul trash during the Trails Maintenance Day. If anyone is interested, they should contact Valerie De La Cruz at (626) 458-6126.
    - The next Trail Maintenance Day is scheduled for October 16, 2010. However, there may be a conflict with a SHPOA event (Fall Festival) that is scheduled for the same date. The back-up date for the Trail Maintenance Day is October 23, 2010. Contact Valerie De La Cruz if there are any areas that need special focus.

Assorted Discussion Items

<u>Changes in Los Angeles County Sheriff's Department</u>

Two months ago the LA County Sheriff's Department merged with the County Safety Police. The sheriffs are stationed in Castaic and will now patrol 26 County parks from the Big Tujunga Area north to Lancaster. The closest station to the Mitigation Area is located in Crescenta Valley. Deputy Ernie Masson distributed the phone number for the Sheriff's Parks Bureau dispatch center: (323) 845-0080. When calling this number, it is best to refer to the Mitigation Area as the "Tujunga Ponds" or "Big Tujunga Mitigation Bank Area". Four units will be patrolling on each shift, with both daytime and nighttime patrols. It was suggested that copies of Terry Kaiser's map be made and distributed to each deputy for reference purposes. The Castaic Sheriff's Station phone number is (661) 257-0881. This number is only for information and other issues pertaining to LA County. This is not to report incidences; however, this number can be used in non-emergency situations.

Parks will be patrolled in three sections; North, South, and East. The Mitigation Area is in the North Section (Sylmar to Lancaster, the San Fernando Valley Section). Each section will be patrolled by 2 vehicles. The Deputy Sheriffs will routinely check each park in the area every day. This will not be just a "drive-by" check. The deputies will get out and walk throughout the parks. The deputies have a key to the gate off Foothill. They will drive through, park by the west pond, and walk around. Mari Quillman mentioned that ECORP sends a biologist out one day on the weekends during the spring and summer to conduct community outreach regarding appropriate recreational use of the Mitigation Area. It was suggested that these outreaches be coordinated with the deputy patrolling the area.

The Angeles Golf Course recently did a sweep for homeless people and the people who were encouraged to leave the golf course may have relocated to the Mitigation Area. Deputies would be willing to do a weekend sweep of homeless, just contact Deputy Masson.

It would be a good idea to set up a tour of the Mitigation Area on a weekday with the Sheriff's deputies and personnel from the Supervisor's office.

Bike patrolling will be implemented just for the summer season. One sergeant and six deputies will be on mountain bikes. This raised a concern among the group because mountain biking is not allowed in the Mitigation Area and if recreational users see deputies on bikes, it could encourage mountain bikers use at the site. Also, horses are not well adapted to bicycles and scare easily, endangering riders.

The LA County Sheriff's Department has a mounted patrol – most are reserve deputies but a few are full-time deputies. It is often hard to schedule the mounted patrol.

Deputy Masson encouraged everyone at the meeting to contact the Sheriff's Department if any type of assistance is needed for the site. They are more than willing and now have the resources to respond to requests. Deputy Masson also clarified that for emergencies, people should contact the dispatch center (323-845-0080), and for non-emergencies they should contact Deputy Masson at the Sheriff's station (661-257-0881). Some issues will take time to resolve, but the Sheriff's Department is willing and able to help solve any problem.

Updating Signs Posted at the Mitigation Area

The signs posted at the Mitigation Area will need to be re-posted with County ordinances. These signs will need specific lettering and size to match other County signs. The County will need to be contacted for this. Deputy Masson mentioned that there is no way to cite people unless the ordinances are posted. He also mentioned that it is better to have more information posted on the signs so the Deputy Sheriffs are able to cite people. Each ordinance needs to be specifically stated on the signs. Spanish will need to be added to the signs for all users. The rules "No Removal of Vegetation" and "No Hunting" should be added to the signs. For violations, the County needs to be notified, not the City Police dispatch. Deputy Masson offered to review the signs before posting. He can be contacted at the phone number listed above for the Castaic Sheriff's Station.

Users Cutting Yucca Stems

It has been noted recently that users of the Mitigation Area have been cutting down the yucca flower stalks in the upland area. ECORP will check on any protection for the yuccas and will check with CA Department of Fish and Game about yucca cutting by Native Americans.

Tomayo Property

Active homeless camps are present on the Tomayo property. Valerie De La Cruz talked about having the County's property line marked so the Sheriff's deputies know where the Mitigation Area boundaries are.

Off-road Group in Big Tujunga Wash

There is a persistent off-road vehicle (ORV) group utilizing Big Tujunga Wash for off-road activities. Deputy Masson was notified of these activities and he encouraged the group to call the dispatch to report issues. Off-road patrolling by deputies on mountain bikes has received more funding so they can cover more areas in the unincorporated areas of the County.

Wheatland Entrance on North

There was a fence that was almost buried. Flood Maintenance is going to remove the fence and reconstruct a fence there. This is located near the Tomayo property.

Mary Bell Entrance

A trash can is now located at the Mary Bell entrance. The erosion area will be filled in with dirt under the stepover bars. When Flood Maintenance picks up trash they will monitor the erosion situation. Sandbags were placed at this entrance to prevent further erosion, however, curb repair needs to be conducted. LACDPW will work with the City to find a good solution for the scouring at the Mary Bell entrance. The trash along Wentworth was also addressed and it was stated that Sun Valley Grafitti Busters is probably the group that picks up trash along the road there.

New Trail off Cottonwood

A new trail was cut near the Cottonwood entrance. It was suggested that a sign be erected at the top of the trail near the parking lot to keep users on the trail. Supportive wording could be included on the sign. Suggestions also included the placement of a barrier, such as a chain link fence or railing, would prevent further use of this cut trail.

Vector Control

The mosquitoes are getting bad again in the riparian areas along Haines Creek. LADPW stated that anyone can call Vector Control. There is a lot of stagnant water present on the north side of the ponds. LADPW contacted Vector Control and verified with them that a site visit was scheduled for spraying within a week of the CAC meeting.

Issues with Loose Dogs

There is a Latino man that comes in the Mitigation Area daily. He owns the two pit bulls that run loose throughout the site every day. Some folks have tried to talk to him about the recreation rules for the site, but he doesn't appear to care. The CAC was instructed to call Animal Control if we see the pit bulls running loose throughout the Mitigation Area. He parks at

Gabrieleno Park – CAC was advised to record his license plate if he is seen again. The new County code signs discussed will allow the Sheriff to cite him for disobeying the rules. It needs to be clarified whether an incident report by an officer needs to be made or if the City can report the license plate without an incident report. ECORP said they will have their outreach biologist, Greg Benavides, attempt to talk to him.

Homeless Area

An active homeless area is located just under the 210 Freeway. Their items are washing into Big Tujunga Wash during high flows.

Barrel

Andrea Gutman mentioned that there is still a barrel by the fence on the west side of the ponds near where the new permanent opening will go.

IV. Current Status of Programs

1. Exotic Plant Eradication Program
   - Program will be continued into 2010. Large amounts of thistle have been observed. Exotic plant removal crews will focus on this.
2. Riparian Habitat Restoration
   - No planting will occur, however, exotic plant removal will continue.
3. Exotic Wildlife Removal/Monitoring
   - Will continue into 2010.
4. Water Quality Analysis
   - Annual water quality analysis will continue in 2010.
5. Trail Restoration/Maintenance
   - No areas in need of immediate attention, quarterly trail surveys will continue in 2010.
6. New Public Outreach Activities
   - The new outreach activities appear to be successful. These will continue during the summer months.

V. Discuss and Schedule for the Next Trail Maintenance Day

The next Trail Maintenance Day is scheduled on October 16, 2010 from 8:00 am to 12:00 pm and a backup date of October 23, 2010 was set aside in case of rain on October 16^{th}. LADPW mentioned that storm season begins October 15, 2010. LADPW will provide trash bags, gloves, and snacks.

VI. Schedule Next CAC Meeting

The next CAC meeting is scheduled for Thursday, September 23, 2010 from 6:30 pm to 8:30 pm at Hansen Yard, 10179 Glen Oaks Boulevard, Sun Valley, CA 91352.

VII. Action Items

- ECORP will research protection status and Native American cutting of the yuccas with CA Department of Fish and Game.
- LACDPW will look into getting new signs made. People should email Valerie De La Cruz if they have anything to add to the signs.
- A tour to be set up with the Sheriff's department and Supervisor's personnel.
- ECORP to send an electronic file of the public outreach flier to Cindy Rowlan and Valerie De La Cruz in both English and Spanish.
- ECORP to submit articles to Chris Arlington of SHPOA for their newsletter. Deadlines are 2 months prior to printing.
- Mary Benson suggested that Michael Carpenter should be the Lakeview Terrace representative for the CAC meetings. Mary will contact him.
- LADPW will look into placing a barricade to prevent recreation users from using new trail cut near Cottonwood entrance
- Valerie De La Cruz will contact Terry Kaiser about Bill and Sheila Meers (San Fernando Rangers) to talk about access permits for the Mitigation Area for future poker rides. She will look into posting permitting process information regarding organized rides on LADPW's website.
- ECORP to contact ETI at Dale Gibson's ranch to tell them about clean up day.
- LADPW will look into setting up a booth again at the Ride for a Cure event on October 2, 2010.
- SHPOA would like a speaker from Public Works to attend their Association Meeting the second Tuesday in October (October 12).
- LADPW will check to see if an incident report is required to report the man with the loose pit bulls, or if the City can report his license plate without an incident report.
- Have ECORP's outreach biologist Greg Benavides talk to alleged owner of the dogs who parks at Gabrieleno Park and then turns his pit bulls loose.

Big Tujunga Wash Mitigation Area Project
Community Advisory Committee Minutes
Thursday, September 23, 2010 Meeting
At Hansen Yard

I. Welcome/Introduction

Meeting attendance sign-in sheet attached.

II. Review of Meeting Agenda

Valerie De La Cruz reviewed the meeting agenda. She requested that the group defer the review and discussion of action items from the April 29, 2010 meeting until later in the agenda. Three visitors, including Mr. Boris Nikolof (Los Angeles County Sheriff's Department, Parks Bureau), Mr. Chris Mowry (Los Angeles County Parks and Recreation Department), and Ms. Kristi Herrera (Foothill Mounted Patrol), were attending the meeting and they had time constraints. So, Valerie asked that the group first address the items the visitors needed to discuss.

III. Discussion of Information Provided By Visitors

Ms. Kristi Herrera provided some background on how she and her husband became involved with the Foothill Mounted Patrol (Patrol). She stated the Patrol has 45 active members and that they patrol in 3-person teams in the morning and afternoons. Their shifts are approximately 3 hours long. So far, they have had a good response from the public. They are currently in the process of doing additional training for their rangers. Their job is basically to patrol and to report situations they may come across. They do not have enforcement authority and their job is not to tell people what they can and can't do.

Sergeant Boris Nikolof provided some background regarding the Sheriff Department's recent acquisition of patrolling responsibility for the County parks. He stated the Department has 149 parks to patrol on a daily basis. Deputies are assigned to patrol certain areas and the Department's goal is to keep the same Deputies in each area for familiarity purposes. When the Deputies patrol, they are supposed to get out of their vehicles and talk to people while they patrol. Summer is the busy season for patrols. They assign fewer officers to patrols during the winter. At the Big Tujunga Mitigation Area, the Deputies have noted some people drinking alcohol, swimming in the ponds, and barbequing. Terry Kaiser noted that he rode with the Deputies while they were patrolling and they were quick to cite the alcohol drinkers. Sergeant Nikolof stated that horse patrols are the most effective method of patrolling and that the Deputies will enforce the codes on the signs on an as-needed basis. The Sergeant was asked about the fines for infractions of the various codes. He stated he would send the information on the fines (Bail Schedule) to Valerie De La Cruz. Chris Arlington of SHPOA requested that they also be provided to her so she can pass the information along to her group.

Sergeant Nikolof stated that the correct number to call to report issues at the Big Tujunga Mitigation Area is (800) 834-0064. However, if there is an emergency, he stated that the call should be made to 911. Sergeant Nikolof will provide the Big Tujunga grid map to Dispatch.

IV. Discussion of Action Items at the September 23, 2010 Meeting

Action items from the last meeting were reviewed:

- Cutting of Yuccas and protections for this plant species.
    - Greg Benavides (ECORP) provided some life history information about the yuccas, including the fact that the yuccas only bloom once in five years and then the plants die. Historically, the Native Americans utilized the stalks for food and for a soap-like substance they contain. Nowadays, people may be taking them for decorations or they may be using them as the Native Americans did in the past. Greg Benavides will continue to research if there is an ordinance that protects them from being harvested during the blooming season. The September 2010 newsletter included an article that highlighted the yucca.

- Newsletter dispersal.
    - Terry Kaiser requested 30 to 40 copies of the newsletter to distribute to feed and tack stores in the area. Mary Benson stated she could provide a list of schools where the newsletter could be distributed to in order to get the information about the Mitigation Area to the local communities. Chris Arlington stated that she would print out the newsletters from the LACDPW website and she would distribute them at the SHPOA meetings. Terry Kaiser stated he would add the LACDPW link to the ETI website, which has approximately 150 members.

- New Signs
    - Valerie De La Cruz stated that new signs will be fabricated with the new codes in both English and Spanish and they will include the new phone numbers. She stated that each existing sign will be replaced with a set of 4 signs (Examples of the signs were passed out at the meeting). Signs will be posted at the Gibson Ranch entrance, the south and north Wheatland entrances, the Marybell entrance, the powerline easement, and the north entrance to the ponds. The signs will post the hours of operation and will stipulate that visitors are not allowed on the site during rains. [Note – October 15^{th} is the beginning of the storm season and there is still a potential for debris flows from the Station Fire. In addition, Big Tujunga Dam is still under construction so there will be no flood control through the dam this winter. LACDPW is pouring the spillway and the work should be complete in May 2011. This winter, they will be building the control house.]

    - Some concern was raised that the "No Firearms or Weapons" ordinance on the sign does not specify that it includes air rifles and paintball guns. In actuality, the official code does specify air rifles, sling shots, and etc. Chris Stone and Valerie will look into adding the words "air rifles and paintball guns" to the signs.

  - A suggestion was made that it would be beneficial to include an article in the next newsletter that explains the restrictions related to weapon use in the Mitigation Area. It would be an opportunity to let people know that all weapons, including paintball guns, standard BB guns, and Airsoft BB guns, are not allowed in the Mitigation Area.

- Tour of the Mitigation Area for the Los Angeles County Supervisor's and City Council personnel.
  - Valerie De La Cruz offered to take Sheriff's Department and Supervisor's personnel on a site visit. It was decided that the best time to do this would be in the spring.

- Electronic File of English/Spanish Public Outreach Flier
  - ECORP provided the electronic file of the public outreach flier to Cindy Rowlan and Valerie De La Cruz.

- Submittal of articles for SHPOA Newsletter.
  - Chris Arlington summarizes Big T Washline newsletter articles and includes them in the SHPOA.

- Attendance of Michael Carpenter at CAC Meetings
  - Mary Benson stated that Michael Carpenter may attend the spring meeting. Mary noted that Michael Carpenter was hosting the Coastal Cleanup Day effort between Foothill Boulevard and the 210 Bridge. Valerie De La Cruz did notify him about the upcoming Big Tujunga Mitigation Area Trails Cleanup Day.

- Prevention of use of trail at end of Cottonwood entrance
  - The group decided the best remedy against the unauthorized trail use would be to keep branches piled up at the uphill and downhill ends of the trail. ECORP will make sure that Natures Image's maintenance crews keep plant materials at these locations to continue to deter the unauthorized use of the trail.

- San Fernando Ranges Poker Rides
  - Terry Kaiser spoke to Bill and Sheila Meers (San Fernando Rangers) about the route of their Poker Rides. They informed him that their rides do not go into the Mitigation Area.

- Ride for the Cure Event
  - LACDPW arranged to have a booth at the Ride for the Cure event.
  - The Event was organized to include various activities on each weekend for a number of months. On September 25, the obstacle/trails trial event was scheduled but there was concern that LACDPW was not contacted regarding an access permit for this event if it was planned to occur in the Mitigation Area. Valerie De La Cruz will check with Dale Gibson regarding this event.

- Attendance by LACDPW at the SHPOA Meeting (October 12, 2010)

- o Elektra Kruger will contact Valerie De La Cruz regarding having someone from LACDPW attend the meeting. Chris Arlington and Elektra Kruger requested that whoever attends should provide some background on the Big Tujunga Mitigation Area. In addition, the LACDPW person who attends needs to remind attendees not to release turtles or other pets in the Mitigation Area and that there are populations of native turtles and fish that do reside there. The location of the meeting is: Tierra Del Sol, 9919 Sunland Boulevard. The meeting starts at 7:00 pm and the speakers begin at 7:30 pm.

- Loose Dog Issues
  - o Sergeant Nikolof stated that if there are loose dog issues in the Mitigation Area, then contact the Sheriff's Department at 800-934-0064. LACDPW will coordinate with County Animal Control regarding enforcement in the Mitigation Area. Terry Kaiser provided LACDPW with a County Animal Control contact name - Stacey Dancy. County Animal Control can be contacted regarding loose dogs but they may need assistance from the Sheriff's Department to access the Mitigation Area. The Sheriff's Department is willing to assist them but until a procedure is coordinated between LACDPW and County, issues in the Mitigation Area should be reported to the Sheriff's Department.

- ECORP's outreach to Owner of Loose Pitbulls
  - o Greg Benavides attempted to talk to the alleged owner of the dogs but he was very unreceptive to any outreach.

New Discussion Items

<u>Horse Carcass Removal</u>

The carcass of the horse that died is mostly deteriorated and Terry Kaiser has arranged for the Sanitation Department to pick it up. It should be removed around the end of the first week of October. Barriers on the trails have been removed and all trails are open.

<u>Poison Oak Trimming</u>

The primary area where poison oak is encroaching on the trail is east of the south Wheatland entrance. ECORP will conduct a reconnaissance of the trails just prior to the next maintenance visit by the landscape contractor (Natures Image) to notify them of the problem areas.

<u>Fire in the Mitigation Area</u>

LACDPW and ECORP were surprised when the CAC members mentioned that there had been a fire in the mitigation area over the Labor Day weekend (approximately 1 acre in size). The location of the fire was just north of the Gibson Ranch, in the riparian habitat area. The CAC members stated that the Fire Department used water-dropping helicopters to extinguish the fire. ECORP's biologist will map the extent of the burn and photograph the conditions where the fire occurred during the next trails monitoring site visit. Any major incidents that occur within the Big Tujunga Mitigation Area should be reported to LACDPW personnel immediately.

Fence Repair/Removal Issues

Valerie De La Cruz stated that they are still working with Flood Maintenance Division to remove the embedded fence on the south side of the ponds.

The Caltrans fence is still down on the north side of the ponds where the vehicle went off of the 210 freeway and crashed into the fence. LACDPW will work with Caltrans and LA. County Parks to have the fence repaired.

The hole located in the fence at the northwest corner of the ponds would be continually cut if this portion of the fence is repaired. In order to avoid continual maintenance issues, the hole will not be repaired.

Homeless Outreach

Mary Benson, Field Deputy for Councilmember Paul Krekorian's office (Second Council District), explained that the Councilman's office would like help in identifying homeless people encampments in the Mitigation Area. She stated that an outreach was conducted in the Big Tujunga Wash on September 23rd to notify the homeless community that the California Coastal Cleanup Day was planned for Saturday, September 25th.

Mary Benson discussed the "Homeless Connect Day" planned for 9:00 am to 2:00 or 3:00 pm on November 1 at 7747 Foothill Boulevard in the community of Tujunga. The purpose of the event is to provide outreach, education, and resources to homeless individuals. Individuals will be interviewed about who they are, what their situation is, and why they have chosen a homeless lifestyle. The goal will be to help them change their situation so they no longer live this lifestyle. Homeless individuals will be transported to the event and they will be provided with a hot meal and a take away packet.

Mary Benson suggested that the October 23rd Trails Maintenance Day event at the Mitigation Area would be a good time to notify homeless individuals about the November 1st "Homeless Connect Day."

Mary Benson mentioned that the Mayor has announced that Rommel Pasqual will be the new Deputy Mayor in charge of the environment. She suggested that LACDPW may be able to partner with that office for River Keeper outreach. Mary Benson will pass the information along to Valerie De La Cruz.

Trails in the Creek

The CAC members mentioned that some equestrians are riding their horses down the middle of the creek between the two crossings located just downstream of the Cottonwood Area. The creek is wide at that location and instead of crossing to the upland side of the creek, the equestrians are riding down through the creek to the next crossing. ECORP's biologist will meet with Terry Kaiser and possibly Chris Mowry, the LA County Parks and Recreation Department's Ranger, to look at the area and determine a method to eliminate this trail use.

IV. Current Status of Programs

1. Exotic Plant Eradication Program
   - The Natures Image maintenance crews will be out on the site two more times before the end of the year to remove exotic plants. The trees that were girdled in 2009 will be treated again if necessary. The trees are expected to die in place and it will likely take 10 to 15 years for the trees to deteriorate. Future monitoring will include determining if/when limbs need to be removed or trunks need to be cut. The primary focus will be on the girdled trees that are located near trails. LACDPW discouraged the CAC members from cutting vegetation in the Mitigation Area because unauthorized cutting violates the California Department of Fish and Game permit. If vegetation needs to be removed along the trails, then LACDPW should be notified and ECORP will coordinate with the individuals who report the areas where maintenance needs to occur.

2. Riparian Habitat Restoration
   - Planting of additional containers/cuttings will no longer be part of the habitat restoration program. Rather, the expansion of the exotic plant removal program to include the large non-native trees will open up the tree canopy as the trees die and the native plants will be able to fill in under the trees. This will help to create native habitat areas that are more conducive to breeding birds and other wildlife.

3. Exotic Wildlife Removal/Monitoring
   - The exotic wildlife removal program is continuing with three more visits planned prior to the end of the year. The focus will continue to be on utilizing different methods to remove various species of exotic wildlife. Nighttime snorkeling has been effective in capturing bullfrogs and non-native fish species. Nets and traps are typically placed in the stream/ponds and left in place for 24 hours. These methods target crayfish, non-native fish, and turtles. Earlier in 2010, a large common snapping turtle was captured in the ponds. In addition, native southwestern pond turtles were also captured. The native turtles were released and the snapping turtle was turned over to the California Turtle and Tortoise Club for adoption.

4. Water Quality Analysis
   - The sampling for the annual water quality analysis will be conducted in November 2010.

5. Trail Restoration/Maintenance
   - Trails maintenance will continue. One of the focus areas will continue to be the trimming of the poison oak that grows along the water trail.

6. New Public Outreach Activities
   - The new outreach activities continue to be successful. There will likely be one or two more outreach visits in September/October.

V. Discuss and Schedule for the Next Trail Maintenance Day

The next Trail Maintenance Day is scheduled on October 23, 2010 from 8:00 am to 12:00 pm. The event will be cancelled if rain is forecasted. Since storm season begins on October 15, the event will not be rescheduled if cancelled due to weather. LACDPW will provide trash bags, gloves, and snacks.

VI. Schedule Next CAC Meeting

The next CAC meeting is scheduled for Thursday, April 28, 2011 from 6:30 pm to 8:30 pm at Hansen Yard, 10179 Glen Oaks Boulevard, Sun Valley, CA 91352.

VII. Action Items

- Sergeant Nikolof will provide the information on the fines (Bail Schedule) to Valerie De La Cruz of LACDPW. Valerie De La Cruz will distribute the information to ECORP and the members of the CAC.

- Sargeant Nikolof will provide a copy of the Big Tujunga grid map to Dispatch.

- Greg Benavides (ECORP) will do some follow-up research to determine if there is an ordinance that protects the Yuccas from being harvested during the blooming season.

- Valerie De La Cruz will provide Terry Kaiser with 30 to 40 copies of the newsletter to distribute to feed and tack stores in the area.

- Mary Benson will provide a list of schools where the newsletter can be distributed to in order to get the information about the Mitigation Area to the local communities.

- Chris Arlington will print out the newsletters from the LACDPW website and distribute them at the SHPOA meetings.

- Terry Kaiser will add the LACDPW link to the ETI website, which has approximately 150 members, so that the ETI members can view the newsletter and other information about the Mitigation Area.

- Chris Stone and Valerie De La Cruz will look into adding the words "air rifles and paintball guns" to the new signs that will be posted in the Mitigation Area.

- The next Big T Washline newsletter may include an article explaining that all weapons, including paintball and BB guns, are not allowed in the Mitigation Area.

- Valerie De La Cruz will plan for a spring time tour for Los Angeles County Supervisor's and City Council personnel.

- ECORP will make sure that Natures Image's maintenance crews keep plant materials piled at the unauthorized trail at the end of Cottonwood in order to continue to deter the unauthorized use of the trail.

- Valerie De La Cruz will check with Dale Gibson regarding the September 25th "Ride for the Cure" trails trial event that was planned to occur in the Mitigation Area. Use of the Mitigation Area for an event of this type requires a permit from LACDPW.

- Elektra Kruger will contact Valerie De La Cruz regarding having someone from LACDPW attend the SHPOA meeting.

- Valerie De La Cruz will coordinate with County Animal Control regarding enforcement in the Mitigation Area. The contact person at County Animal Control is Stacey Dancy.

- ECORP will conduct a reconnaissance of the trails just prior to the next maintenance visit by the landscape contractor (Natures Image) to notify them of the problem areas, including where the poison oak is growing into the trail.

- ECORP's biologist will map the extent of the burn and photograph the conditions where the fire occurred during the next trails monitoring site visit. This information will be provided to LACDPW and will be included in the 2010 annual report.

- Mary Benson will provide Valerie De La Cruz with information about potential partnering between LACDPW and the new Deputy Mayor's office (Rommel Pasqual, Deputy Mayor in charge of the environment) for River Keeper outreach.

- ECORP's biologist will meet with Terry Kaiser and possibly Chris Mowry, the LA County Parks and Recreation Department's Ranger, to look at the area where equestrians are riding through the creek to determine a method to eliminate this trail use.

APPENDIX J

Community Outreach Memos

1801 Park Court Place, Bldg. B, Ste. 103
Santa Ana, CA 92701
(714) 648-0630 phone
(714) 648-0935 fax

ECORP Consulting, Inc.

Memo

To: Mr. David Hughes, BonTerra Consulting

From: Ms. Mari Quillman

Date: 7/1/2010

Re: Big Tujunga Wash Mitigation Area – Task O Public Outreach Visits (2010-074/O/O2)

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. (ECORP) has expanded its public outreach efforts to include other park user-groups who regularly visit the Mitigation Area for recreational purposes. This memo summarizes outreach activity for June 2010.

Description of Weekend Visits to Target Non-Equestrian Recreational User Group

The Mitigation Area was visited by Gregorio Benavides, an ECORP biologist, on June 19, 23, 26, and 27, 2010. Mr. Benavides was accompanied on June 19th by Adam Schroeder, another ECORP biologist. Each visit consisted of a walk through the entire trail system of the Mitigation Area as well as to known locations where non-equestrian visitors recreate. These known locations include swimming holes near the Wheatland Ave entrance, the Tujunga Ponds, and various locations along Haines Canyon Creek that are situated away from the trail and are therefore hidden from view. Outreach took place between the hours of 11 and 3 PM, when visitors would most likely be encountered.

On Saturday June 19, only equestrian visitors were encountered; no non-equestrian visitors were on site in spite of the favorable weather. The equestrians received information fliers as well as business cards for future contact.

On June 23, five non-equestrian visitors were interviewed. Three of the five had been wading in Haines Canyon Creek. They were receptive and friendly and asked about alternative swimming areas. They were directed to the Hansen Dam Swimming Pool. The other two visitors, a couple, were there for a short hike on the trail. All five visitors received information fliers and business cards.

On June 26, two sets of non-equestrian visitors were interviewed. One set consisted of a family of three and a young man. They were picnicking along the creek's edge just north of the Upland Area. Only the couple's daughter was wading in the creek. There was no cooking taking place. They were receptive and received information fliers and business cards. The second set of visitors was preparing to swim in the West Pond. They were interviewed and were given information fliers and business cards. They were receptive and decided to leave shortly afterwards. This group consisted of a man with his small daughter and his two teenage sons and an older man in his twenties.

On June 27 only one hiker was interviewed. He was on a hike with his four (leashed) dogs and was handed an information flier and a business card. No equestrians were encountered on this day.

The results of the outreach site visits will be summarized in a subsequent report. If you have any questions regarding the contents of this memorandum, please contact me at (714) 648-0630.

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September 27, 2010
(2010-116/O)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 4 Tasks O - First Quarter (July – September 2010) Public Outreach Memo for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting Inc. (ECORP) has expanded its public outreach efforts to include non-equestrian user-groups who regularly visit the Mitigation Area for recreational purposes.

Outreach Efforts

On site interviews and education about the Mitigation Area was conducted by Gregorio Benavides during the last month of the first quarter of the Year 4 (September 4, 11, and 26, 2010). All outreach efforts took place on weekends, during the peak hours of 10 AM to 5 PM. Outreach efforts were not performed during the month of August, 2010.

During the September outreach effort, approximately 40 fliers were distributed to weekend visitors. Informal interviews, short question and answer sessions, and an explanation of LADPW's conservation goals were conducted to approximately 50 people consisting of family groups of 3–15 persons ranging from adults to toddlers. Outreach took place in the Mitigation Area at the Tujunga Ponds and along popular swimming/wading locations at Haines Canyon Creek.

Non-Equestrian Family Groups

As expected, visitors were receptive to outreach efforts. About half of the groups were new to the outreach effort in the Mitigation Area; the others had received outreach materials and on-site education in the past from ECORP biologist Gregorio Benavides. All groups were of Latino heritage with some being monolingual (Spanish only) or bilingual.

When prompted for the reason for their visit, each of the family groups stated they were at the Mitigation Area to recreate with family. All family groups were situated at or headed for Haines Canyon Creek or the Tujunga Ponds. Swimming and wading was observed. Several family groups had small, unleashed dogs. There was no cooking observed as each of the family groups stated that they were aware of the no open-fire policy in the Mitigation Area. Alcohol consumption (beer) was observed in about half the family groups; only the adult males were doing so.

Effects on Sensitive Habitat by Non-Equestrian Family Groups

An elaborate dam was observed at the swimming pond near the South Wheatland entrance; this site was the most popular during the September 26 visit consisting of approximately 25 people. The dam was constructed with large boulders and large dead branches that have been at that site for at least a year. Garbage was not observed at the picnicking sites either during or post family visits. Garbage cans at the South Wheatland entrance and at the ponds indicate that visitors are making full use of disposal sites. Tree trimming adjacent to picnicking areas was not observed; no new trails were observed.

Equestrian User Groups

Approximately five equestrians were provided with outreach material and outreach education during the month of September. Taking into consideration rider and horse safety, these outreach moments were more brief and concise than those for the non-equestrian groups. As expected, they were very interested in speaking about the outreach effort and to learn about the sensitive species in the Mitigation Area.

The outreach effort will continue in the second quarter to both non-equestrian and equestrian user-groups.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 9/27/10

Gregorio Benavides

Biologist

APPENDIX K

Erosion Control and Barrier Maintenance Quarterly Reports

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

March 26, 2010
(2007-110/G/G1)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: Task G1 – Third Quarter (January – March 2010) Erosion Control and Barrier Maintenance Monitoring Report Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Kwan:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. (ECORP) has continued the erosion control and barrier maintenance monitoring efforts throughout the restoration site.

During the third quarter of the third contract year, ECORP biologists conducted four separate Task G1 visits to the Mitigation Area. Those surveys took place in January (4 - 5) and March (5 and 16). No Task G1 visits were performed in February 2010.

In January 2010, during exotic plant species removal in the Mitigation Area, ECORP biologist Gregorio Benavides surveyed for barrier and erosion issues along terrain adjacent to Haines Canyon Creek. There were no barrier or erosion issues found within the Mitigation Area.

In March 2010, two site visits were conducted to assess the state of the Mitigation Area after post Station Fire rains. A considerable amount of overland runoff via the Haines Wash entered the Mitigation Area causing significant erosion on trails and along the Haines Canyon Creek. Impacts caused by runoff were documented with GPS and digital photography.

The majority of trail erosion occurred within Restoration Sections 1-3. Tree roots were exposed by scouring, which caused parts of the trail to become undermined (Figure 1). Standing dead trees were also undermined causing the tree to fall over into the trail (Figure 2). Along Haines Canyon Creek, there was a significant change to the bank physiognomy or shape of the bank (Figure 3a and 3b). This was caused by overland runoff entering the creek and by the increased water flow within the creek; the latter causing severe bank undercutting and scouring (Figures 4 and 5).

Restoration Section 4 lies downstream and furthest to the west of the Haines Wash. There was no substantial trail erosion here (due to the trail's higher elevation); however considerable erosion impacts were observed along the creek. On the westernmost part of the Mitigation Area of Haines Creek, severe sedimentation blocked a portion of the creek effectively diverting water away from this area (Figure 6). A 2009 native fish survey of this now dry section (Figures 7a and 7b) of the creek contained Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus*), and arroyo chub (*Gila orcutti*). The adjacent portion of the creek also experienced considerable scouring and sedimentation caused by water input from the post Station Fire rains.

There were no barrier issues found during the March 2010 field surveys.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 3/26/10

Gregorio Benavides
Biologist

Figure 1. This photo shows the severity of erosion caused by overland runoff from the post Station Fire rains. Note the undermined soil and the exposed roots.

Figure 2. This dead tree was standing before the post Station Fire rains, but erosion caused by overland runoff caused it to fall into the trail.

Figure 3a. This photo of Haines Canyon Creek in Restoration Section 3 was taken on March 11, 2010. Note the severe scouring of the bank and the dead vegetation (presumably caused when this part of the creek was inundated). See figure 3b for comparison of this location.

Figure 3b. This photo was taken on December 8, 2009, in the same location as the photo above. While this site was targeted for exotic invasive plant removal, those plants did not constitute a large portion of the bank-side flora.

Figure 4. Increased water flow in Haines Canyon Creek undercut bank soil thereby exposing plant roots as pictured here.

Figure 5. Scouring from high water flow scoured the bank and the terrain adjacent to Haines Canyon Creek. This photo was taken 3 meters away from the creek. Note the dead vegetation and exposed cobble.

Figure 6. The location marked with the arrow is the portion that was blocked by sediment. The sediment was deposited during the post Station Fire rains caused this channel to become dry.

Figure 7a. This photo was taken on October 28, 2009. Water flowed down from the left of the frame.

Figure 7b. This photo was taken on March 5, 2010 from the same perspective as figure 7a. Note the exposed cobble, which when underwater is considered prime habitat for native fish such as the Santa Ana sucker.

July 1, 2010
(2007-116/G/G1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: Task G1 – Fourth Quarter (April – June 2010) Erosion Control and Barrier Maintenance Monitoring Report Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. (ECORP) has continued the erosion control and barrier maintenance monitoring efforts throughout the restoration site.

During the fourth quarter of the third contract year, ECORP biologists conducted Task G1 surveys in the Mitigation Area. Those surveys took were done in conjunction with the exotic plant removal efforts conducted on April 28 and 30.

While no new rain events resulting in severe overland runoff were observed during the fourth quarter, the effects observed during recent rain events were still visible in April. Bank erosion was still noticeable and the sections of the trails documented in the previous memo were still in need of remediation. Water clarity in the Haines Canyon Creek had improved significantly compared to previous assessments, in which heavy sediment and debris deposition into the creek was observed.

There were no barrier issues found during the April 2010 field surveys. Biologists did not conduct site visits during the month of June 2010.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 7/1/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

October 4, 2010
(2010-116/G/G1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: Task G1 – First Quarter (July through September 2010) Erosion Control and Barrier Maintenance Monitoring Report Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz;

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. (ECORP) has continued the erosion control and barrier maintenance monitoring efforts throughout the Mitigation Area. During the first quarter of the fourth contract year, ECORP biologists conducted Task G1 surveys in the Mitigation Area. The G1 surveys were conducted during outreach efforts on September 4 and 11, 2010 by ECORP biologist Gregorio Benavides.

No new rain events resulting in severe overland runoff were observed during the first quarter. As a result, no new erosion on trails or in adjacent areas as a result of rains was observed. A section of Haines Canyon Creek – a crossing just northwest of the upland area – has experienced a significant amount of erosion due to equestrian activity. It appears that equestrians are crossing this and other sections of Haines Canyon Creek in a side-by-side manner. The banks of the creek have begun to erode at these crossings, widening the reach of the trail, resulting in extremely moist and muddy soil that leads into the Creek. ECORP biologists have on occasion observed this mode of crossing the creek. The most salient evidence is the horse tracks left by equestrians that indicate a side-by-side approach towards the Creek.

Barriers on the project site were intact and showed no signs of vandalism.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 10/4/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
1801 Park Court Place, Building B Suite 103, Santa Ana, California 92701
Phone: (714) 648-0630 ● Fax: (714) 648-0935 ● Email: Ecorp@ecorpconsulting.com

December 31, 2010
(2010-116/G/G1)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: Task G1 – Second Quarter (October through December 2010) Erosion Control and Barrier Maintenance Monitoring Report Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. (ECORP) has continued the erosion control and barrier maintenance monitoring efforts throughout the restoration site.

During the second quarter of the fourth contract year, ECORP biologists conducted Task G1 surveys in the Mitigation Area. The G1 surveys were conducted during exotic plant removal and treatment efforts from October 25 through 28, 2010, and again on December 28, 2010.

No new rain events resulting in severe overland runoff were observed during the first quarter. As a result, no new erosion on trails or in adjacent areas was observed.

Barriers on the project site were intact and showed no signs of vandalism.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 12/31/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
1801 Park Court Place, Building B Suite 103, Santa Ana, California 92701
Phone: (714) 648-0630 • Fax: (714) 648-0935 • Email: Ecorp@ecorpconsulting.com

APPENDIX L

Cottonwood/Willow Restoration Area Maintenance Quarterly Reports

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

March 26, 2010
(2007-110/G/G2)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 Task G2 – Third Quarter (January – March 2010) Cottonwood/Willow Restoration Areas Maintenance for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Kwan:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. has continued its cottonwood/willow restoration areas maintenance and monitoring efforts for 2010.

Natures Image continued exotic invasive plant species removal in the adjacent areas of cottonwood/willow restoration on January 4, 5, and 12, 2010. Nature's Image employees inspected plantings but did not perform maintenance and care activities (such as watering) as the cottonwood (*Populus fremontii*) plantings were in a dormant state. To this date, there are no surviving willow plantings in the Mitigation Area. No Task G2 activities were performed in February or March.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 3/26/10

Gregorio Benavides
Biologist

July 1, 2010
(2007-116/G/G2)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 Task G2 - Fourth Quarter (April – June 2010) Cottonwood/Willow Restoration Areas Maintenance for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. has continued its cottonwood/willow restoration areas maintenance and monitoring efforts for 2010.

April 28, 29, 30 and May 4 and 5, 2010, Natures Image continued exotic invasive plant species treatment and removal in the adjacent areas of cottonwood/willow restoration. Nature's Image employees inspected plantings and performed basic maintenance and care activities, such as removing vegetation immediately adjacent to plantings.

No site visits or exotic vegetation removal activities were conducted by ECORP biologists in the month of June.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 7/1/10

Gregorio Benavides
Biologist

October 4, 2010
(2010-116/G/G2)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 4 Task G2 – First Quarter (July - September 2010) Cottonwood/Willow Restoration Areas Maintenance for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. has continued its cottonwood/willow restoration areas maintenance and monitoring efforts for 2010.

During the first quarter of the fourth contract year, ECORP biologists conducted Task G2 surveys in the Mitigation Area. The G2 surveys were conducted during outreach efforts (September 4th and 11th) by ECORP biologist Gregorio Benavides.

No maintenance was conducted at the cottonwood/willow restoration area at this time. Trees were checked for health and no signs of vandalism were observed.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 10/4/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

December 30, 2010
(2010-116/G/G2)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 4 Task G2 – Second Quarter (October - December 2010) Cottonwood/Willow Restoration Areas Maintenance for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. has continued its cottonwood/willow restoration areas maintenance and monitoring efforts for 2010.

During the second quarter of the fourth contract year, ECORP biologists conducted Task G2 surveys in the Mitigation Area. The G2 surveys were conducted during exotic plant removal and treatment efforts on October 25 and December 28, 2010.

During the removal effort, Natures Image continued exotic invasive plant species treatment and removal in the adjacent areas of cottonwood/willow restoration. Nature's Image employees inspected plantings and performed basic maintenance and care activities, such as removing vegetation immediately adjacent to plantings.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 12/30/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
1801 Park Court Place, Building B Suite 103, Santa Ana, California 92701
Phone: (714) 648-0630 ● Fax: (714) 648-0935 ● Email: Ecorp@ecorpconsulting.com

APPENDIX M

2010 Functional Analysis Report

2010 Functional Analysis and Success Monitoring for the Big Tujunga Wash Mitigation Area Los Angeles County, California

Submitted to:

County of Los Angeles
Department of
Public Works
900 S. Fremont Avenue
Alhambra, California 91803

Submitted by:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

1801 Park Court Place
Building B, Suite 103
Santa Ana, California 92701

CONTENTS

2010 Functional Analysis and Success Monitoring for the Big Tujunga Wash Mitigation Area Los Angeles County, California

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Purpose of the Study

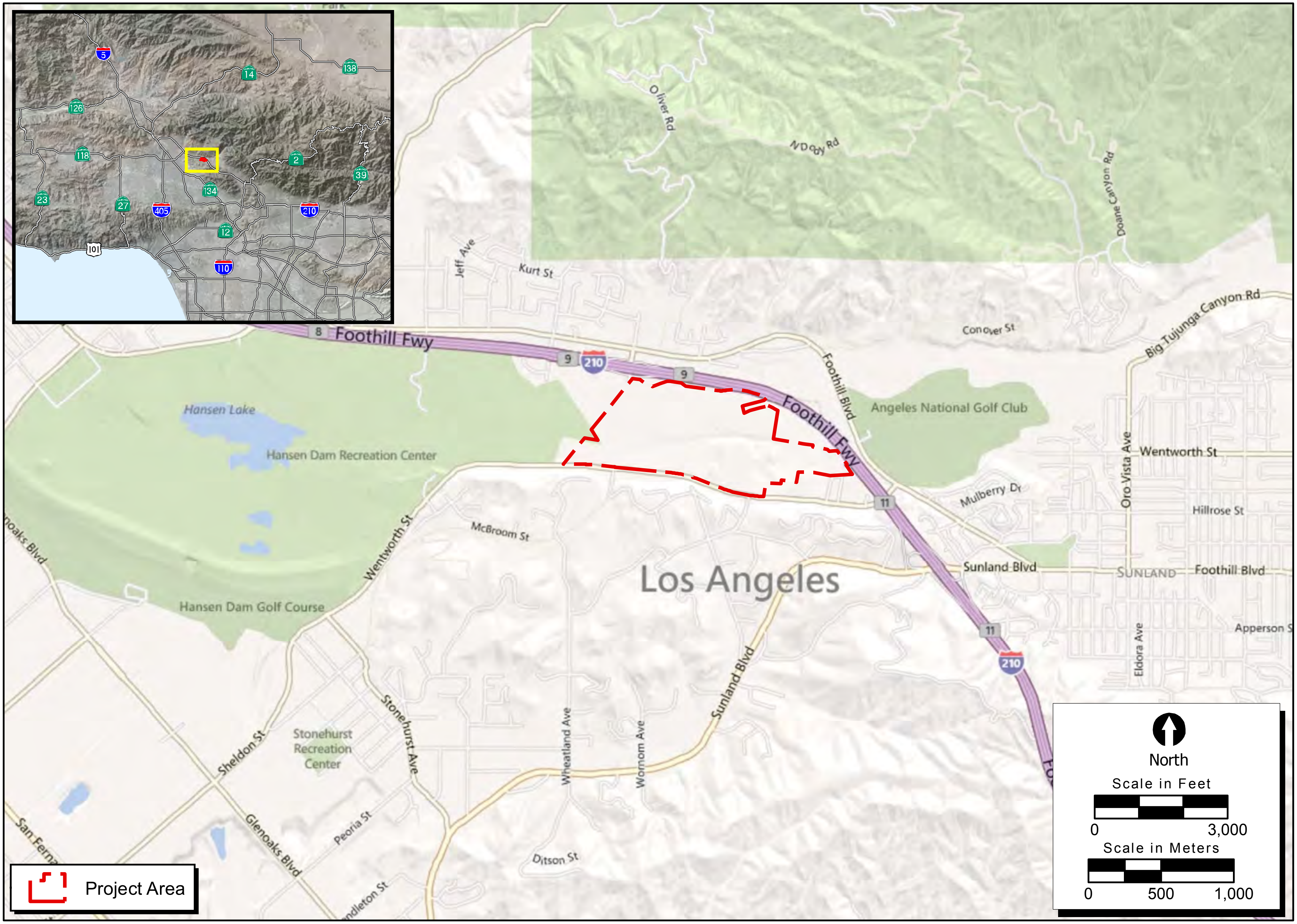
The purpose of this analysis is to use an objective, quantitative method of habitat assessment to compare the functional values of riparian habitat in the Big Tujunga Wash Mitigation Area (Mitigation Area) with the baseline functional analysis previously completed on the site (Chambers Group, Inc. 1998). The functional analysis is used as a tool to assess the overall success of the habitat restoration program that was initiated in late 2000. Additionally, success monitoring and analysis was implemented in 2009 as a quantitative method to evaluate the performance specifically of the riparian restoration areas. This document includes the results of the functional analysis and the success monitoring for 2010.

1.2 Location and Setting

The Big Tujunga Wash Mitigation Area is located in Big Tujunga Wash, just downstream of the Interstate 210 (I-210) overcrossing, near the City of Los Angeles' Sunland area in Los Angeles County's San Fernando Valley. The site is bordered on the north and east by I-210 and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. Figure 1 depicts the general vicinity of the project and the boundaries of the Mitigation Area.

The Mitigation Area supports two watercourses, one containing flow from Big Tujunga Wash proper and the other conveying the flow from Haines Canyon to Big Tujunga Wash. The flow in the Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam and is intermittent based on rainfall amounts and water releases from the Dam. The flow in Haines Canyon Creek, located along the south side of the site, is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately one-half mile downstream of the site. The site is wholly located within a state-designated Significant Natural Area (LAX-018) and the biological resources found on the site are of local, regional, and statewide significance.

The Big Tujunga Ponds and surrounding habitat, consisting of approximately 12.9 acres located in the northeast corner of the site, were originally created as part of the mitigation for the construction of I-210 and are currently under the jurisdiction of the Los Angeles County Department of Recreation and Parks. Previous reports for the Mitigation Area (2008 and earlier) identified an area of 27 acres (e.g., ECORP 2008a). However, new Geographic Information System (GIS) data obtained in 2009, and subsequent remapping of the Mitigation Area, indicate a smaller acreage under the jurisdiction of the Los Angeles County Department of Recreation and Parks. An aerial photograph showing Big Tujunga Wash, Haines Canyon Wash, Haines Canyon Creek, and the Tujunga Ponds is shown on Figure 2.



Location: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Site_Vicinity\Tujunga_ProjectVicinity_v3b_Updated20120229.mxd

Figure 1. Project Location

2010-116 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
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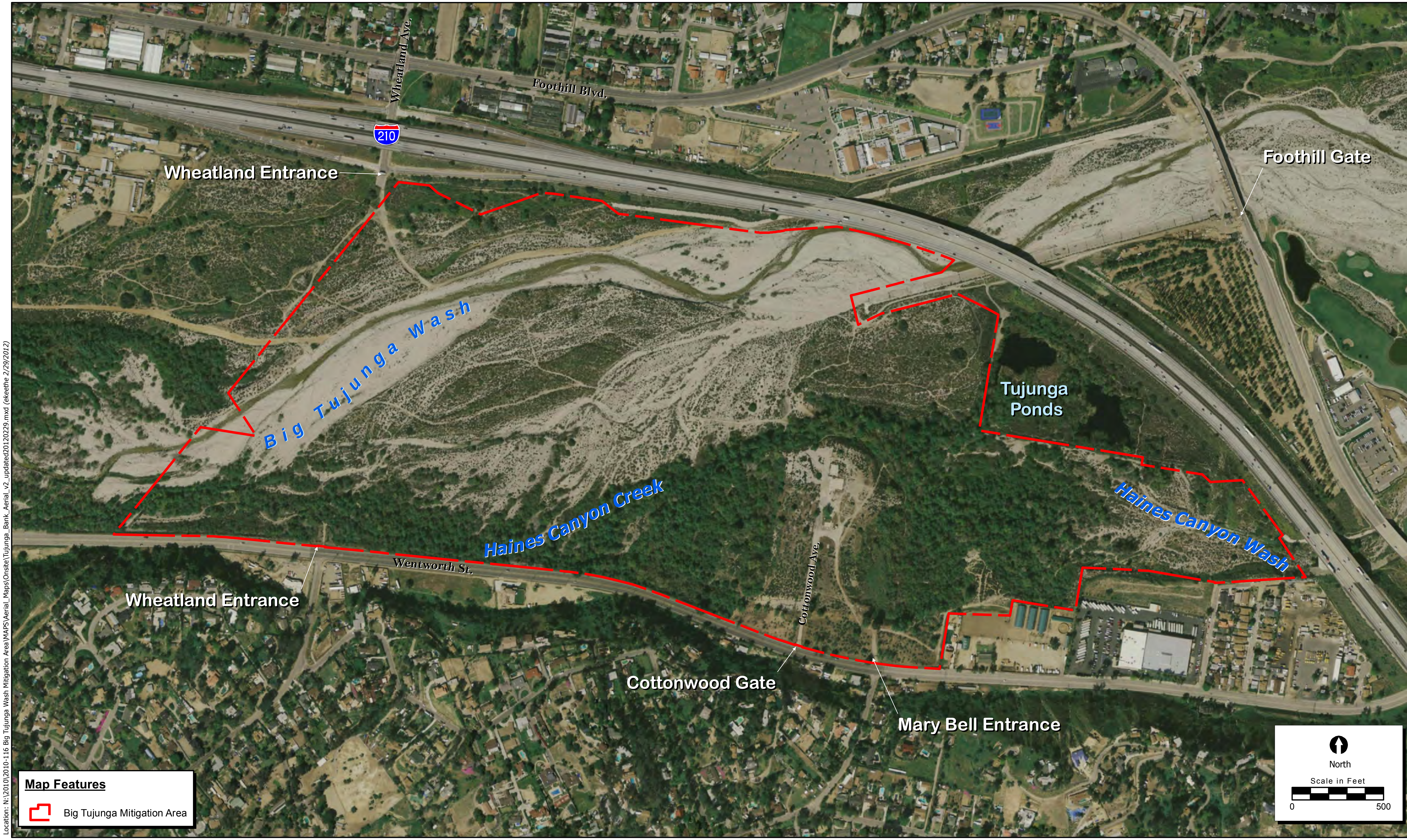

Figure 2. Big Tujunga Wash Mitigation Bank

2010-116 Big Tujunga Wash Mitigation Area

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2.0 METHODS

2.1 Functional Analysis Design

A modified version of the hydrogeomorphic (HGM) approach was used for the functional assessment of the riparian or floodplain habitat in the Mitigation Area. The logic behind the HGM approach is to compare the wetlands functions of the target sites to a reference standard site determined to have the highest level of functioning (Brinson 1995). By definition, reference standard functions receive an index score of 1.0. Target sites are assigned a score of between 0, for no function, and 1.0 for as high as the reference standard. The crediting and debiting mechanism for Skunk Hollow Mitigation Bank (Stein 1997) was used as a starting point and adapted to be specific for this analysis. Nine evaluation variables were used for the functional assessment of riparian habitat:

Riparian Habitat
- Cover (COV)
- Structural Diversity (STD)
- Contiguity (CON)
- Urban Encroachment (URB)
- Percent Exotic Vegetation (EXO)

Hydrologic
- Hydrologic Regime (REG)
- Characteristics of Flood-prone area (FPA)
- Micro and Macro Topographic Complexity (TOP)

Biogeochemical
- Available Organic Carbon (CAR)

In addition to these variables, which evaluate wetlands function, three variables were included to address wildlife values. It is implicit in HGM that wildlife values will be present if the wetlands functions are high. However, for the purpose of this analysis, it was considered desirable to directly compare wildlife values prior to and after enhancement activities. The wildlife evaluation variables are:

Wildlife Values
- Rareness (RAR)
- Wildlife Species Richness (RIC)
- Presence of Habitat Specialists (SPE)

The definitions and scores for each of these evaluation variables are presented in Table 2-1. In order to determine the Functional Units (FU) per acre of each system, the evaluation variables are combined into algorithms that express their relationship in the most streamlined fashion practical. Potential mathematical expressions of the relationship between evaluation variables were explored using guidelines in the U.S. Fish and Wildlife Service Habitat Evaluation Procedures Handbook (1980). Potential mathematical relationships to describe the relationship between evaluation variables are briefly discussed below.

It is appropriate to sum the scores of the evaluation variables (i.e., FU = EV1+EV2…….+EVn) when habitat value is determined by variables that act independently and when these variables cumulatively increase the value of the habitat. In contrast, a compensatory relationship exists when a variable with a low functional value can be offset by a variable with a high value. In that case the mathematical formula that best expresses the relationship between evaluation variables would be an arithmetic mean (i.e., FU = (EV1+EV2……+EVn)/n) because the overall habitat value will be equal to the average of the separate evaluation variables. If a compensatory relationship exists between variables but overall functional value is strongly influenced by low values to the extent that if any of the evaluation variables are equal to zero, functional value is equal to zero, then a geometric mean (i.e., FU = (EV1xEV2 ….xEVn)1/n) may be the most appropriate mathematical expression. Finally, if one evaluation variable strongly influences other variables and the value of these other variables is zero when the influential evaluation variable is zero, then it would be appropriate to multiply the dependent criteria by the influential variable.

For most of the evaluation variables used in the riparian model, it was believed that most of the variables acted independently and contributed cumulatively to overall habitat function. Therefore, an additive function was used to describe the relationship between most of the variables with the exception that two of the variables, Percent Exotic Vegetation (EXO) and Hydrologic Regime (REG), strongly influence other variables. For example, the riparian habitat variables, Structural Diversity (STD) and Cover (COV) both contribute cumulatively to the habitat value and a high value for one does not compensate for a low value for the other. Therefore, it is appropriate to sum the values for these variables. However, exotic vegetation has little habitat value and a site will have little value as habitat if most of the vegetation is exotic, even if STD and COV are high. Therefore, a low score for exotic vegetation (high percentage of exotics) depresses the value of both these variables and it is appropriate to multiply the sum of STD and COV by EXO. We do not propose to multiply the scores for Contiguity (CON) and Urban Encroachment (URB) by EXO, because the habitat values expressed by these variables are somewhat independent of the composition of the vegetation. For example, an undeveloped area dominated by exotic vegetation would still serve as a wildlife movement corridor; therefore, if the site had a high value for CON, this variable would not be depressed by exotic vegetation. Similarly, the negative effects of urban encroachment on habitat (such as cats and dogs, human disturbance, noise, invasive lighting) would act independently of exotic vegetation.

The Hydrologic (FPA and TOP) and Biogeochemical (CAR) variables contribute to functional value in an independent and cumulative function and are added. However, all of the functional variables (Habitat, Hydrologic, and Biogeochemical) are strongly dependent on water. Therefore, all of these variables are multiplied by REG because water is the driving force behind riparian systems. If water is not present (REG=0), the riparian system has no functional value. The exception to this is URB, which is not dependent upon the presence of water. This variable was not multiplied by REG because it is an independent variable.

The maximum value that could be obtained if all variables were 1 is 10. To scale the FU to a value between 0 and 1, with 1 being the FU for a highly functional reference system in which all of the evaluation variables were equal to 1, the total value of the algorithm is divided by 10, the maximum possible score. Therefore the algorithm for riparian habitat is:

$$FU=\frac{((STD+COV)EXO+CON+CAR+FPA+TOP)REG+URB+RAR+RIC+SPE)}{10}$$

The total Functional Capacity Units (FCU) for the site is determined by multiplying the FU value by the number of acres of habitat present on the site:

FCU = FU * Acres of riparian habitat

Table 2 - 1 Riparian Habitat and Hydrogeomorphic Functional Analysis Variables

Value	Variables
Riparian Habitat-Structural Diversity (STD)	
0.0	Site permanently converted to land use that will not be able to support native riparian vegetation, such as housing, agriculture, or concrete channel.
0.2	No existing riparian vegetation (e.g., covered with annual grasses and scrub, bare ground).
0.4	Vegetated areas of the site contain sparse, scattered, patchy, or remnant riparian vegetation that is immature and/or lacks structural (vertical) diversity, and may have exotic plants interspersed in riparian areas.
0.6	The patches of riparian vegetation on the site contain riparian trees and/or saplings (i.e., perennial dicots), but contain no, or poorly developed, shrub understory.
0.8	The patches of riparian vegetation on the site contain riparian trees and saplings, plus a well developed native shrub understory.
1.0	The patches of riparian vegetation on the site are structurally diverse. They contain riparian trees, saplings, and seedlings, as well as developed native shrub understory.
Riparian Habitat – Cover (COV)	
0.0	Site permanently converted to land use not able to support native riparian vegetation, such as housing, agriculture, or concrete channel.
0.2	No existing riparian vegetation (e.g., covered with annual grasses and scrub, bare ground).
0.4	Patches of monotypic riparian vegetation covering up to 50% of the site, interspersed among grasses, exotic plants, or bare ground.
0.6	Patches of diverse riparian vegetation covering up to 30% of the site, interspersed among grasses, exotic plants, or bare ground; AND/OR greater than 50% of the site covered with monotypic patch(es) of riparian vegetation, interspersed among grasses, exotic plants, or bare ground.
0.8	Diverse riparian vegetation covering between 30% and 75% of the site, e.g., strips or islands of riparian habitat interspersed in open space.
1.0	Diverse riparian vegetation (e.g., at least 3 different genera of riparian vegetation present) covering between 75% and 100% of the site.
Contiguity of Habitat (CON)	
0.0	Habitat on site is completely isolated from similar habitat and surrounded by permanent barriers to wildlife movement (e.g., houses).
0.4	Habitat on site is completely isolated from similar habitat by dirt roads or other open space, but there are no permanent barriers to wildlife movement.
0.6	Habitat is partially continuous with similar habitat upstream or downstream of the site, but large open spaces or areas frequented by humans may inhibit wildlife movement.
0.8	Habitat is continuous with similar habitat either upstream or downstream of the site.
1.0	Habitat is continuous with similar habitat upstream and downstream of the site.

Value	Variables
Urban Encroachment (URB)	
0.0	Habitat is completely isolated from similar habitat due to urban development.
0.2	Habitat has one side contiguous with similar habitat, with remaining sides surrounded by urban development.
0.4	Habitat has two adjacent sides with similar habitat, other remaining sides surrounded by urban development.
0.6	Habitat has two opposite sides with similar habitat, other remaining sides surrounded by urban development.
0.8	Habitat has one side open to urban development.
1.0	Habitat completely surrounded by similar habitat with no evidence of urban development.
Percent of Exotic Invasive Species/Vegetation (EXO)	
0.0	Site is covered by pure stands of exotic invasive vegetation.
0.2	Site is covered by more than 75% exotic invasive vegetation.
0.4	Site is covered by 51 - 75% exotic invasive vegetation.
0.6	Site is covered by 26 - 50% exotic invasive vegetation.
0.8	Site is covered by 10 - 25% exotic invasive vegetation.
1.0	Site is covered by less than 10% of exotic invasive vegetation.
Hydrologic Regime of Riparian Zone (REG)	
0.0	No regular supply of water to the site. Site not associated with any water source, surface drainage, impoundment, or groundwater discharge.
0.2	Water supply to the site is solely from artificial irrigation (e.g., sprinklers, drip irrigation). No natural surface drainage, natural impoundment, groundwater discharge or other natural hydrologic regime.
0.5	Site sustained by natural source of water, but is not associated with a stream, river, or other concentrated flow conduit. For example, the site is sustained by groundwater, or urban runoff. There is no evidence of riparian processes (e.g., overbank flow, scour, or deposition.)
0.7	Site is within or adjacent to an impoundment on a natural watercourse which is subject to fluctuations in flow or hydroperiod.
1.0	Site is within or adjacent to a stream, river, or other concentrated flow conduit, which provides the primary source of water to the site. The site contains some evidence of riparian processes such as overbank flow or scour or deposition.
Characteristics of Flood-prone Area (FPA)	
0.0	Channel is contained in a concrete-lined channel, culvert, etc.
0.2	Channel has an earthen bottom; however it, is structurally confined (e.g., riprap or concrete sideslopes).
0.4	Channel has an earthen bottom and earthen side slopes; however, it is incised or confined such that the flood prone area would be subject to overbank flow only during extreme flow events (e.g., greater than a 50-year flood event).
0.6	Channel has an earthen bottom and earthen side slopes and is mildly incised or confined such that the flood prone area would be subject to periodic overbank flow (e.g., during a ten-year flood event).
0.8	Site is part of a flood plain which provides an opportunity for overbank flow during moderate flow events (e.g., during a two- to ten-year flood event).
1.0	Site is a natural channel with little to no evidence of incision or confinement.

Value	Variables
Micro and Macro Topographic Complexity (TOP)	
0.0	Channel is contained in a concrete-lined channel, culvert etc., which has no natural micro or macro topographic features.
0.2	Flood prone area is characterized by a homogenous, flat earthen surface with little to no micro and macro topographic features.
0.6	Flood prone area contains micro and/or macro topographic features such as ponds, hummocks, bars, rills, and large boulders, but is predominantly homogeneous or flat surface.
1.0	Flood prone area is characterized by micro and macro topographic complexity such as pits, ponds, hummocks, rills, large boulders, etc.
Available Organic Carbon (CAR)	
0.0	Site is contained in a concrete-lined channel that contains no detritus.
0.2	Site is contained in a concrete-lined channel that contains some detritus.
0.4	Site contains less than 5% relative cover of debris, leaf litter, or detritus in channel.
0.6	Site contains between 5% and 25% relative cover with debris, leaf litter, or detritus.
0.8	Site contains between 26% and 60% relative cover with debris, leaf litter, or detritus.
1.0	Site contains over 60% relative cover with debris, leaf litter, or detritus.
Rareness - Listed and sensitive species (RAR)	
0.0	No listed or sensitive species observed or known to occur on site; no suitable habitat.
0.2	No listed or sensitive species observed or known to occur on site; limited suitable habitat exists.
0.4	No listed or sensitive species observed or known to occur on site. Suitable habitat present on the site.
0.6	Listed threatened or endangered species and/or sensitive species reported on the site in the past but not observed during the 2010 monitoring and maintenance activities (no 2010 focused surveys). Suitable habitat still present on the site.
1.0	One or more sensitive or listed endangered or threatened species observed on the site during the 2010 monitoring and maintenance activities (no 2010 focused surveys). Suitable habitat present on the site.
Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	
0.0	Less than 10 species of wildlife detected during monitoring and maintenance activities (no 2010 focused surveys).
0.2	Between 11 and 30 species of wildlife detected during monitoring and maintenance activities (no 2010 focused surveys).
0.5	Between 31 and 50 species of wildlife detected during monitoring and maintenance activities (no 2010 focused surveys).
0.7	Between 51 and 60 species of wildlife detected during monitoring and maintenance activities (no 2010 focused surveys).
1.0	Over 60 species of wildlife detected during monitoring and maintenance activities.

Value	Variables
Presence of Habitat Specialists (Terrestrial Vertebrate Wildlife) (SPE)	
0.0	No habitat specialists observed on the site.
0.2	1 to 5 habitat specialists observed on the site.
0.6	5 to 10 habitat specialists observed on the site.
1.0	Greater than 10 habitat specialists observed on the site.

2.2 Functional Analysis Methods

2.2.1 Data Collection

Four of the habitat and hydrologic evaluation variables apply to the site as a whole and did not require the collection of additional field data. These criteria are CON, URB, REG, and Characteristics of the Flood-prone Area (FPA). These criteria were scored based on the overall characteristics of the Big Tujunga Wash site.

The evaluation criteria derived from additional field sampling were STD, EXO, Micro and Macro Topographic Complexity (TOP), COV, Available Organic Carbon (CAR), Rareness (RAR), Terrestrial Wildlife Species Richness (RIC), and Presence of Habitat Specialists (SPE).

STD and EXO were scored primarily from measurements made using the point-centered quarter method (Mueller-Dombois and Ellenberg 1974; Cox 1996). In this method of vegetation sampling, the distance to the mid-point of the nearest tree and the nearest shrub from the sampling point is measured in four directions (one in each of the four quarters established at the sampling point through a cross formed by two perpendicular lines through the point). This method yields quantitative data for number of species, density of each species, and density of shrubs and trees (vegetation layers). These data can then be used to derive scores for STD and EXO. Additionally, at each sampling point, a transect was used to determine the density of topographic features. For the purpose of this analysis, a topographic feature was defined as a feature (boulder, pit, hummock, etc.) that is greater than one foot in height or size. The length of the transect was either the distance to the farthest tree or shrub as measured by the point-centered quarter method or 10 meters (m) (32.8 feet [ft]) from the sampling point, whichever was greater. Because a tape measure had to be laid out to measure the distance to the nearest tree or shrub in each quarter, this measurement was used as the transect line when it was long enough to measure density of features. However, in dense riparian brush, this distance may be very short. In that instance, a separate 10-m transect to count topographic features was conducted. Finally, at each sampling point a 1-square meter (m^2) (3.3-ft^2) quadrat was analyzed to count seedlings and saplings (part of score for STD and EXO) and to measure cover of debris, leaf litter, and detritus.

A stratified random sampling scheme was used to avoid biased data collection. The points were selected by dividing the Mitigation Area riparian habitat into grid segments, each 91.4 m (300 ft) in length and width. The grid was drawn over a scanned aerial photograph of the site. A stratified random method was used to select 10 grid segments throughout the riparian habitat. Two sampling points were selected within each of the 91.4-m (300-ft) grid segments for point-centered quarter samples, quadrats, and transects. The first point was selected by walking into the approximate center of the predetermined square. The second point was determined by randomly selecting a compass direction and a number of paces selected from a random number generator. The surveyors then walked the selected number of paces in the selected compass direction. Each point became the center of the point-centered quarter measurements, the topographic features transect, and the one-meter square quadrat. Using this sampling scheme, 20 1-m^2 (3.3-ft^2) quadrats and 20 transects were conducted, with 80 trees and 80 shrubs measured, in the riparian areas of the Mitigation Area. All tree and shrub species were identified on site using the Jepson Manual (Hickman 1993) and recorded in order to develop a compendium of plant species that occur in the Mitigation Area riparian habitat. The sampling point locations for the Mitigation Area are shown in Figure 3. Field sampling for functional analysis was conducted on the site on June 24, 2010.

Two classifications of vegetation (trees and shrubs) were included in the point-centered quadrat measurements in the riparian habitat. The distance to the closest tree, defined as a woody plant of average to tall height (i.e., greater than 2 m-[6.6 ft]) originating from a single base, was measured in each quadrat. The distance to the nearest shrub, defined as a plant of small to medium height (i.e., less than 2 m [6.6 ft]) with a woody base, was also measured for each quadrant. Young individuals of the genus *Salix* were considered a shrub if its growth pattern was multi-branched at the base and the individual had not attained a height over 2 m (6.6 ft). The estimated diameter of the canopy of each tree and shrub included in the distance measurement was also recorded to determine aerial cover.

The understory in many of the selected riparian sampling locations in the Mitigation Area was impassable due to dense vegetation or steep topography. On some occasions, the distance randomly selected to be walked to determine the second sampling point was either estimated or modified by reducing the distance.

Location: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2010\Functional_Analysis\Tujunga_Function_Sampling_2010.mxd (JSwager 1/21/2011)

Figure 3. Functional Analysis Sampling Points

2010-116 Big Tujunga Wash Mitigation Area

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2.2.2 Data Analysis

Functional analysis values for STD, COV, TOP, and CAR were determined by analyzing data collected for the riparian habitat at the Mitigation Area. Presentation of both calculations and analyzed data has been slightly modified from previous reports to provide a more relevant analysis of the riparian habitat.

Density

Density, a component of STD, was calculated based on the point-centered quarter method of vegetation sampling where the distance from the center of the quadrat to the mid-point of the nearest shrub or tree was recorded for each of the four quarters (Mueller-Dombois and Ellenberg 1974; Cox 1996). Absolute density for all shrubs and for all trees per unit area was determined by the formula:

$$\text{Absolute (total) density of all species (plants/area)} = \frac{\text{Area}}{D^2}$$

where area is 4,046.9 m^2 (1 acre) and D is the mean distance. Density for a group of species (e.g., native shrubs or native trees, etc.) could then be determined using the following formula:

$$\text{Absolute (total) density of a group of species (plants/area)} = \frac{\text{Number of individuals of a group of species}}{\text{Total number of individuals of all species}} * \text{Absolute (total) density of all species}$$

Relative density for a group of species, expressed as a proportion of all species present per unit area, was calculated by the formula:

$$\text{Relative density (\%)} = \frac{\text{Absolute (total) density of a group of species}}{\text{Absolute (total) density of all species}} * 100$$

which can be further simplified as follows:

$$\text{Relative density (\%)} = \frac{\text{Number of individuals of a group of species}}{\text{Total number of individuals of all species}} * 100$$

At the community level, relative density of the two vegetation classes (trees and shrubs) can be determined using previously calculated densities:

$$\text{Relative density} = \frac{\text{Absolute (total) density of vegetation class}}{\text{Total (sum) of absolute densities for all classes}} * 100$$

which illustrates spatial distribution of trees and shrubs in the community per unit area.

Vertical Structure

Another component of STD involves the vertical variety of the vegetation. As an aid in estimating vertical structural diversity, heights of tree and shrubs encountered at each sampling point were estimated and classified into categories as follows:

Height of Tree or Shrub	Classification
< 2 m (< 6.6 ft)	1
2 – 4 m (6.6 – 13.1 ft)	2
> 4 m (> 13.1 ft)	3

Dominance (Percent Cover)

Dominance was used to determine COV. Absolute dominance refers to the area covered by the crown of a group of species per unit area, which is a measure of cover. Absolute dominance of a group of species was calculated by the following formula:

$$\text{Absolute (total) dominance of a group of species } (m^2/\text{area}) = \text{Absolute (total) density of a group of species} * \text{average dominance value for that group of species}$$

where the average dominance value for a species is the average area covered by the crown for one individual of that group of species.

Dominance for an individual species or for a group of species (e.g., native trees) can be expressed as a percent cover by the dividing the total absolute dominance value for that species or group by the unit area (4,046.9 m^2 [1 acre]) and multiplying the result by 100:

$$\text{Absolute dominance (percent cover)} = \frac{\text{Absolute (total) dominance of a group of species}}{\text{Area}} * 100$$

Relative dominance, or the percent dominance of a group of species relative to the dominance of all groups, is expressed as:

$$\text{Relative dominance (\%)} = \frac{\text{Absolute (total) dominance of a group of species}}{\text{Total (sum) of absolute dominance values for all groups}} * 100$$

Percent Organic Cover

CAR was estimated by visually estimating the percentage of organic debris and leaf litter within the boundaries of each quadrat. These values were averaged to examine the total potential available organic carbon in the habitat.

Topography

TOP was determined by scoring the number of rocks, ridges, slopes, or other geographic units measuring 0.3 m (1 ft) or higher about the ground surface along a 10-m (32.8-ft) transect line (or farthest distance as measured by the point-centered quarter method). Possible scores range from a value of 0 for a flat topography with no rocks or boulders to 2 or greater for a transect with numerous boulders and/or slopes. Scores were averaged to determine a mean value per 100 linear meters.

2.3 Success Monitoring and Analysis Methods

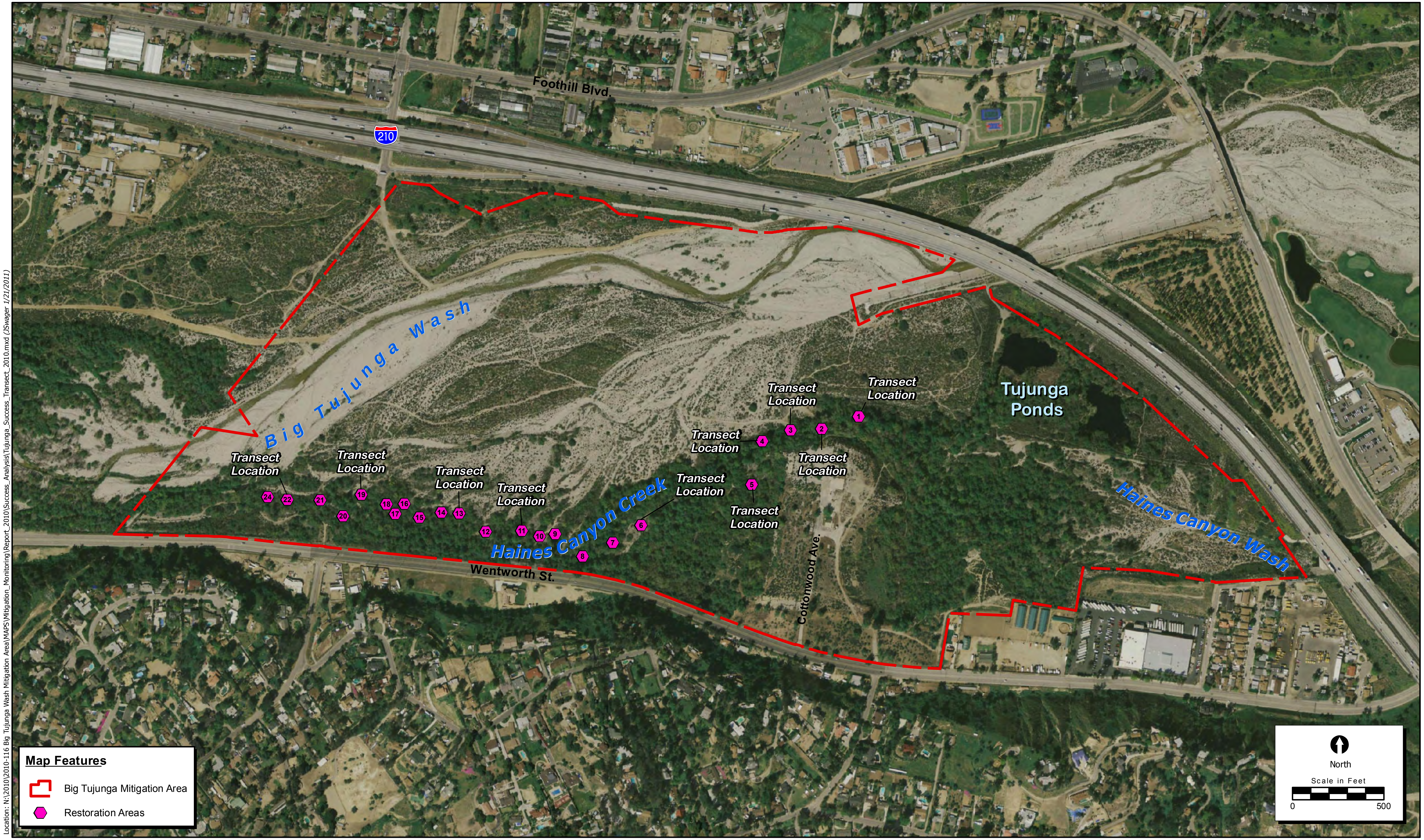
In order to provide a more thorough assessment of the riparian habitat and specifically monitor and measure the success of the updated revegetation efforts (ECORP 2008b), a second analysis methodology was implemented. This success analysis of vegetation within the Mitigation Area included (1) estimation of total percent cover by desired and weedy (undesired) species for all restoration areas through visual reconnaissance, and (2) detailed analysis of growth, cover, height, and viability through a minimum of 40 percent sampling of the 23 restoration areas using point transect methods (10 restoration areas). Point transect lines, either 7.6 or 15.2 m (25 or 50 ft) in length dependent on the area dimensions, were established in the 10 selected restoration areas. At each 0.3-m (1-ft) interval along the transect, a point was projected vertically into the vegetation using a thin demarcated rod. Each species intercepted on the rod was recorded and classified according to vegetation layer. Three layers were identified: a ground layer for vegetation less than 0.5 m (1.6 ft) in height, a shrub layer for vegetation 0.5 to 2 m (1.6 ft to 6.6 ft) in height, and a tree layer for vegetation over 2 m (6.6 ft). Coverage of native and non-natives within a vegetation layer was determined by dividing the number of hits for the species group by the total number of hits for the layer. Presence or absence of plants was also noted at each transect point for determination of overall vegetation cover. Transect lines were established to best represent the restoration area as determined by the monitor.

Plant vigor, recruitment, and patterns of growth within the restoration areas were noted and documented along with the quantitative measurements described above. Aggregations of individual plants or species into stands or zones provide important information relating to (1) gradients in physical parameters within the area, or (2) interactions with neighboring species (including wildlife). Photographic records were kept of all restoration areas for purposes of comparing earlier and later stages of plant establishment and growth. Set photographic documentation points were utilized for each survey for consistency in photographic comparisons. All plant species were identified on site using the Jepson Manual (Hickman 1993) and recorded to develop a compendium of plant species that occur in the Mitigation Area riparian habitat. The transect locations within the sampled restoration areas for the Mitigation Area are shown in Figure 4. Field sampling for the success analysis was conducted in the Mitigation Area on June 22 and 23, 2010.

3.0 RESULTS

3.1 Functional Analysis Results

Approximately 76 trees and 296 shrubs per acre were found in the riparian habitat at the Mitigation Area. Approximately 87 percent of the trees and 65 percent of the shrubs encountered were native species. The tree canopy forms a dense multi-layered canopy throughout the site in most areas (86.1% cover overall) and shrubs form an open understory of approximately 4 percent cover. The relative density of trees and shrubs at the community level was approximately 20 percent trees and 80 percent shrubs. However, overall tree cover dominated the community with a relative dominance value of approximately 95 percent. The results for overall density, relative density, dominance (percent cover), and relative dominance for the Mitigation Area riparian habitat are summarized in Table 3-1.



Aerial Date: March 2008

Figure 4. Success Analysis Transect Locations

2010-116 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Table 3 - 1 Density, Relative Density, Dominance, and Relative Dominance

	Density (# plants/acre)	Relative Density (% of total community)	Dominance (Percent Cover)	Relative Dominance (% of total community)
Native Species				
Trees	66.5	87.2	78.3	90.6
Shrubs	192.5	64.9	3.8	84.5
Non-Native Species				
Trees	9.8	12.8	8.1	9.4
Shrubs	103.9	35.1	0.7	15.5
Summary All Species				
Trees	76.2	20.5	86.1	95.3
Shrubs	296.4	79.5	4.2	4.7

Overall organic cover and cover of annual grasses were relatively low at approximately 38 percent and 4 percent, respectively. The average number of topographic features encountered per 100 m was approximately 10. The average tree height analysis (2.9 category units) indicated that most trees on the site are greater than 4 m (13.1 ft) in height with some falling into the 2 to 4 m (6.6 to 13.1 ft) height range. The results of percent organic cover, percent annual grass cover, tree height, and average topography score measurements for the riparian habitat within the Mitigation Area are summarized in Table 3-2.

Table 3 - 2 Percent Organic Cover, Annual Grass Cover, Average Tree Height, and Average Number of Topographic Features

Percent Organic Cover	Percent Cover of Annual Grass	Average Tree Height (Category units)	Average Topography Features (per 100 meters)
38.3	4.4	2.9	9.9

Standardized data sheets used during functional analysis field sampling are found in Appendix A and a compendium of all plant species encountered, including trees and shrubs, in the riparian habitat is found in Appendix D.

3.2 Qualitative Descriptions and Determination of Functional Values

Structural Diversity (STD)	
Score	**Criteria**
0.7	0.6 - The patches of riparian vegetation on the site contain riparian trees and/or saplings (i.e., perennial dicots), but contain no, or poorly developed, shrub understory. 0.8 - The patches of riparian vegetation on the site contain riparian trees and saplings, plus a well-developed native shrub understory.

The site contains a well-developed native tree component with most native trees greater than 4 m (13.1 ft) in height, with some falling into the 2 to 4 m (6.6 to 13.1 ft) height range (2.9 category units for native trees). The density of native shrubs is moderate at 193 plants per acre, and native tree density is at 67 individuals per acre. Native tree canopy cover is approximately 78 percent overall. However, native shrubs comprise only about 4 percent cover in the understory. Despite the apparently underdeveloped understory, native shrubs are well-represented with a relative dominance value of approximately 85 percent. A score of 0.7 was selected to best represent the structural diversity in this habitat.

Riparian Habitat - Cover (COV)	
Score	**Criteria**
1.0	Diverse riparian vegetation (e.g., at least 3 different genera of riparian vegetation present) covering between 75% and 100% of the site.

Riparian vegetation on the site is diverse with a total of 23 native species represented. Trees in the riparian habitat had an average aerial cover (dominance value) of approximately 47.7 m^2, which is consistent with the multi-layered cover value of approximately 78 percent in the native tree canopy. Relative dominance of native trees in the Mitigation Area riparian habitat is approximately 91 percent. Native shrubs provided 0.79 m^2 of aerial cover, on average, creating an open understory of approximately 4 percent cover. Therefore, a score of 1.0 was assigned to this variable.

Contiguity of Habitat (CON)	
Score	**Criteria**
1.0	Habitat is continuous with similar habitat upstream and downstream of the site.

The riparian habitat is continuous with similar habitat both upstream in the Tujunga ponds and downstream beyond the property boundaries. Therefore, a score of 1.0 was selected for this variable.

Urban Encroachment (URB)	
Score	**Criteria**
0.6	Habitat has two opposite sides with similar habitat, other remaining sides surrounded by urban development.

I-210 forms the boundary of the riparian habitat at the extreme east end of the site near the Tujunga Ponds. The majority of the habitat downstream of the ponds is bordered by residential and commercial urban developments along Wentworth Street. Relatively undisturbed alluvial habitat forms the habitat's north boundary and a portion of the south boundary in the east portion of the site. Finally, the habitat is contiguous with similar habitat at the site's extreme western end. Although the urban encroachment is not strictly limited to two opposite sides, the score of 0.6 best describes the amount and position of urban development around the site.

Percent of Exotic Invasive Species/Vegetation (EXO)	
Score	**Criteria**
1.0	Site is covered by less than 10% of exotic invasive vegetation.

A variety of non-native species occur within the riparian habitat including castor bean (*Ricinus communis*), sticky eupatory (*Ageratina adenophora*), evergreen ash (*Fraxinus uhdei*), giant reed (*Arundo donax*), and tree of heaven (*Ailanthus altissima*); however, overall cover of exotic invasive species was low at approximately 8 percent for exotic tree species and less than 1 percent for exotic shrub species. A score of 1.0 was therefore assigned to this variable.

Hydrologic Regime of Riparian Zone (REG)	
Score	**Criteria**
1.0	Site is within or adjacent to a stream, river, or other concentrated flow conduit, which provides the primary source of water to the site. The site contains some evidence of riparian processes such as overbank flow or scour or deposition.

The riparian habitat is adjacent to Haines Canyon Creek, a perennial stream that is the primary source of water to the site. Evidence of deposition was also observed. Consequently, a score of 1.0 was assigned to this variable.

Characteristics of Flood-prone Area (FPA)	
Score	**Criteria**
0.8	Site is part of a flood plain which provides an opportunity for overbank flow during moderate flow events (e.g., during a two- to ten-year flood event).

The hydrological assessment for the Big Tujunga Wash has not changed since the initial analysis completed in 1997 (Chambers Group, Inc. 1998). The site is part of a flood plain that experiences overbank flow; therefore, a score of 0.8 was assigned to this variable.

Micro and Macro Topographic Complexity (TOP)	
Score	**Criteria**
0.7	0.6 - Flood-prone area is characterized by micro and macro topographic features such as ponds, hummocks, bars, rills, and large boulders, but is predominantly homogeneous or flat surface. 1.0 - Flood prone area is characterized by micro and macro topographic complexity such as pits, ponds, hummocks, rills, large boulders, etc.

The data analysis determined that approximately 10 topographic features are present per 100 m. A score of 0.7 assigned to this variable best represents the topographic complexity, which includes areas of relatively flat surface present in the riparian habitat.

Available Organic Carbon (CAR)	
Score	**Criteria**
0.8	Site contains between 26% and 60% relative cover with debris, leaf litter, or detritus.

Available organic carbon in the form of leaf litter and organic debris was limited on the site. Only seven of the 20 quadrats had 50 percent or greater cover of litter. The average litter cover of approximately 38 percent was much lower than that observed in 2009 (84.3%). Because the average amount of litter for the site was between 25 and 60 percent, a score of 0.8 was assigned to this variable.

Rareness - Listed and Sensitive Species (RAR)	
Score	**Criteria**
1.0	One or more sensitive or listed endangered species and/or sensitive species observed on the site during monitoring and maintenance activities (no 2010 focused surveys). Suitable habitat present on the site.

A total of 1 listed and 9 sensitive wildlife species were observed on site during 2010. Santa Ana sucker (*Catostomus santaanae*), a federally listed threatened fish species and a California Species of Special Concern (SSC) (CDFG 2010a; CDFG 2009), were found along the upper and lower portions of Haines Canyon Creek. Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3) and arroyo chub (*Gila orcuttii*), both SSCs, were also observed in Haines Canyon Creek. One southwestern pond turtle (*Actinemys marmorata pallida)*, a SSC, was observed in the Big Tujunga ponds. Other SSCs detected in the Mitigation Area include olive-sided flycatcher (*Contopus cooperi*) and yellow warbler (*Dendroica petechia brewsteri*). In addition, Cooper's hawk (*Accipiter cooperii*), black-crowned night heron (*Nycticorax nycticorax*), Nuttall's woodpecker (*Picoides nuttallii*) and rufous hummingbird (*Selasphorus rufus*) were observed during monitoring and maintenance activities (no focused surveys in 2010). Due to the detection of 10 listed and/or sensitive wildlife species and presence of suitable habitat, a score of 1.0 for this variable was assigned.

Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	
Score	**Criteria**
0.8	0.7 - Between 51 and 60 species of wildlife detected during monitoring and maintenance activities (no 2010 focused surveys). 1.0 - Over 60 species of wildlife detected during monitoring and maintenance activities.

A total of 68 wildlife species were detected in 2010, including 1 crustacean, 2 insects, 10 fishes, 3 amphibians, 5 reptiles, 45 birds, and 2 mammals. After removing crustaceans, insects, and fish, 55 of the 68 species represent terrestrial wildlife species that are included in the score for this variable. Therefore, the riparian habitat was assigned a score of 0.8 for this variable. A compendium of all wildlife species observed or detected in the Mitigation Area in 2010 is found in Appendix E.

Presence of Habitat Specialists (Terrestrial Vertebrate Wildlife) (SPE)	
Score	**Criteria**
1.0	1.0 - Greater than 10 habitat specialists observed on the site.

A total of 13 wildlife species that are considered habitat specialists were observed on site during 2010. These include pied-billed grebe (*Podilymbus podiceps*), double-crested cormorant (*Phalacrocorax auritus*), green heron (*Butorides virescens*), black-crowned night heron (*Nycticorax nycticorax*), belted kingfisher (*Ceryle alcyon*), western tanager (*Piranga ludoviciana*), Nuttall's woodpecker (*Picoides nuttallii*), downy woodpecker (*Picoides pubescens*), yellow warbler, Wilson's warbler (*Wilsonia pusilla*), common yellowthroat (*Geothlypis trichas*), song sparrow (*Melospiza melodia*), and red-winged blackbird (*Agelaius phoeniceus*).

The pied-billed grebe is a small diving bird that requires seasonal or permanent ponds with dense stands of emergent vegetation, bays and sloughs for breeding. The double-crested cormorant is associated with aquatic habitats including ponds, lakes, rivers, lagoons, estuaries, and open coastline. The green heron is found in small wetlands in low-lying areas and only breeds in thick swampy vegetation. The black-crowned night heron occupies streamside, pond, and wetland habitats. The belted kingfisher is found near a variety of open water habitats such as rivers, lakes, and coastal areas, and eats fish, amphibians, reptiles, and insects. The common yellowthroat is a small song bird that is associated with low, dense vegetation near water. Red-winged blackbirds breed in emergent vegetation near open water. The pied-billed grebe, double-crested cormorant, green heron, black-crowned night heron, belted kingfisher, common yellowthroat, and red-winged blackbirds were found in and around the Tujunga ponds.

Wilson's warbler nests in dense, moist thickets and streamside vegetation. Song sparrow breeds in dense riparian thickets and emergent wetlands. The Wilson's warbler and song sparrow were found around the Tujunga ponds and along streamside wetland and riparian habitat along Haines Canyon Creek.

The western tanager is highly associated with mixed woodlands and was observed in the riparian habitat. The Nuttall's woodpecker is associated with oak and riparian woodlands and the downy woodpecker is found in open deciduous woodlands, especially in riparian areas. The yellow warbler is typically found in wet, deciduous thickets, especially willows. All of these species were observed in the riparian habitat throughout the site. Nuttall's woodpecker was also observed within the oak woodland habitat on site.

The wildlife species detected in 2010 were a result of incidental observations made during exotic species removal efforts and trail maintenance visits. Due to the observation of 13 habitat specialists, this variable was assigned a score of 1.0.

3.3 Calculation of Functional Units and Functional Unit Capacity

The algorithm used to obtain a functional unit value for the riparian habitats is:

$$FU = \frac{((STD + COV)EXO + CON + CAR + FPA + TOP)REG + URB + RAR + RIC + SPE)}{10}$$

The calculation for the FU value for the riparian habitat is therefore:

$$FU = \frac{((0.7 + 1.0)\ 1.0 + 1.0 + 0.8 + 0.8 + 0.7)\ 1.0 + 0.6 + 1.0 + 0.8 + 1.0)}{10}$$

For the riparian system, the FU is calculated to be 0.84 per acre.

To calculate the total for the riparian habitat at Big Tujunga Wash, the following formula was used:

$$FCU = FU_{willow}\ (\text{acres of willow riparian habitat})$$

In previous functional analysis reports for the Mitigation Area, a total of 76.0 acres of willow riparian habitat was used to calculate the FCU. However, in 2009, the habitats in the Mitigation Area were remapped in order to create a new vegetation map. The number of acres of willow riparian habitat present in 2009 was then recalculated using GIS. In order to get a more accurate estimate of the acres of willow riparian habitat, GIS was also utilized to subtract the number of acres encompassed by the trails through the willow riparian habitat. The resulting total acreage for willow riparian habitat currently present in the Mitigation Area is 91.2 acres. This is an increase over what was originally mapped in 1997. This increase likely occurred because areas in which large stands of exotic plant species were removed in 2000 and 2001 have filled in with willow riparian habitat. Therefore, based on the new acreage of 91.2 acres, the total FCU for riparian habitat in the Mitigation Area in 2010 is:

$$FCU_{Big\ T} = (0.84_{FUwillows})(91.2 \text{ acres of willows}) = 76.61$$

3.4 Discussion and Comparison of Functional Values

The Functional Capacity Unit (FCU) value of the riparian habitat at the Big Tujunga Wash Mitigation Area decreased slightly by 0.9 units from 77.52 units in 2009 to 76.61 units in 2010. The Functional Unit (FU) value between 2009 and 2010 also decreased from 0.85 to 0.84, respectively. This decrease in the FU value was likely due to the fact that the scores for Structural Diversity (STD), Available Organic Carbon (CAR), and Terrestrial Wildlife (Vertebrate) Species Richness (RIC) had all decreased this year. However, the decrease in the FU value was largely offset by the increased score for Percent of Exotic Invasive Species/Vegetation (EXO). The larger value of EXO resulted from a much lower percentage of non-native (exotic) plant species in the riparian areas (8% trees and <1% shrubs). The removal of non-native plant species began again in late 2009 once the revised Streambed Alteration Agreement was issued by the California Department of Fish and Game (CDFG). Percentage of non-native plant species was relatively high in 2009 as removal efforts began after completion of the 2009 functional analysis field work (12.8% trees and 9.2% shrubs). The subsequent decrease in the FCU value for 2010 was offset by the increase in the number of acres of riparian habitat. Prior to 2009, the number of acres of riparian habitat that was mapped in 1997 was used for the FCU calculation (76.0 acres). The increased acreage of riparian habitat and relatively low non-native plant cover explains why the functional unit capacity in 2010 remained virtually unchanged from 2009.

Compared to baseline conditions, the functional unit capacity found in 2010 is approximately 28 percent greater than that recorded in 1997. Table 3-3 presents a comparison of functional capacity values for each variable in 1997 (Baseline), 2001, 2007, 2008, 2009, and 2010.

Table 3 - 3 Comparison of Functional Capacity Values

Variable	2010	2009	2008	2007	2001	1997
Structural Diversity (STD)	0.7	0.8	0.8	0.8	0.7	0.7
Riparian Habitat Cover (COV)	1.0	1.0	1.0	1.0	0.8	1.0
Percent of Exotic Invasive Species/Vegetation (EXO)	1.0	0.8	1.0	1.0	1.0	0.8
Contiguity of Habitat (CON)	1.0	1.0	1.0	1.0	1.0	1.0
Available Organic Carbon (CAR)	0.8	1.0	1.0	1.0	1.0	1.0
Characteristics of Flood-prone Area (FPA)	0.8	0.8	0.8	0.8	0.8	0.8
Micro and Macro Topographic Complexity (TOP)	0.7	0.7	0.7	0.7	0.9	0.8
Hydrologic Regime of Riparian Zone (REG)	1.0	1.0	1.0	1.0	1.0	1.0
Urban Encroachment (URB)	0.6	0.6	0.6	0.6	0.6	0.6
Rareness – Listed and Sensitive Species (RAR)	1.0	1.0	1.0	1.0	1.0	1.0

Variable	2010	2009	2008	2007	2001	1997
Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	0.8	1.0	1.0	1.0	1.0	0.7
Presence of Habitat Specialists (Terrestrial Vertebrate Wildlife) (SPE)	1.0	1.0	0.6	1.0	0.6	0.9
FU	**0.84**	**0.85**	**0.88**	**0.89**	**0.84**	**0.79**
Acres	**91.2**	**91.2**	**76.0**	**76.0**	**76.0**	**76.0**
FCU	**76.61**	**77.52**	**66.88**	**67.64**	**63.84**	**59.74**

Although the score for Riparian Habitat Cover (COV) criteria remained at the highest possible value of 1.0, cover in the riparian habitat decreased substantially since 2009. Currently, native tree cover is approximately 78 percent, whereas in 2009 cover was nearly 149 percent with twice as much average aerial cover (82.3 m^2 in 2009 versus only 47.7 m^2 in 2010). This decrease is likely due to the 2009 Station Fire (August-October) in the Angeles National Forest, which produced large amounts of exposed debris. During subsequent rain events, extensive debris flows entered the riparian area via both the Big Tujunga Wash and Haines Canyon Wash, damaging and even removing vegetation as well as hindering native establishment. The non-native plant species removal effort that resumed in late 2009 also indirectly contributed to a decline in the remaining vegetation. Vegetation provides stability by trapping sediment among roots; removal of said vegetation, whether native or non-native, hinders retention of sediment and increases erosion and root failure of the remaining vegetation. A plant's inability to remain anchored increases the likelihood of being damaged or washed away. It should be noted, however, that cover is still appropriate for a riparian habitat (>75%) and there are 23 different native species present in the riparian habitat, 14 of which are native trees species (6 genera). This is an increase from 7 native tree species in 2009 (18 species overall).

Native trees and shrubs are well-represented in the Mitigation Area with relative dominance values of approximately 91 and 85 percent, respectively. Despite the apparently robust riparian vegetation, the score for Structural Diversity (STD) criteria has decreased slightly from 0.8 in 2009 to a score of 0.7 in 2010. Native tree species were present in 2010 at a density of 67 individuals per acre, down from 73 individuals the year before. The density of native shrubs declined near 50 percent since 2009, from 396 individuals per acre to only 193 individuals currently. Although the shrub understory is comprised predominately native species (84.5% relative dominance), it is poorly developed at only 4 percent cover. Only 5 of the 68 native trees sampled in the riparian habitat were less than 4 m (13.1 ft) in height (1 tree was less than 2 m [6.6 ft]), suggesting very little vertical structural diversity. A relatively low density of natives, a poorly developed shrub understory, and a lack of vertical diversity explain the relatively low score for STD. This decrease in structural diversity is likely attributed to debris flows from the Station Fire, as the more vulnerable shrubs and young trees were washed away.

The amount of debris, leaf litter, and detritus decreased substantially from approximately 84 percent in 2009 to only 38 percent this year. As a result, the score for the Available Organic Carbon (CAR) criteria also decreased. As with the structural diversity and overall cover of the riparian habitat, the amount of available organic carbon declined as a result of debris flows from the Station Fire. The large debris flows pushed all debris, leaf litter, and detritus present in 2009 downstream and out of the riparian habitat. Furthermore, the direct removal of vegetation during these debris flows, whether native or non-native, translates to the removal of the source of organic carbon from the system. The non-native plant species removal effort further contributed to the removal of organic carbon. Once native plant species are able to re-establish, organic carbon will increase and the score for this variable is expected to improve in later analyses.

The riparian habitat currently includes some topographic features, such as hummocks and boulders, but appears generally flat. Although the score for the Topographic Complexity (TOP) criteria remained the same as that of 2009, the actual number of topographic features has been decreasing over the last few years. There were approximately 35 features per 100 meters as measured in 2003, 17 features in 2008, 11 features in 2009, and only 10 features measured in the current year. Topography in the riparian habitat has likely been affected by debris flows from the Station Fire as well as changes in water flow in adjacent Haines Canyon Creek, causing alternating events of scouring and sedimentation. Removal of non-native plant species in the riparian habitat may also be contributing to the reduction on topographic complexity. By removing vegetation, retention of sediment among roots of the remaining plants is limited, creating a more homogeneous surface. Additionally, overland runoff from nearby urban development increases erosion in areas where non-native vegetation has been removed. However, it is important to note that riparian habitats are known dynamic systems and changes in both vegetation and topography are expected. Once established, native trees and shrubs will provide more sediment stability, which will then result in an increase in topographic complexity.

The score for the Rareness (RAR) variable has not changed since the implementation of the functional analysis; however, the number of listed and/or sensitive wildlife species observed decreased slightly from last year. A total of 12 sensitive wildlife species were observed in 2009 whereas 10 sensitive species were observed in the Mitigation Area this year. This is likely a reflection of the absence of focused wildlife survey tasks in 2010. Focused sensitive wildlife surveys for native fish, least Bell's vireo, southwestern willow flycatcher, and arroyo toad are only required every 3 years during the long-term monitoring phase of the Mitigation and Monitoring Plan (MMP). These focused surveys provide additional opportunities for species observation. All listed and/or sensitive wildlife species detections this year were incidental observations made during non-native plant removal efforts and quarterly maintenance visits. This decrease in observation opportunities also resulted in an overall decrease in species richness. Ninety eight terrestrial wildlife species were detected in the Mitigation Area in 2009. However, only 55 species were detected this year. The score for Terrestrial Wildlife (Vertebrate) Species (RIC) decreased from 1.0 to 0.8 as a result. It should be noted, however, the number of sensitive wildlife species this year is greater than that observed in 2008, which also lacked focused surveys.

The score for the Presence of Habitat Specialists (SPE) remains the same as in 2009. However, the number of habitat specialists decreased from 14 to 13 species. Again, this is undoubtedly due to the lack of focused wildlife surveys in 2010 and subsequent decrease in observation opportunities. The number of habitat specialists for 2010 is still greater than that observed in 2008, another year in which no focused surveys were conducted. Although the scores for RAR and SPE remain the same, the numbers of these categories of species did increase in comparison with 2008, indicating that overall habitat quality is improving in the Mitigation Area and attracting relatively more sensitive species and habitat specialists.

In conclusion, the FCU value decreased slightly, as a result of the declines in structural diversity, organic carbon, and species richness (STD, CAR, and RIC). The lower scores for both STD and CAR can be attributed to the negative effects of the Station Fire debris flows through the Mitigation Area. The lack of focused surveys limited the number of wildlife observation opportunities and resulted in a lower RIC score. However, there was an increase in the EXO score (i.e., reduced non-native species vegetation cover), indicating that the non-native plant removal effort is proving successful in the Mitigation Area. By providing open space for native plant establishment and removing competitive non-native species, both riparian cover and structural diversity are expected to improve. In turn, the amount of debris, leaf litter, and detritus will also increase. The number of sensitive species and habitat specialists present was greater than in 2008, which also lacked focused surveys, suggesting an increase in the overall functional value of the Mitigation Area riparian habitat for wildlife.

3.5 Success Analysis Results

Plant cover was determined for both native and non-native species at each of the three vegetation layers (tree, shrub, and ground) and results are presented in Table 3-4. Native species were well-represented in the tree layer at approximately 61 percent; no non-native trees were present in the restoration areas. The shrub layer was relatively open with native species accounting for approximately 21 percent and non-natives for 9 percent. Ground cover was dominated by non-native species (36.6%) while cover of natives was approximately 18 percent.

Table 3 - 4 Percent Cover by Vegetation Layer and Plant Category

	Percent Cover	
Vegetation Layer	**Native**	**Non-native**
Tree	60.8	0.0
Shrub	21.3	9.2
Ground	17.9	36.6

Additionally, total percent cover in the restoration areas was determined for native and non-native species. Cover of native plant species was slightly higher at 72 percent when compared to non-natives (59.6%). Bare ground accounted for approximately 3 percent of the restoration areas sampled. Combined coverage of all three vegetation components was greater than 100 percent as a result of presence of both native and non-native species at a single transect sampling point.

Table 3 - 5 Percent Cover of Natives, Non-natives, and Bare Ground

Percent Cover Of Native Species	Percent Cover of Non-native Species	Percent Cover of Bare Ground
72.0	59.6	3.4

In 2007, there were a total of 51 surviving cottonwoods from the 2002 and 2007 riparian planting efforts (ECORP 2008b). Forty eight live individuals were counted during the 2009 success analysis field sampling, indicating a survival rate of 94 percent for cottonwoods over a span of two years. Due to the high survival rate of cottonwoods, as well as the increasing difficulty in distinguishing planted and recruited individuals, count data for cottonwoods were not collected during the 2010 success analysis field effort. The other native plant species originally included in the riparian plantings are mulefat (*Baccharis salicifolia*), black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), California wild rose (*Rosa californica*), and California blackberry (*Rubus ursinus*). These species appeared to be well established in the restoration areas; however, detailed information regarding the success of each could not be adequately gauged.

Standardized data sheets used during success analysis field sampling are found in Appendix B and representative photographs of restoration sites are found in Appendix C. A compendium of all plant species encountered in the riparian habitat is found in Appendix D.

3.6 Discussion of Success Values

In 2008, ECORP submitted a Revised Habitat Restoration Plan for the Mitigation Area (ECORP 2008b). The new revegetation strategy was to include a more active non-native plant removal program and to increase maintenance efforts for the surviving cottonwoods. It was also determined that future success monitoring would focus on the success criteria of 75 percent native cover in the restoration areas rather than the survival of riparian plantings. Prior to 2009, results of the functional analysis were used to estimate percent cover and overall success of the restoration areas. The functional analysis field sampling locations were originally selected to provide baseline information about the riparian habitat that existed within the Mitigation Area. In contrast, the restoration areas are located within highly disturbed habitat and required extensive maintenance and native replanting efforts. In order to obtain more accurate information regarding the performance of the restoration areas and determine the effectiveness of the new revegetation strategy, the separate success monitoring analysis was implemented.

In the 2008 annual report, it was suggested that the 5th year requirement of 75 percent native cover had been met in riparian restoration areas based on the cover values calculated as part of the functional analysis. However, it was determined in 2009 that the success criteria had not been met in the riparian restoration areas based on the success monitoring and analysis results (54.2%). Percent cover values calculated during the 2009 success analysis also indicated a much lower level of vegetative cover by layer in the restoration areas (native trees 48.8% and shrubs 13.2%) as compared to the riparian habitat (native trees 148.5% and shrubs 19.2%). These discrepancies highlighted the importance of the separate success analysis for measuring success specifically in the restoration areas. The success analysis results for 2009 were then used to design a more appropriate long-term monitoring plan and make necessary adjustments to the current revegetation strategy, both of which would help improve overall habitat quality.

In addition to the relatively low native cover in 2009, non-native cover in the restoration areas was very high at approximately 58 percent overall. It was determined that an intense non-native plant removal program would be the most effective revegetation strategy as it would provide space for growth of important riparian plant species as well as additional opportunities for native plant establishment. Removal efforts began in earnest in late 2009 once the revised Streambed Alteration Agreement was issued by CDFG. Although non-native cover is still high overall in 2010 (59.6%), there have been several improvements in the restoration areas as a result of the non-native plant removal effort. Non-native trees appear to have been eradicated and non-native ground cover has been reduced by almost 50 percent (36.6% compared to

61.8% in 2009). Furthermore, native species have benefitted from the removal of the competitive non-native plants; native cover is currently at 72 percent in the restoration areas.

Despite the non-native plant removal efforts, non-native shrub cover actually increased slightly from 5 percent in 2009 to approximately 9 percent at present. Given that native shrub cover also increased, it appears that the complete removal of non-native trees created enough open space and light to the lower-growing shrubs to quickly establish and grow. Furthermore, native shrubs increased almost twice as much compared to non-natives (21.3% in 2010 from 13.2% in 2009). Removal of non-natives was highly effective at the ground level; non-native ground cover was reduced nearly 50 percent. However, native ground cover also decreased slightly from approximately 24 percent in 2009 to only 18 percent in 2010. Debris flows from the Station Fire as well as overland runoff during rain events have likely impacted ground vegetation, removing both native and non-native species. Surprisingly, there was relatively less bare ground in the restoration areas this year (3.4%) considering the massive reduction in ground cover. The removal of ground vegetation created additional open space for the establishment of shrubs; subsequent growth of these shrubs covered half of the bare ground present in 2009 (6.2%). In addition, debris flows possibly brought in seeds from upland areas, further facilitating the establishment of shrubs, particularly non-native species.

The results of the 2010 success analysis further highlight the major differences between the riparian habitat and the restoration areas, specifically the effects of both the non-native plant removal effort and the Station Fire debris flows. The removal of non-native trees and shrubs within the riparian habitat appears to have been very successful; cover decreased approximately 5 percent and 9 percent, respectively, since 2009. However, native cover also decreased in the riparian habitat, suggesting that the debris flows removed additional vegetation. Despite the decrease in tree cover in the riparian habitat, it is still relatively high (78.3%) when compared to the restoration areas (60.8%). Thus, light and open space in the riparian habitat is limited, hindering the recovery of the native shrub understory. The non-native plant removal effort proved partly successful within the restoration areas. The resulting lack of non-native tree cover (0%), in addition to the relatively low native tree cover, appears to have provided ample opportunity for both native and non-native shrubs to flourish. The massive reduction in ground cover in the restoration areas also contributed to the expansion of shrubs. It is likely that the debris flows and overland runoff had less of an effect on the higher vegetation layers (trees and shrubs) in the restoration areas, which are mostly located downstream along Haines Canyon Creek (Figure 4). Flows primarily entered the Mitigation Area from the east via the Haines Canyon Wash, where several of the functional analysis sampling points for the riparian habitat are located (Figure 3). These areas received the full impact of the flows and the subsequent damage was measured during the 2010 field sampling effort. As the flows spread over the Haines Canyon Wash area and moved downstream, they lessened in intensity and damage was likely limited to the ground level.

During the summer of 2007, an intensive supplemental watering regime was implemented to help with the survival and establishment of planted cottonwoods during drought conditions. The high survival rate of the planted cottonwoods (94%) calculated during the 2009 success analysis indicated both the success of these efforts as well as the potential for improvement in the restoration areas. Because the cottonwoods are now established, the supplemental watering regime was scaled back and restoration efforts were focused on the removal of non-native species. In addition, cottonwoods appeared to be recruiting naturally; the distinction between plantings and recruits could no longer be made.

A major goal of the Mitigation Plan for the Mitigation Area was to improve habitat and thus better support breeding and foraging activities of sensitive riparian wildlife species, such as the least Bell's vireo, in the restoration areas (Chambers 2000). High cover of native riparian trees and shrubs is essential for these sensitive species; however, the 2009 success analysis results indicated that the restoration areas provided limited native cover. The intense non-native plant removal program that was subsequently implemented appears be very effective in providing establishment opportunities and increasing cover of natives. Although native riparian cover did increase to 72 percent, the 2010 success analysis results indicate that non-natives plant species are still a major presence in the restoration areas. Due to the massive amounts of debris produced, debris flows from the Station Fire are expected over the next five years and will likely bring in additional non-native seeds from upland areas. It is imperative that the non-native plant removal program continue as this type of vegetation will adversely affect sensitive wildlife species utilizing the riparian habitat as well as limit any future improvements in native cover. If the non-native plant removal program is also maintained at the same level of intensity, the success criteria of 75 percent native cover may be achieved sooner than expected, resulting in improved habitat quality for riparian wildlife.

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APPENDIX A

Functional Analysis Data Sheets and Tables of the Raw Data

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 4A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S. lasio	3	13.8	7	Hetero vill	4.73	1.2
2	S lasio	3	12.63	7.6	Lep squ	4.6	0.6
3	S lasio	3	13.03	4.6	Lep squ	1.21	0.8
4	S lasio	3	13.35	14	Lep squ	1.13	0.8

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: ∅ % Cover annual grasses: ∅

No. of seedlings/saplings: ∅ Non-native Cover: ∅

GPS Coordinates: S11 0375351 UTM 3792604

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 13.35 (m)

Comments:
on sandy trail; outside riparian
↳ horse turnout

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 4B Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S lasio	3	15.55	14	Heter vill	1.61	1.2
2	S lasio	3	17.51	15	Het vill	1.34	0.3
3	S lasio	3	16.65	7	Het vill	3.67	0.6
4	S lasio	3	14.28	7.6	Lep equ	4.82	2.1

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: Ø % Cover annual grasses: Ø

No. of seedlings/saplings: Ø Non-native Cover: Ø

GPS Coordinates: S11 0375337 UTM 3792698

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 17.51 (m)

Comments:
on main trail in sand

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 9A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S lasio	3	17.06	5.4	en fas	2.82	1.6
2	S lasio	3	21.75	5.1	en fas	1.01	1.1
3	S good	3	8.92	7.5	en fas	2.57	0.67
4	S good	3	10.82	7.5	en fas	2.27	0.9

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 5 % Cover annual grasses: Ø

No. of seedlings/saplings: Ø Non-native Cover: 5

GPS Coordinates: S11 0375266 UTM 3792576

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 21.75 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 9B Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S good	3	4.0	~~8~~10	Art doug	0.1	0.3
2	S good	3	4.5	4.8	Art doug	0.3	0.3
3	—	—	—		Art doug	0.3	0.3
4	—	—	—		Art doug	0.2	0.3

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 90 % Cover annual grasses: 25

No. of seedlings/saplings: ∅ Non-native Cover: 30

GPS Coordinates: S11 0375252 UTM 3792564

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

bee hive in S. goodingii

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 12A Location: ______

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S lasio	3	6.67	12	Ribes aur	2.38	1
2	S lasio	3	1.5	9	Ros cal	4.15	0.5
3	Sam mex	3	5.47	3.8	Tox div	0.86	0.6
4	S lasio	3	5.82	4.5	Ros cal	0.58	02

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 90 % Cover annual grasses: 10

No. of seedlings/saplings: Ø Non-native Cover: 15

GPS Coordinates: S11 0375610 UTM 3792523

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 12B Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S good	3	2.95	20	Tox div	1.33	0.15
2	Frax vul	2	2.7	0.4	Tox div	0.8	0.9
3	S ~~laev~~ lasio	2	3.48	2.2	Art doug	1.05	0.4
4	Quer agr	3	5.69	3.3	Art doug	0.72	0.2

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 20 % Cover annual grasses: ~~3~~ 5

No. of seedlings/saplings: Ø Non-native Cover: 10

GPS Coordinates: S11 0375508 UTM 3792499

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

BIG TUJUNGA WASH

Date: 6|24|10 Field Crew: RG CS

Sample Plot No: 16A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Frax vul	3	5.28	2.1	Arundo do	6.33	0.3
2	S. lasio	3	3.44	6.6	Ficus	3.7	0.4
3	S. laev	3	5.25	2.0	Agerntina	4.78	0.3
4	Alnu rho	3	2.48	11.85	Age	9.64	0.6

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 100 % Cover annual grasses: ϕ

No. of seedlings/saplings: ϕ Non-native Cover: ∅

GPS Coordinates: S11 0376869 UTM 3792676

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

willows + Alnus healthy

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 15B Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S. lasio	3	7.18	5.3	Arun don	4.06	0.3
2	Aln rho	3	7.85	11.85	Ager	9.2	1.3
3	S. exigua	3	16	3	Lep squ	7.92	1.7
4	~~Bac sal~~ S lasio	3	13.8	7.1	Bac sal	8.8	2.77

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 50 % Cover annual grasses: 20

No. of seedlings/saplings: ∅ Non-native Cover: 25

GPS Coordinates: S11 0375877 UTM 3792587

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 0 Transect Length: 16 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/23/10 Field Crew: RG CS

Sample Plot No: 19A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Frax vul	3	7	9.95	Agentina	9.5	2
2	S lasio	3	8.35	7.1	Ager	8.35	1
3	S laevigata	3	1.55	6	Ager	3	0.3
4	S lasio	3	1.18	4.2	—	—	—

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 10 % Cover annual grasses: 2

No. of seedlings/saplings: ~~8~~ 9 Non-native Cover: 2

GPS Coordinates: S11 0376010 UTM 3792615

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/23/10 Field Crew: RG CS

Sample Plot No: 19B Location: ______

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Slasio	3	1.95	5.2	Ficus	6.12	0.25
2	Slasio	3	2.15	8.95	Ficus	2.58	0.3
3	Frax vul	3	3.75	10.2	Ficus	0.74	0.6
4	Frax ude	3	8.15	6.2	Ficus	0.82	0.6

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 15 % Cover annual grasses: ~~2~~ 3

No. of seedlings/saplings: Ø Non-native Cover: 5

GPS Coordinates: S11 0376001 UTM 3792604

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/23/10 Field Crew: RG CS

Sample Plot No: 23 A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	radius Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Frax udei	3	1.9	~~3~~ 5	Cyperus sp.	3.75	0.5
2	Frax udei	3	6.42	6.7	—		
3	B. lasio	3	2.87	12	Ager ade	3.7	0.2
4	Frax udei	3	1.83	2	exotic sp	4.38	0.4

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 98% % Cover annual grasses: Ø%

No. of seedlings/saplings: 2 Non-native Cover: 2%

GPS Coordinates: S11 0376072 UTM 3792639

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

Frax udei - treated for removal

BIG TUJUNGA WASH

Date: 6|23|10 Field Crew: RG CS

Sample Plot No: 23B Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	radius Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S lasio	3	1.35	9.5	Cyperus	2.6	0.5
2	Frax vul.	1	1.47	0.4	Art doug	2.1	0.5
3	Frax vul	3	1.5	0.4	Cyperus	3.3	0.6
4	Frax vul	2	3.0	1.3	Ageratina	1.95	0.4

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 10% % Cover annual grasses: 1

No. of seedlings/saplings: 1 Non-native Cover: 3

GPS Coordinates: S11 0376052 UTM 3792638

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 4.3 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/23/10 Field Crew: RG CS

Sample Plot No: 24A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m) radius	Shrub Species	Distance (m)	Cover[2] (m)
1	S. goodingii	3	10.88	10.9	Bac sal	2.98	2.5
2	Frax udei	3	2.9	4	Bac sal	8.48	1.5
3	Frax udei	3	2.95	5	Art doug	5.95	0.5
4	Pop fre	3	9.2	10	Art doug	6	0.3

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 25 % Cover annual grasses: 75 NN

No. of seedlings/saplings: 0 Non-native Cover: 75

GPS Coordinates: S11 0376167 UTM 3792688

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10.88 (m)

Comments:

Frax udei - treated for removal

BIG TUJUNGA WASH

Date: 6/23/10 Field Crew: RG CS

Sample Plot No: 24B Location:

Point-Quarter Data:

Mulberry? ΣM

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S. good	3	2.63	20	exotic stem in center large palmate	2.38	0.5
2	S. lasio	3	2.65	9	Urtica diotica	1.9	0.8
3	S lasio	3	3.1	6	Ficus (indica)	13	0.8
4	S. lasio	3	9.16	5	Mulberry?	1.9	~~1.9~~ 0.35

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: ~~40~~ 45 % Cover annual grasses: Ø

No. of seedlings/saplings: Ø Non-native Cover: Ø

GPS Coordinates: S11 0376188~~8~~8 UTM 3792699

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 30A Location: ______

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S lasio	3	2.98	14	Ribes aur	5.35	0.3
2	Popfre	3	3.33	3	Urtica dio	1.1	0.4
3	S lasio	3	6.66	10.5	Ric com	0.67	0.5
4	S lasio	3	7.2	3.8	Aru don	2.62	0.1

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 2 % Cover annual grasses: ∅

No. of seedlings/saplings: ∅ Non-native Cover: 5

GPS Coordinates: S11 0376544 UTM 3792514

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: ∅ Transect Length: 10 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 30B Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Popfre	3	4.53	3	Ficus	2.08	0.8
2	S lasio	3	7.43	7	Aru don	3.47	0.5
3	S lasio	3	6.3	12.6	Senecio fl-do	9.58	2.5
4	S lasio	3	6.5	8	Ficus	2.3	1.7

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 100 % Cover annual grasses: ∅

No. of seedlings/saplings: ∅ Non-native Cover: 20

GPS Coordinates: S11 0376542 UTM 3792520

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 31A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S lasio	3	5.82	14.4	Bac sal	6.26	2.2
2	S lasio	3	10.69	6	Bac sal	4.38	1.5
3	Ailanthus	1	3.6	0.6	Bac sal	1.06	0.6
4	S lasio	3	4.6	7.7	Bac sal	2.02	1.4

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 2 % Cover annual grasses: 20

No. of seedlings/saplings: Ø Non-native Cover: 20

GPS Coordinates: S11 0376490 UTM 3792421

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10.69 (m)

Comments:
in rocky wash above E-W trail

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CB

Sample Plot No: 31 B Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sam mex	3	3.13	6.2	Ager ede	3.22	0.2
2	Sam mex	~~3~~ 2	9.47	1	Ricin com	3.37	0.8
3	S lasio	3	11.1	11.1	Artcal	2.0	0.1
4	S lasio	3	6.07	~~12~~ 15	Ric com	3.05	0.4

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 1 % Cover annual grasses: Ø

No. of seedlings/saplings: Ø Non-native Cover: Ø

GPS Coordinates: S11 0376540 UTM 3792411

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 11.1 (m)

Comments:
in rocky wash south of E-W trail (parallel to)

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 38A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	S lasio	3	14.3	19.5	Bac sal	6.0	2.0
2	Euc sp.	3	6.04	14.2	Eri fas	8.0	0.8
3	Pop fre	3	30	10.3	———	———	
4	Euc sp.	3	9.47	20	Yuc whip	1.6	0.9

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 100 % Cover annual grasses: ∅

No. of seedlings/saplings: ∅ Non-native Cover: ∅

GPS Coordinates: S11 0376701 UTM 3792591

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: ∅ Transect Length: 30 (m)

Comments:

BIG TUJUNGA WASH

Date: 6/24/10 Field Crew: RG CS

Sample Plot No: 38B Location: ______

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sam mex	2	4.59	2.7	Eri fas	2.46	1.2
2	Sam mex	3	5.61	6.2	Bac sal	6.42	1.3
3	Alanthus	1	4.96	1.8	Bac sal	4.43	2.9
4	S lasio	3	17.73	9.6	~~tos~~ Sal mel	6.87	3.0

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 2

% Cover annual grasses: 1 ~~Ø~~

No. of seedlings/saplings: Ø

Non-native Cover: 1

GPS Coordinates: S11 0376695

UTM 3792618

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2

Transect Length: 17.73 (m)

Comments:

in small, rocky wash just south of fence (east of trail)

APPENDIX B

Success Analysis Data Sheets and Tables of the Raw Data

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10		
Surveyors: RG / CS	Coordinates: 0376171 3792662	Area # 1	
Section: 3			
Photo#: ~~2~~ 1		Direction: NW	Length: 25
Native	Non-Native	Both	No Plants
𝍸 𝍸 𝍸 𝍷𝍷𝍷𝍷		𝍸 𝍷	
Species	Ground Layer	Shrub Layer	Tree Canopy
1. Rubus ursinus	𝍸 𝍷𝍷 𝍸 𝍸	𝍷𝍷𝍷 𝍸	
2. Sal. las.	𝍷	𝍷	𝍸 𝍸 𝍷𝍷𝍷 𝍸 𝍸
3. Brome sp.	𝍷𝍷		
4. Bac. sal	𝍷	𝍷𝍷	
5. Earhartia sp.	𝍸 𝍷		
6. Spiral seed	𝍷		
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10	
Surveyors: RG / CS	Coordinates: 0376103 3792679	Area #2
Section: 3		
Photo#: ~~3~~ ~~4~~ 2	Direction: S	Length: 50 ft.

Native	Non-Native	Both	No Plants
卌 卌 卌 卌	卌 |||	卌 卌 | 卌 卌	|

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Bac sal.	|		
2. Sal las.			卌 卌 卌 卌 卌 卌 卌 |
3. Earharta sp. (non-native)	卌 |||		
4. Euphorbia sp. (non-native)	|		
5. Art dou	卌 卌 卌 卌 |	卌 卌 |	
6. Pop. fre.		||||	||
7. Pha ramo	卌		
8. Sam mex		||||	|||
9. Card. (Cardus pycno)	卌 |||	卌 卌 ||	
10. Bromus sp.	卌 ||||		
11. Bras nigra	|||		

1 live Popul—s (2 ft)

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10		
Surveyors: RG / CS	Coordinates: 0376039 3792656	Area #3	
Section: 3			
Photo#: ~~56~~ 3-06		Direction: S	Length: 50ft

Native	Non-Native	Both	No Plants
卌 卌 卌 卌 卌 卌	|	卌 卌 |||	卌 |

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Earharta (grass)	卌 ||||		
2. S. lasio		卌*	卌 卌 ||
3. Alnus rho		卌 卌 |	卌 卌 卌 卌 ||
4. Phacelia	卌 卌* 卌 ||||*	卌 卌 ||	
5. Art doug	卌 ||||		
6. Sonchus sp.	|		
7* Erodium ~~sp.~~ texanum	|		
8. Ribes aur	||		
9. Bromus sp.	卌		
10. Pop fremontii		||	
Bras nigra		||	

2 live populus

BIG T RIPARIAN SUCCESS TRANSECT SHEET		Date: 6/22/10	
Surveyors: RG / CS		Coordinates: 0375953 3792627 Area #4	
Section: 3			
Photo#: 4-5 ok		Direction: N-S	Length: 26ft
Native	Non-Native	Both	No Plants
~~20~~ 19		5	1
Species	Ground Layer	Shrub Layer	Tree Canopy
1. Salix good	2	12	24
2. ryegrass*	5	1	
3. Steph pauc	4	1	
4. Phacelia	1		
5. Art doug	2		
6.			
7.			
8.			
9.			
10.			

2 live Populus

cam cal
Mala sax

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10	
Surveyors: RG CS	Coordinates: 0376007 3792567	Area 5
Section: 3		

Photo#: 22-23	Direction: E-W	Length: 25ft

Native	Non-Native	Both	No Plants
I	𝍸 𝍸 III	𝍸 III	III

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Ribes aur		II	
2. Lobalaria	𝍸 𝍸 𝍸 III		
3. Bras nig	IIII	𝍸 𝍸	
4. S Lasio		𝍸 II	
5. Bromus	II		
6. scar pimp	𝍸 II		
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10		
Surveyors: RG CS	Coordinates: 376829 3792485	Area 6	
Section: 3			
Photo#: ~~20-21 unable to recreate~~ 18-19 (facing S)		Direction: E-W	Length: 50ft

Native	Non-Native	Both	No Plants
𝍸 𝍸 |	𝍸 𝍸 𝍸| |||| |||	𝍸 ||||	||

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Bromus	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||		
2. Yuc whi	||	𝍸 ||||	
3. En fas	𝍸	||||	
4. Salv mel	|||	𝍸	
5. Lot scoparius	|	|	
6. Salix lasio			||
7. Phacelia	||||		
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10
Surveyors: RG / CS	Coordinates: 375812 3792482 Area # 7
Section: 3	
Photo#: 14-15	Direction: Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Conyza Phac Card pycn	Sal lasio Conyza Phac	Sal lasio Pop fre Alnus rhom
2.	Art cal Earhardia Ricinus com	Card pycno Art cal ~~Foen vulg~~	
3.	Euph pep	Bac sal conium mac Bras nig	
4.		Ficus	
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10	
Surveyors: RG / CS	Coordinates: 375778 379 2442	Area # 8
Section: 3		

Photo#: 16-17	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Phacelia	Ficus Cyperus Sam mex	Fraxinus ud Sib elm (Ulmnus) Fraxinus v.
2.		Ribes Vitis g Art doug	Quer ag Salix lasio
3.		Alanthus Agritina	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10		
Surveyors: RL / CS	Coordinates: 0375731 3792478		Area 9
Section: 3			
Photo#: 12 - 13	Direction:	Length:	

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Lac ser. Pha [illegible]	Lac ser. Bras nigra	Sal las Pop fre
2.	Arte dracunculus Cam cal:	Bac sal, Blackberry	Que agr.
3.		Art. cal. Rosa cal.	
4.		Avena fatua Heterotheca grand	
5.		Terragon Salvia mellifera	
6.		Erio fasci. [illegible]	
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10		
Surveyors: RG / CS	Coordinates: 0375720 3792518 Area 10		
Section: 4			
Photo#: 6-7	Direction:	Length:	

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Eri. Fas. Pha. ramo	Eri. Fas. Scalebroom	Sal. las Prun. ill.
2.	Bromus sp.	Bras. nigra Gnaphalium	
3.	Croton calif. Ambrosia acanth.	Art. Cal. Yucca whip	
4.		Op. litt. Lot scop.	
5.		Heterotheca March	
6.		Eriastrum dens. Toxicodendron sp.	
7.		Bull thistle	
8.			
9.			
10.			

1 live populus 8-9ft tall

BIG T RIPARIAN SUCCESS TRANSECT SHEET		Date: 6/22/10	
Surveyors: RC/CS		Coordinates: 0375610 3792494	Area 1
Section: 4			
Photo#: 8-9		Direction: E-W	Length: 25
Native	Non-Native	Both	No Plants
𝍸	𝍸 |||	𝍸 𝍸 ||	
Species	Ground Layer	Shrub Layer	Tree Canopy
1. Bromus sp.	𝍸 𝍸 𝍸 𝍸		
2. Ehrharta	𝍸 𝍸		
3. Pop. fre.		||	𝍸
4. Bac sal.		𝍸	
5. Sal las.		𝍸		𝍸	
6. Lec serr.	|||			
7. Pha. aru	𝍸		
8.			
9.			
10.			

2 live populus (5 ft)/(10 ft)
1 large populus

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/22/10		
Surveyors: RC / CS	Coordinates: 0375536 3792505 Area 12		
Section: 4			
Photo#: 10-11	Direction:	Length:	
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.		Art. dou. Toxicodendron	Sal las. Que agr.
2.		Ageratina sp.	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET		Date: ~~6/22/10~~ 6/23/10	
Surveyors: RL / ES		Coordinates: 376007 3792567	Area # ~~5~~ 13
Section: 3			
Photo#: 24-25		Direction: E-W	Length: 25

Native	Non-Native	Both	No Plants
卌 卌 卌 III		卌 II	

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Rosa cal	卌 卌 卌	卌 卌 I	
2. Pop fre			卌 卌 II
3. Toxico div.		II	
4. Salix lasio			卌 卌 卌 卌 I
5. Bras nig	II		
6. Ribes aur	I		
7. Bromus	卌		
8.			
9.			
10.			

Harmac
giant nettle
ramex

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10		
Surveyors: RG CS	Coordinates: 03745478 3792527 Area # 14		
Section: 3			
Photo#: 30 - 31		Direction: —	Length: —
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	lobu mar sonchus lact ser	Cal ros Toxico	Malo laur Slasio
2.		Cyperus Popfre Ribes aur	Bac sal Alnus rho
3.		Ficus Arundo donax	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

2 live
1 dead } Popfre

eragrostis?

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10		
Surveyors: RG CS	Coordinates: 0375447 3792549 Area #15		
Section: 3			
Photo#: 28-29		Direction:	Length:
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Ricinus com euph pep Cyperus	Card pync Solanum S. laev	Alnus rhom S. laxio ← Frax vul
2.	Phacel lact ser Ehrharda	Garatina Ficus Quer agr	← Frax udei Ulmus
3.	clark rho?	Toxico Ros cal	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

2 live
1 dead } Popfre

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10		
Surveyors: RG CS	Coordinates: 0375413 3792542 Area #16		
Section: 3			
Photo#: 26-27		Direction:	Length:
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Phacelia Ricinus com Lactuca ser	Toxico div Ribes aur Sonchus	Alnus rhom Plat rac Salix lasio
2.	Euph pep Agaratina		Fraxinus vel
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

* 3 dead Popfre

BIG T RIPARIAN SUCCESS TRANSECT SHEET		Date: 6/23/10	
Surveyors: RG CS		Coordinates: 0375376 3792546 Area #17	
Section: 3			
Photo#: 32-33; 34-35 new angle? Popfre down		Direction:	Length:
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Lactuca ser Sonchus cheeseweed	Artdoug Rub urs Cyperus	Slaxgo ~~Cupres~~ Bac sal
2.		Phacelia Bras nig Utica	Alnus rho Frax udei
3.		Datura Rumex	Frax vel
4.			
5.			
6.			
7.			
8.			
9.			
10.			

grass

Popfre
large = damaged
2 small = 1 dam (~3ft)

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10		
Surveyors: RG CS	Coordinates: 0375344 3792556 Area #18		
Section: 3			
Photo#: 36-37	Direction: —	Length: —	
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Bromus Mimgutt Lob mar	Tox div Bac sal Pop fre	S lasio Alnus rho
2.	Polypogon Veronica Ricinus com	Art cal Mar mac	
3.	Yuc whi	Bras nig Phacelia Ribes aur	
4.		Cyperus Rosa cal	
5.			
6.			
7.			
8.			
9.			
10.			

Pop fre
1 alive

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10	
Surveyors: RG CS	Coordinates: 0375297 3792590	Area #19
Section: 3		

Photo#: 38-39	Direction:	Length: 25

Native	Non-Native	Both	No Plants
	卌 卌 ǀǀǀ	卌 卌 ǀǀ	

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Slasio			卌
2. Bras nig	卌 卌	卌 卌 卌 ǀ	
3. Lob mar	ǀǀǀ		
4. Bac sal		ǀǀ	
5. Art doug		卌 ǀǀ	
6. Bromus	卌 卌 ǀǀǀ		
7. Harr vul ~~Sal [illegible]~~		卌	
8. Sal mel		ǀǀǀ	
9.			
10.			

1 live Pop fre (~14ft)

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10		
Surveyors: RG CS	Coordinates: 0375314 3792537 Area #20		
Section: 3			
Photo#: 40-41	Direction:	Length:	

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Amb acan	Phacelia Toxdiv Har mac	Popfre S lasio
2.		Ribesaur Bras nig Heter grain	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Ulmc/Pop fre (p14 ft)

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10
Surveyors: RG CS	Coordinates: 0375261 3792532 Area #21
Section: 3	

Photo#:	Direction:	Length:
42-48		

Native	Non-Native	Both	No Plants
			R

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Bromus lact ser Heter gra	Eri fas Bras nig Art cal	Bac sal S lasio Quer ag
2.	Het villo	Sal mel Ribes aur Senecio fl	Halo las Alnus rho Pop fre
3.		Tox div Phacelia Brick cal	
4.		Art doug Lep squ	
5.			
6.			
7.			
8.			
9.			
10.			

1 live Popfre

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10		
Surveyors: RG CS	Coordinates: 0375202 3792547	Area # 22	
Section: 3			
Photo#: 46-47	Direction: E-W	Length: 25ft	

esccal
tocalote

Native	Non-Native	Both	No Plants
	卌 ||||	卌 卌 卌 |	

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Bromus	卌 卌 卌 卌 ||	|||	
2. Slasio			卌 卌 |||
3. S good			|||
4.			
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 6/23/10	
Surveyors: RG CS	Coordinates: 0375060 3792539	Area # 24
Section: 3		

Photo#: 44-45	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Bromus Brasnig Amb acan	Eri fas Het villo Rosa cal	Pop fre Slasio Bac sal
2.	lact ser Opu lit Lob mar	Rub urs Har mac	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

APPENDIX C

Riparian Success Restoration Area Site Photographs

Photo 1: As-Built Area 1

Photo 2: As-Built Area 2

Photo 3: As-Built Area 3

Photo 4: As-Built Area 4

Photo 5: As-Built Area 5

Photo 6: As-Built Area 6

Photo 7: As-Built Area 7

Photo 8: As-Built Area 8

Photo 9: As-Built Area 9

Photo 10: As-Built Area 10

Photo 11: As-Built Area 11

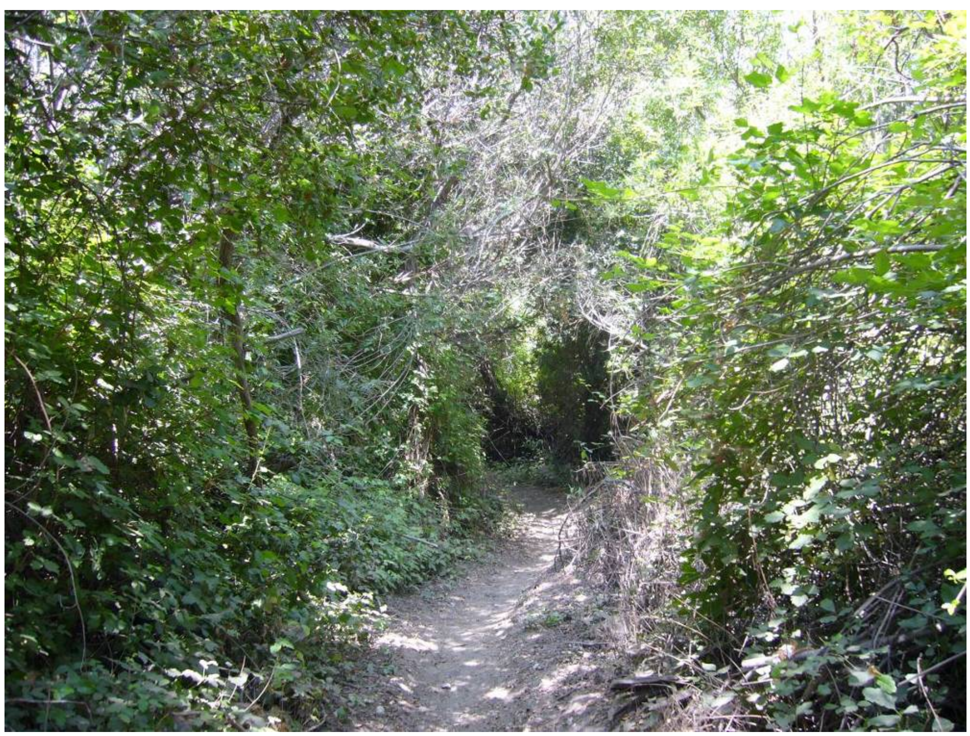

Photo 12: As-Built Area 12


Photo 13: As-Built Area 13


Photo 14: As-Built Area 14

Photo 15: As-Built Area 15

Photo 16: As-Built Area 16

Photo 17: As-Built Area 17

Photo 18: As-Built Area 18

Photo 19: As-Built Area 19

Photo 20: As-Built Area 20

Photo 21: As-Built Area 21

Photo 22: As-Built Area 22

Photo 23: As-Built Area 24

APPENDIX D

Big Tujunga Wash Mitigation Area Flora Compendium

Scientific Name	Common Name
VASCULAR PLANTS	
ANGIOSPERMS (DICOTYLEDONS)	
ACERACEAE	**MAPLE FAMILY**
Acer negundo var. californicum	box elder
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**
Malosma laurina	laurel sumac
Toxicodendron diversilobum	western poison oak
APIACEAE	**CARROT FAMILY**
*Conium maculatum**	poison hemlock
ASTERACEAE	**SUNFLOWER FAMILY**
*Ageratina adenophora**	sticky eupatory
Ambrosia acanthicarpa	annual bur-sage
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Artemisia dracunculus	tarragon
Baccharis salicifolia	mule fat
Brickellia californica	California brickellbush
*Carduus apychocephalus**	Italian thistle
*Centaurea melitensis**	tocalote
Cirsium occidentale var.*occidentale*	California thistle
Conyza canadensis	horseweed
Gnaphalium canescens ssp. *canescens*	fragrant everlasting
Heterotheca grandiflora	telegraph weed
Heterotheca villosa var. *villosa*	golden aster
*Lactuca serriola**	prickly lettuce
Lepidospartum squamatum	scale broom
Malacothrix saxatilis	cliff aster
Pseudognaphalium biolettii (bicolor)	bicolor cudweed
Rafinesquia californica	California chicory
Senecio flaccidus var. *douglasii*	sand-wash butterweed
*Sonchus asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria pauciflora var. *pauciflora*	few-flower wreath-plant
BETULACEAE	**BIRCH FAMILY**
Alnus rhombilofia	white alder
BRASSICACEAE	**MUSTARD FAMILY**

*Brassica nigra**	black mustard
*Lobularia maritime**	sweet alyssum
Nasturtium officinale	watercress
CACTACEAE	**CACTUS FAMILY**
Opuntia littoralis	coastal prickly pear
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**
Sambucus mexicana (*nigra* ssp. *cerulea*)	blue elderberry
CRASSULACEAE	**STONE-CROP FAMILY**
Dudleya lanceolata	coastal dudleya
CURCURBITACEAE	**GOURD FAMILY**
Marah macrocarpus	wild cucumber
EUPHORBIACEAE	**SPURGE FAMILY**
Croton californicus	croton
*Euphorbia peplus**	petty spurge
*Ricinus communis**	castor bean
FABACEAE	**Pea FAMILY**
Lotus scoparius	deerweed
*Medicago sativa**	alfalfa
FAGACEAE	**OAK FAMILY**
Quercus agrifolia	coast live oak
GERANIACEAE	**GERANIUM FAMILY**
*Erodium cicutarium**	red-stem filaree
Erodium sp.*	filaree
GROSSULARIACEAE	**GOOSEBERRY FAMILY**
Ribes aureum	golden currant
HYDROPHYLLACEAE	**WATERLEAF FAMILY**
Eriodictyon crassifolium	yerba santa
Phacelia ramosissima	branching phacelia

LAMIACEAE	**MINT FAMILY**
*Marrubium vulgare**	horehound
Salvia mellifera	black sage
MALVACEAE	**MALLOW FAMILY**
*Malva parviflora**	cheeseweed
MORACEAE	**FIG FAMILY**
*Ficus carica**	edible fig
OLEACEAE	**OLIVE FAMILY**
*Fraxinus udhei**	evergreen ash
Fraxinus velutina	velvet ash
ONAGRACEAE	**EVENING PRIMROSE**
Camissonia bistorta	California sun cup
Camissonia californica	California primrose
Clarkia unguiculata	elegant clarkia
PAPAVERACEAE	**POPPY FAMILY**
Eschscholzia californica	California poppy
PLANTAGINACEAE	**PLANTAIN FAMILY**
*Plantago psyllium (indica)**	Indian plantain
PLATANACEAE	**PLANE TREE FAMILY**
Platanus racemosa	western sycamore
POLEMONIACEAE	**PHLOX FAMILY**
Eriastrum densifolium	chaparral woolly star
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum fasciculatum	flat-top buckwheat
Eriogonum gracile	slender buckwheat
*Rumex crispus**	curly dock
PRIMULACEAE	**PRIMROSE FAMILY**
*Anagallis arvensis**	scarlet pimpernel
RANUNCULACEAE	**CROWFOOT FAMILY**
Delphinium cardinale	cardinal or scarlet larkspur

ROSACEAE	**ROSE FAMILY**
Prunus ilicifolia	holly-leafed cherry
Rosa californica	California rose
Rubus ursinus	California blackberry
SALICACEAE	**WILLOW FAMILY**
Populus fremontii	Fremont's cottonwood
Salix exigua	sandbar willow
Salix gooddingii	Goodding's black willow
Salix laevigata	red willow
Salix lasiolepis	arroyo willow
SCROPHULARIACEAE	**FIGWORT FAMILY**
Mimulus guttatus	common monkeyflower
*Verbascum virgatum**	wand mullein
*Veronica anagallis-aquatica**	water speedwell
SIMAROUBACEAE	**QUASSIA FAMILY**
*Ailanthus altissima**	tree of heaven
SOLANACEAE	**NIGHTSHADE FAMILY**
Datura wrightii	jimson weed
*Nicotiana glauca**	tree tobacco
Solanum americanum	white nightshade
ULMACEAE	**ELM FAMILY**
*Ulmus parvifolia**	Chinese elm
URTICACEAE	**NETTLE FAMILY**
*Ficus carica**	fig
Urtica dioica	stinging nettle
VITACEAE	**GRAPE FAMILY**
Vitis girdiana	desert wild grape
ANGIOSPERMS (MONOCOTYLEDONS)	
CYPERACEAE	**SEDGE FAMILY**
Cyperus sp.	umbrella sedge
LILIACEAE	**LILY FAMILY**
Yucca whipplei	our lord's candle
POACEAE	**GRASS FAMILY**
*Arundo donax**	giant reed

*Avena fatua**	wild oat
*Bromus madritensis**	foxtail chess
*Ehrharta calycina**	perennial veldtgrass
*Lolium perenne**	perennial ryegrass
Polypogon sp.*	beard grass
*non-native species	

APPENDIX E

Big Tujunga Wash Mitigation Area Wildlife Compendium

Scientific Name	Common Name
CRUSTACEA	**CRUSTACEANS**
Decapoda	**Crayfish and shrimp**
Procambarus clarkii	red swamp crayfish
INSECTA	**INSECTS**
Orthoptera	**Grasshoppers, crickets, and katydids**
Gryllus assimilis	common black cricket
Diptera	**Flies**
Culicidae family	mosquito spp.
OSTEICHTHYES	**BONY FISH**
Catostomidae	**Suckers**
*** *Catostomus santaanae*	Santa Ana sucker
Centrarchidae	**Sunfishes**
Lepomis cyanellus	green sunfish
Lepomis macrochirus	bluegill
Micropterus salmoides	largemouth bass
Cyprinidae	**Carps and minnows**
Carassius auratus	goldfish
* *Cyprinus carpio*	common carp
** *Gila orcuttii*	arroyo chub
** *Rhinichthys osculus* ssp. 3	Santa Ana speckled dace
Ictaluridae	**Catfish**
Ameiurus melas	black bullhead
Poeciliidae	**Freshwater fish**
Gambusia affinis	mosquitofish
AMPHIBIA	**AMPHIBIANS**
Bufonidae	**True toads**
Anaxyrus (=Bufo) boreas	Western toad
Hylidae	**Treefrogs and allies**
Pseudacris cadaverina	California treefrog
Ranidae	**True frogs**
* *Lithobates catesbianus*	American bullfrog
REPTILIA	**REPTILES**
Emydidae	**Box and water turtles**
** *Actinemys marmorata pallida*	Southwestern pond turtle
* *Trachemys scripta*	red-eared slider
Chelydridae	**Snapping turtles**
* *Chelydra serpentina*	common snapping turtle

Phrynosomatidae	**Phrynosomatids**
Sceloporus graciosus vandenburgianus	Southern sagebrush lizard
Sceloporus occidentalis	Western fence lizard
AVES	**BIRDS**
Podicipedidae	**Grebes**
Podilymbus podiceps	pied-billed grebe
Phalacrocoracidae	**Cormorants**
Phalacrocorax auritus	double-crested cormorant
Ardeidae	**Herons and egrets**
Butorides virescens	green heron
Nycticorax nycticorax	black-crowned night-heron
Anatidae	**Geese and ducks**
Anas platyrhynchos	mallard
Oxyura jamaicensis	ruddy duck
Accipitridae	**Raptors**
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	red-tailed hawk
Odontophoridae	**Quail**
Callipepla californica	California quail
Rallidae	**Rails and coots**
Fulica americana	American coot
Columbidae	**Pigeons and doves**
* *Columba livia*	rock dove
Zenaida macroura	mourning dove
Trochilidae	**Hummingbirds**
Calypte anna	Anna's hummingbird
Selasphorus rufus	rufous hummingbird
Selasphorus sasin	Allen's hummingbird
Alcedinidae	**Kingfishers**
Ceryle alcyon	belted kingfisher
Picidae	**Woodpeckers**
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	downy woodpecker
Picoides villosus	hairy woodpecker
Tyrannidae	**Tyrant flycatchers**
** *Contopus cooperi*	olive-sided flycatcher
Empidonax difficilis	Pacific-slope flycatcher
Sayornis nigricans	black phoebe
Tyrannus vociferans	Cassin's kingbird
Vireonidae	**Vireos**
Vireo huttoni	Hutton's vireo
Corvidae	**Jays and crows**
Aphelocoma californica	Western scrub-jay
Corvus corax	common raven
Hirundinidae	**Swallows**
Stelgidopteryx serripennis	Northern rough-winged swallow
Aegithalidae	**Bushtits**
Psaltriparus minimus	bushtit

Troglodytidae	**Wrens**
Troglodytes aedon	house wren
Timaliidae	**Wrentits**
Chamaea fasciata	wrentit
Mimidae	**Mockingbirds and thrashers**
Mimus polyglottis	Northern mockingbird
Toxostoma redivivum	California thrasher
Parulidae	**Wood warblers**
** *Dendroica petechia*	yellow warbler
Geothlypis trichas	common yellowthroat
Wilsonia pusilla	Wilson's warbler
Thraupidae	**Tanagers**
Piranga ludoviciana	Western tanager
Emberizidae	**Towhees and sparrows**
Melospiza melodia	song sparrow
Pipilo crissalis	California towhee
Pipilo maculatus	spotted towhee
Cardinalidae	**Grosbeaks and buntings**
Pheucticus melanocephalus	black-headed grosbeak
Icteridae	**Blackbirds and orioles**
Agelaius phoeniceus	red-winged blackbird
Molothrus ater	brown-headed cowbird
Quiscalus mexicanus	great-tailed grackle
Fringillidae	**Finches**
Carduelis psaltria	lesser goldfinch
Carpodacus mexicanus	house finch
MAMMALIA	**MAMMALS**
Leporidae	**Hares and rabbits**
Sylvilagus audubonii	desert cottontail
Sciuridae	**Squirrels**
Spermophilus beecheyi	California ground squirrel

* Non-native species
** CDFG California Species of Special Concern
*** State and/or Federally Listed Species

APPENDIX N

2010 Water Quality Monitoring Report

County of Los Angeles
Department of Public Works

November 2010 Water Quality Monitoring Report

for the

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

MWH

November 2010 Water Quality Monitoring Report

for

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

Prepared For:

ECORP Consulting, Inc.
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Prepared By:

MWH
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Table of Contents

Section Name **Page Number**

LIST OF FIGURES

Figure Number **Page**

LIST OF TABLES

Table Number **Page**

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Water Quality Monitoring
November 2010

BACKGROUND

The County of Los Angeles Department of Public Works (LADPW) purchased a 207-acre parcel in Big Tujunga Wash as a mitigation bank for County flood control projects throughout Los Angeles County. In coordination with local agencies, the County defined a number of measures to improve habitat quality at the site. A Master Mitigation Plan (MMP) was prepared to guide the implementation of these enhancements. The MMP also includes a monitoring program to gather data on conditions at the site during implementation of the improvements. The MMP was prepared and is currently being implemented by ECORP Consulting, Inc. MWH, a subconsultant to ECORP, is responsible for the water quality monitoring program described in the MMP. Monitoring was conducted on a quarterly basis from the fourth quarter of 2000 through the fourth quarter of 2005. In 2006, monitoring was conducted on a semi-annual basis. In 2007 through 2009 monitoring was conducted annually, in December. This report presents the results of the water quality sampling for 2010.

The project site is located just east of Hansen Dam in the Shadow Hills area of the City of Los Angeles. Both Big Tujunga Wash, an intermittent stream, and Haines Canyon Creek, a perennial stream, traverse the project site in an east-to-west direction. The two Tujunga ponds are located at the far eastern portion of the site.

Project Site Activities

A timeline of project-related activities that could influence water quality is presented in **Table 1**.

Table 1
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
4/00	Baseline water quality sampling
11/00 to 11/01	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
12/00 to 11/02	Water hyacinth removal
12/00	Fish Sampling at Haines Canyon Creek
12/14/00	Water quality sampling
1/01 to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2/01	Partial riparian planting
3/01	Selective clearing at Canyon Trails Golf Club
3/12/01	Water quality sampling
6/19/01	Water quality sampling
7/01	Fish Sampling at Haines Canyon Creek
9/11/01	Water quality sampling
10/01 to 11/01	Fish Sampling at Haines Canyon Creek

Table 1 (Continued)
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
12/12/01	Water quality sampling
1/02	Final riparian planting
2/02	Upland replacement planting
3/26/02	Water quality sampling
6/25/02	Water quality sampling
7/02	Fish Sampling at Haines Canyon Creek
9/12/02	Water quality sampling
10/02	Grading at Canyon Trails Golf Club begins
11/02	Fish Sampling at Haines Canyon Creek
12/19/02	Water quality sampling
3/20/03	Water quality sampling
4/1/03	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
6/23/03	Water quality sampling
8/03	Fish Sampling at Haines Canyon Creek
9/30/03	Water quality sampling
Fall 2003	Completion of the golf course construction
12/17/03	Water quality sampling
1/04	Fish Sampling at Haines Canyon Creek
4/2/04	Water quality sampling
4/3/04	Rock Dam Removal Day
6/04	Angeles National Golf Club (previously named Canyon Trails) opens to the public
7/2/04	Water quality sampling
10/5/04	Water quality sampling
12/9/04	Water quality sampling
4/7/05	Water quality sampling
6/30/05	Water quality sampling
10/25/05	Water quality sampling
12/22/05	Water quality sampling
7/11/06	Water quality sampling
12/29/06	Water quality sampling
12/17/07	Water quality sampling
12/29/08	Water quality sampling
8/26/2009 to 10/16/2009	The Station Fire was the largest fire in the recorded history of Angeles National Forest and the 10th largest fire in California since 1933. The fire burned a total of 160,577 acres. The fire was fully contained on October 16, 2009. (Source: Angeles National Forest Incident Update available - http://www.inciweb.org/incident/1856/)
12/15/09	Water quality sampling
11/19/10	Water quality sampling (pesticide samples collected 12/1/10)

Angeles National Golf Club Activities

The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern. The golf course has been operating since June 2004.

In March 2004, the golf course maintenance staff indicated that the following chemicals may be used on an as needed basis: Primo™ (a grass growth inhibitor used for turf management; active ingredient – trinexapac-ethyl) and Rodeo® (an herbicide used to control aquatic weeds; active ingredient – glyphosate) (J. Reidinger, pers. comm. to M. Chimienti, LADPW, March 18, 2004). Based on this information, glyphosate was added to the list of sampling parameters starting in the first quarter of 2004.

In December 2004 and February 2005, the Golf Club provided MWH with the golf course's monthly pesticide use reports. The reports indicate that 10 types of chemical products (seven herbicides, one insecticide, one fungicide, and one grass growth inhibitor) were applied. Pesticide use reports were again provided by the Golf Club in April 2007 for the period from November 2006 to March 2007. During this period, pesticides were applied only in November 2006 as summarized in **Table 2**.

Table 2
Pesticide Applications at the Angeles National Golf Course (November 2006)

Active Ingredient	Manufacturer and Product Name	Applications
Flutolanil	Bayer Prostar 70 WP (fungicide)	One application of 37 pounds on 130,000 sq. ft. of turfgrass
Glyphosate	Verdicon Kleenup Pro (herbicide)	One application of 5 gallons (2% volume) as a spot treatment on turfgrass
Gibberellic Acid	Valent ProGibb T&O (plant growth regulator)	One application of 1 quart on 16 acres of turfgrass
Pyraclostrobin	BASF Insignia 20 WG (fungicide)	One application of 7.2 pounds on 130,000 sq. ft. of turfgrass

Source: Angeles National Golf Course Monthly Summary Pesticide Use Reports for November 2006 through March 2007

In December 2004, the Golf Club also provided MWH with the golf course's water quality monitoring reports to date. The results were summarized and presented in the 2004 Annual Report for the Big Tujunga Wash Mitigation Bank Water Quality Monitoring Program (distributed in February 2005).

In August 2006, the Golf Club provided MWH with additional water quality monitoring reports from the first and second quarters of 2006. The Golf Club's monitoring activities for the first and second quarters of 2006 included:

- Groundwater samples were collected on February 24 and May 17 from two groundwater monitoring wells downgradient from the golf course (MW-1 and MW-2R, located near Foothill Boulevard).
- Surface water samples were collected from Big Tujunga Wash approximately 200 feet east of Foothill Boulevard (sampling site SW-2) on February 24 and May 17.
- For the first and second quarters of 2006, surface water samples were not collected from Haines Canyon Creek (sampling site SW-1, approximately 500 feet east of Foothill Boulevard) since water was not flowing at this site on the sampling dates.

[Source: Angeles National Golf Club First Quarter 2006 Monitoring Report (dated May 3, 2006) and Second Quarter 2006 Monitoring Report (dated July 6, 2006), prepared by Brown and Caldwell for the Los Angeles International Golf Club.]

The following parameters were sampled by the Golf Club in the first and second quarters of 2006:

- General parameters – pH, electrical conductivity, total dissolved solids (TDS), sodium, potassium, calcium, magnesium, carbonate, bicarbonate, sulfate, chloride, nitrate as nitrogen, nitrite as nitrogen, total Kjeldahl nitrogen (TKN), ammonia as nitrogen, oil and grease, and surfactants (MBAS)
- Pesticides – aldrin, chlordane, 4,4-DDD, 4,4-DDE, 4,4-DDT, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, heptachlor epoxide, and methoxychlor
- Fungicides – metalaxyl, chlorothalonil, iprodione, propiconazole, vincolozoin, and quintozene
- Herbicides – prodiamine, pronamide, P-butylfluazifop, fenoxaprop, pendimethalin, triclopyr, chlopyralid, 2,4-D amine, dicamba, and MCPP
- Insecticides – chlorpyrifos, trichlorfon, and malathion

In both the groundwater and surface water samples collected for the Golf Club during the first and second quarters of 2006, concentrations of pesticides (including fungicides, herbicides and insecticides) were not detected, and general chemical parameters did not exceed state drinking water standards (Angeles National Golf Club, May 2006 and July 2006).

Figure 1
Angeles National Golf Club Groundwater and Surface Water Sampling Sites (February and May 2006)

Source: Angeles National Golf Club First Quarter 2006 Monitoring Report (dated May 3, 2006), prepared by Brown and Caldwell for the Los Angeles International Golf Club.

MATERIALS AND METHODS

Sampling Stations

Four sampling locations have been identified for the monitoring program for the Big Tujunga Wash Mitigation Bank (**Figure 2**). **Table 3** summarizes sampling locations and the conditions observed on November 19, 2010. [Note, pesticide samples collected December 1, 2010.] The coordinates of the sampling stations were determined by a hand-held Global Positioning System.

Table 3
Water Quality Sampling Locations and Conditions for November 2010

Date	November 19, 2010		
Air Temperature	Approximately 60 degrees Fahrenheit		
Skies	Overcast, foggy, cool		
Observations	Haines Canyon Creek exiting the mitigation bank site very clear, low turbidity. Surface vegetation (*Lemna*) levels very high in the inlet Tujunga pond.		
Sampling Locations	**Latitude**	**Longitude**	**Time of sample**
Haines Canyon Creek	N 34º 16' 2.9"	W 118º 21' 22.2"	1040
Haines Canyon Creek, inflow to Tujunga Ponds	N 34º 16' 6.9"	W 118º 20' 18.7"	1050
Haines Canyon Creek, outflow from Tujunga Ponds	N 34º 16' 7.1"	W 118º 20' 28.3"	1010
Big Tujunga Wash	N 34º 16' 11.7"	W 118º 21' 4.0"	0915

Sampling Parameters

Water Quality. Table 4 summarizes the sampling parameters included in the water quality monitoring program. The following meters were used in the field:

- Dissolved oxygen and temperature – YSI 550A Field DO meter and thermometer
- pH – Orion 230A pH meter with HACH 51935 electrode
- HACH DR 700 – total residual chlorine

Pesticides were analyzed by Emax Laboratories, Inc., Torrance, California. All other analyses were performed at MWH Laboratories, Monrovia, California. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Quality assurance/quality control (QA/QC) procedures in each laboratory followed the methods described in their respective Quality Assurance Manuals.

Table 4
Water Quality Sampling Parameters

Parameter	Analysis Location	Analytical Method
total Kjeldahl nitrogen (TKN)	laboratory	EPA 351.2
nitrite - nitrogen (NO_2-N)	laboratory	EPA 300.0 by IC
nitrate-nitrogen (NO_3-N)	laboratory	EPA 300.0 by IC
ammonia (NH_4)	laboratory	EPA 350.1
orthophosphate - P	laboratory	Standard Methods 4500PE/EPA 365.1
total phosphorus - P	laboratory	Standard Methods 4500PE/EPA 365.1
total coliform	laboratory	Standard Methods 9221B
fecal coliform	laboratory	Standard Methods 9221C
turbidity	laboratory	EPA 180.1
glyphosate (Roundup/Rodeo)[1]	laboratory	EPA 547
chlorpyrifos[2]	laboratory	EPA 8141A
Organophosphorous Pesticides[3]	laboratory	EPA 8081A
dissolved oxygen	field	Standard Methods 4500-O G
total residual chlorine	field	Standard Methods 4500-Cl
temperature	field	Standard Methods 2550
pH	field	Standard Methods 4500-H+

Sources for analytical methods:

EPA. Method and Guidance for Analysis of Water.

American Public Health Association, American Waterworks Association, and Water Environment Federation. 1998. Standard Methods for the Examination of Water and Wastewater, 20th Edition. Washington D.C.

1 First analysis completed in the first quarter of 2004

2 First analysis completed in the fourth quarter of 2004. This analytical method tests for the following chemicals: azinphos-methyl, bolster, coumaphos, diazinon, chlorpyrifos, demeton, dichlorvos, disulfoton, ethoprop, fensulfothion, fenthion, mevinphos, naled, phorate, runnel, stirophos, parathion-methyl, tokuthion, and trichloronate.

3 First analysis completed in December 2007. EPA method 8081A tests for aldrin, BHC, Chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptaclor, methoxychlor, and toxaphene.

BIG TUJUNGA WASH MITIGATION BANK

Prepared For:
Los Angeles County Department of Public Works

Date: December 3, 1999

Prepared By:
Leslie Backus
Chambers Group Inc.

This map was produced using ESRI's ArcView software.

Chambers Group, Inc.

This map is not intended for site-specific purposes.

Figure 2

Mitigation Bank Water Quality Sampling Stations

WQ Station No.	Name
1	Inflow to Tujunga Ponds
2	Outflow from Tujunga Ponds
3	Big Tujunga Wash
4	Haines Canyon Creek, just before exit from site

Discharge Measurements. In addition to the water quality monitoring, flows in the outlet from Big Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were estimated using a simple field procedure. The technique uses a float to measure stream velocity.

Calculating flow then involves solving the following equation:

$$\text{Flow} = ALC / T$$

Where:

A = Average cross-sectional area of the stream (stream width multiplied by average water depth)

L = Length of the stream reach measured (usually 20 feet)

C = A coefficient or correction factor (0.8 for rocky-bottom streams or 0.9 for muddy-bottom streams). This allows you to correct for the fact that water at the surface travels faster than near the stream bottom due to resistance from gravel, cobble, etc. Multiplying the surface velocity by a correction coefficient decreases the value and gives a better measure of the stream's overall velocity.

T = Time, in seconds, for the float to travel the length of L

RESULTS

Baseline Water Quality

Sampling and analysis conducted by LADPW prior to implementation of the MMP is considered the baseline for water quality conditions at the site. The results of baseline analyses conducted in April 2000 are presented in **Table 5**. Higher bacteria and turbidity observed in the 4/18/00 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/00 samples, due to release from sediments.

November 2010 Results

Water Quality

Results of analyses conducted by MWH and Emax Laboratories are appended to this report (**Appendix A**) and summarized in **Table 6**. Note that the yields (percent recoveries) of QC samples were within acceptable limits (percentages) for all samples.

Table 5
Baseline Water Quality (2000)

Parameter	Units	Date	Haines Canyon Creek, inflow to Tujunga Ponds	Haines Canyon Creek, outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Total coliform	MPN/ 100 ml	4/12/00	3,000	5,000	170	1,700
		4/18/00	2,200	170,000	2,400	70,000
Fecal coliform	MPN/ 100 ml	4/12/00	500	300	40	80
		4/18/00	500	30,000	2,400	50,000
Ammonia-N	mg/L	4/12/00	0	0	0	0
		4/18/00	0	0	0	0
Nitrate-N	mg/L	4/12/00	8.38	5.19	0	3.73
		4/18/00	8.2	3.91	0.253	0.438
Nitrite-N	mg/L	4/12/00	0.061	0	0	0
		4/18/00	0.055	0	0	0
Kjeldahl-N	mg/L	4/12/00	0	0.1062	0.163	0
		4/18/00	0	0.848	0.42	0.428
Dissolved phosphorus	mg/L	4/12/00	0.078	0.056	0	0.063
		4/18/00	0.089	0.148	0.111	0.163
Total phosphorus	mg/L	4/12/00	0.086	0.062	0	0.066
		4/18/00	0.113	0.153	0.134	0.211
pH	std units	4/12/00	7.78	7.68	7.96	7.91
		4/18/00	7.18	7.47	7.45	7.06
Turbidity	NTU	4/12/00	1.83	0.38	1.75	0.6
		4/18/00	4.24	323	4070	737

Table 6
Summary of Water Quality Results – November 19, 2010

Parameter	Units	Haines Canyon Creek, Inflow to Tujunga Ponds	Haines Canyon Creek, Outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Temperature	°C	17.3	16.7	12.5	15.8
Dissolved Oxygen	mg/L	4.06	4.73	9.75	8.56
pH	std units	6.50	6.54	7.85	7.56
Total residual chlorine	mg/L	ND	ND	ND	ND
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	ND	ND	ND	ND
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	9.2	6.4	<0.2	6.0
Orthophosphate-P	mg/L	0.026	ND	0.013	0.013
Total phosphorus-P	mg/L	0.033	<0.02	0.022	<0.02
Glyphosate	µg/L	ND	ND	ND	ND
Chloropyrifos*	ng/L	ND	ND	ND	ND
Pesticides (EPA 8081A)**	µg/L	ND	ND	ND	ND
Turbidity	NTU	0.4	0.2	2.3	0.5
Fecal Coliform Bacteria	(MPN/100 ml)	23	70	30	80
Total Coliform Bacteria	(MPN/100 ml)	1600	170	110	500

NTU – nephelometric turbidity units MPN – most probable number ND – non-detect

[1], [2] Pesticide samples collected 12/1/10

[1] The analytical method used for chloropyrifos (EPA 8141A) also tests for the following chemicals: azinphos-methyl, bolster, coumaphos, diazinon, demeton, dichlorvos, disulfoton, ethoprop, fensulfothion, fenthion, mevinphos, naled, phorate, runnel, stirophos, parathion-methyl, tokuthion, and trichloronate.

[2] EPA method 8081A tests for aldrin, BHC, Chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptaclor, methoxychlor, and toxaphene.

Discharge Measurements

Using the field technique described above, flows in the outlet from Big Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were approximated. Estimated flows for November 2010 are summarized in **Table 7**.

Table 7
Estimated Flows for November 2010

Sampling Date	Approximate Flow (cubic feet per second)		
	Outlet of Big Tujunga Ponds	Haines Canyon Creek leaving the site	Big Tujunga Wash
11/19/2010	2.0	4.2	15.2

Comparison of Results with Aquatic Life Criteria

Tables 8 and **12** present objectives established by the Los Angeles Regional Water Quality Control Board (Regional Board) for protection of beneficial uses in Big Tujunga Wash including wildlife habitat. EPA's criteria for freshwater aquatic life are also presented in **Tables 8, 9, 10, 11** and **13**.

Table 8
National and Local Recommended Water Quality Criteria - Freshwaters

Parameter	Basin Plan Objectives[a]	EPA Criteria		
		CMC	CCC	Human Health
Temperature (^oC)	b	See Table 11	See Table 11	--
Dissolved oxygen (mg/L)	>7.0 mean >5.0 min	5.0[c] (warmwater, early life stages, 1-day minimum)	6.0[c] (warmwater, early life stages, 7-day mean)	--
pH	6.5 - 8.5	--	6.5-9.0[d,e]	5.0-9.0[d,e]
Total residual chlorine (mg/L)	0.1	0.019[d,e]	0.011[d,e]	4.0 (maximum residual disinfectant level goal)
Fecal coliform (MPN/100 ml)	200[f] (water contact recreation)	--	--	Swimming stds: 33[g] (geometric mean for enterococci) 126[g] (geometric mean for *E. coli*)
Ammonia-nitrogen (mg/L)	See Table 12	See Tables 9, 10, and 11	See Tables 9, 10, and 11	--
Nitrite-nitrogen (mg/L)	1	--	--	1 (primary drinking water std.)
Nitrate-nitrogen (mg/L)	10	--	--	10 (primary drinking water std.)
Total phosphorus (mg/L)	--	<0.05 – 0.1[e] (recommendation for streams, no criterion)		--
Turbidity (NTU)	h	i	i	5 (secondary drinking water standard) 0.5 – 1.0 (std. for systems that filter)

Notes:

-- No criterion
CMC Criteria Maximum Concentration or acute criterion
CCC Criteria Continuous Concentration or chronic criterion

a Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan).
b Narrative criterion: "The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses."
c Source: USEPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440-5-86-003. Washington, D.C.
d Source: USEPA. 1999. National Recommended Water Quality Criteria – Correction. EPA 822-Z-99-001. Washington, D.C.
e Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.
f Standard based on a minimum of not less than four samples for any 30-day period, 10% of total samples during any 30-day period shall not exceed 400/100ml.
g Source: USEPA. 1986. Ambient Water Quality Criteria for Bacteria – 1986. EPA 440-5-84-002. Washington, D.C.
h Narrative criterion: "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses."
i Narrative criterion for freshwater fish and other aquatic life: "Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."

Table 9
Numeric Values of the Criterion Maximum Concentration (CMC) with Salmonids Present and Absent and the Criterion Continuous Concentration (CCC) for Ammonia Nitrogen (mg/L)

pH	CMC with Salmonids Present	CMC with Salmonids Absent	CCC
6.5	32.6	48.8	3.48
6.6	31.3	46.8	3.42
6.7	29.8	44.6	3.36
6.8	28.1	42.0	3.28
6.9	26.2	39.1	3.19
7.0	24.1	36.1	3.08
7.1	22.0	32.8	2.96
7.2	19.7	29.5	2.81
7.3	17.5	26.2	2.65
7.4	15.4	23.0	2.47
7.5	13.3	19.9	2.28
7.6	11.4	17.0	2.07
7.7	9.65	14.4	1.87
7.8	8.11	12.1	1.66
7.9	6.77	10.1	1.46
8.0	5.62	8.4	1.27
8.1	4.64	6.95	1.09
8.2	3.83	5.72	0.935
8.3	3.15	4.71	0.795
8.4	2.59	3.88	0.673
8.5	2.14	3.2	0.568
8.6	1.77	2.65	0.480
8.7	1.47	2.2	0.406
8.8	1.23	1.84	0.345
8.9	1.04	1.56	0.295
9.0	0.885	1.32	0.254

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 10
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Absent

CCC for Fish Early Life Stages Absent, mg N/L										
	Temperature (°Celsius)									
pH	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

* At 15° C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 11
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Present

CCC for Fish Early Life Stages Present, mg N/L										
pH	Temperature (° Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 12
Maximum One-Hour Average Concentration for Total Ammonia
(mg/L NH_3)

pH	Temperature (°Celsius)						
	0	5	10	15	20	25	30
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan). Taken from USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

Table 13
Example Calculated Values for Maximum Weekly Average Temperature for Growth and Short-Term Maxima for Survival of Juvenile and Adult Fishes During the Summer

Species	Growth (°Celsius)	Maxima (°Celsius)
Black crappie	27	--
Bluegill	32	35
Channel catfish	32	35
Emerald shiner	30	--
Largemouth bass	32	34
Brook trout	19	24

Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

DISCUSSION

Results from the November 2010 sampling are described by parameter in **Table 14**.

Table 14
Discussion of November 2010 Big Tujunga Wash Sampling Results

Parameter	Discussion
Temperature	• Observed temperatures were below levels of concern for growth and survival of warmwater fish species at all stations.
Dissolved oxygen	• Dissolved oxygen levels ranged from 4.06 mg/L in the inflow pond to 9.75 in Big Tujunga Wash. DO levels in the ponds were below the recommended minimum for warmwater fish species (5.0 mg/L).
pH	• Lowest pH was observed in the inflow to Tujunga Ponds (6.50), with highest pH observed in Big Tujunga Wash (7.85). On this date, pH measurements at all stations were within the 6.5 to 8.5 range identified in the Basin Plan.
Total residual chlorine	• No residual chlorine was detected at any station.
Nitrogen	• Nitrate-nitrogen measurements at all stations were below the drinking water standard of 10 mg/L. • Ammonia was below the detection limit at all stations.
Phosphorus	• Total phosphorus levels at all sites were below EPA's recommended range for streams to prevent excess algae growth (observed range at these three stations was ND to 0.033 mg/L; recommended range is <0.05 – 0.1 mg/L).
Glyphosate	• Glyphosate was not detected at any station.
Chloropyrifos	• Chloropyrifos and the other pesticides tested using EPA's analytical method 8141A were not detected at any station.
Pesticides	• Pesticides analyzed by EPA Method 8081A were not detected at any station.
Turbidity	• Turbidity levels were low (≤2.3 NTU) at all stations.
Bacteria	• Fecal coliform levels at all stations were below the water contact recreation standard of 200 MPN. Total coliform levels ranged from 110 in Big Tujunga Wash to 1,600 in the Tujunga Pond inlet.

GLOSSARY

Ammonia-Nitrogen – NH_3-N is a gaseous alkaline compound of nitrogen and hydrogen that is highly soluble in water. Un-ionized ammonia (NH_3) is toxic to aquatic organisms. The proportions of NH_3 and ammonium (NH_4^+) and hydroxide (OH^-) ions are dependent on temperature, pH, and salinity.

Chlorine, residual – The chlorination of water supplies and wastewaters serves to destroy or deactivate disease-producing organisms. Residual chlorine in natural waters is an aquatic toxicant.

Chloropyrifos - white crystal-like solid insecticide widely used in homes and on farms. Used to control cockroaches, fleas, termites, ticks crop pests.

Coliform Bacteria – several genera of bacteria belonging to the family Enterobacteriaceae. Based on the method of detection, the coliform group is historically defined as facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas and acid formation within 48 hours at 35°C.

Fecal Coliform Bacteria – part of the intestinal flora of warm-blooded animals. Presence in surface waters is considered an indication of pollution.

Glyphosate - white compound broad-spectrum herbicide used to kill weeds.

Kjeldahl Nitrogen – Named for the laboratory technique used for detection, Kjeldahl nitrogen includes organic nitrogen and ammonia nitrogen.

Nitrate-Nitrogen – $NO3^-$-N is an essential nutrient for many photosynthetic autotrophs.

Nitrite-Nitrogen – $NO2^-$-N is an intermediate oxidation state of nitrogen, both in the oxidation of ammonia to nitrate and in the reduction of nitrate.

Orthophosphorus – the reactive form of phosphorus, commonly used as fertilizer.

pH – the hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. The pH of "pure" water at 25°C is 7.0 (neutral). Low pH is acidic; high pH is basic or alkaline.

Total Phosphorus – In natural waters, phosphorus occurs almost solely as orthophosphates, condensed phosphates, and organically bound phosphate. Phosphorus is essential to the growth of organisms.

Turbidity – attributable to the suspended and colloidal matter in water, including clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms. The reduction of clearness in turbid waters diminishes the penetration of light and therefore can adversely affect photosynthesis.

APPENDIX A

BIG TUJUNGA WASH MITIGATION BANK
WATER QUALITY MONITORING PROGRAM

LABORATORY RESULTS
November and December 2010

MWH LABORATORIES
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Report

for

MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attention: Sarah Garber
Fax:

Date of Issue
12/20/2010
MWH LABORATORIES

ACCREDITED IN ACCORDANCE WITH nelac 01114CA

Report#: 349439
Project: BIG-TUJUNGA
Group: Water Quality Monitoring
PO#: 1009944.011601

DST: David S Tripp

Project Manager

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Hits Reports, Comments, QC Summary, QC Report and Regulatory Forms. This report shall not be reproduced except in full, without the written approval of the laboratory.

MWH LABORATORIES

Acknowledgement of Samples Received

MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attn: Sarah Garber
Phone: 626-568-6910

Customer Code: MWH-ECORP
Folder #: 349439
Project: BIG-TUJUNGA
Sample Group: Water Quality Monitoring
Project Manager: David S Tripp
Phone: (626) 386-1158
PO #: 1009944.011601

The following samples were received from you on **November 19, 2010**. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample #	Sample ID	Sample Date
201011200100	BTW111910	Nov 19, 2010 09:15

Ammonia Nitrogen	Fecal Coliform Bacteria	Glyphosate
Nitrate as Nitrogen by IC	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
Orthophosphate as P (OPO4)	Orthophosphate as PO4	Total Chlorine Residual
Total Coliform Bacteria	Total Kjeldahl Nitrogen	Total phosphorus as P
Turbidity		

Sample #	Sample ID	Sample Date
201011200101	TJP0111910	Nov 19, 2010 10:10

Ammonia Nitrogen	Fecal Coliform Bacteria	Glyphosate
Nitrate as Nitrogen by IC	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
Orthophosphate as P (OPO4)	Orthophosphate as PO4	Total Chlorine Residual
Total Coliform Bacteria	Total Kjeldahl Nitrogen	Total phosphorus as P
Turbidity		

Sample #	Sample ID	Sample Date
201011200102	TJPI111910	Nov 19, 2010 10:50

Ammonia Nitrogen	Fecal Coliform Bacteria	Glyphosate
Nitrate as Nitrogen by IC	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
Orthophosphate as P (OPO4)	Orthophosphate as PO4	Total Chlorine Residual
Total Coliform Bacteria	Total Kjeldahl Nitrogen	Total phosphorus as P
Turbidity		

Sample #	Sample ID	Sample Date
201011200103	HCC111910	Nov 19, 2010 11:40

Ammonia Nitrogen	Fecal Coliform Bacteria	Glyphosate
Nitrate as Nitrogen by IC	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
Orthophosphate as P (OPO4)	Orthophosphate as PO4	Total Chlorine Residual
Total Coliform Bacteria	Total Kjeldahl Nitrogen	Total phosphorus as P
Turbidity		

Test Description

750 Royal Oaks Dr., Ste 100, Monrovia, CA 91016 Tel (626) 386-1100 Fax (626) 386-1101 http://MWHLabs.com

349439

MWH Laboratories
A Division of MWH Americas, Inc.

CHAIN OF CUSTODY RECORD

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

MWH LABS USE ONLY:

LOGIN COMMENTS: ____

SAMPLES CHECKED AGAINST COC BY: Jr
SAMPLES LOGGED IN BY: JS
SAMPLES REC'D DAY OF COLLECTION? [X] (check for yes)

SAMPLE TEMP RECEIVED AT:
[ ] Colton / Sacramento / Scottsdale ____ °C (Compliance: 4 ± 2 °C)
[X] Monrovia 13 °C (Compliance: 4 ± 2 °C)

CONDITION OF BLUE ICE: FROZEN ✓ PARTIALLY FROZEN ___ THAWED ___ WET ICE ___

METHOD OF SHIPMENT: ~~Pick-Up~~ / Walk-In / FedEx / UPS / DHL / Area Fast / Top Line / Other: ____

TO BE COMPLETED BY SAMPLER:

COMPANY/AGENCY NAME: MWH-ECORP
PROJECT CODE: 1009944.011601

COMPLIANCE SAMPLES - Requires state forms (check for yes) [ ]
NON-COMPLIANCE SAMPLES (check for yes) [X]
REGULATION INVOLVED: ____ (eg. SDWA, Phase V, NPDES, FDA,...)
Type of samples (circle one): ROUTINE SPECIAL CONFIRMATION

MWH LABS CLIENT CODE: MWH-ECORP
COC ID:
SAMPLE GROUP:

SEE ATTACHED BOTTLE ORDER FOR ANALYSES [X] (check for yes), OR
list ANALYSES REQUIRED (enter number of bottles sent for each test for each sample)

SAMPLER PRINTED NAME AND SIGNATURE: SARAH GARBER [signature]

TAT requested: rush by adv notice only
STD___ 1 wk ___ 3 day ___ 2 day___ 1 day ___

SAMPLE DATE	SAMPLE TIME	SAMPLE ID	CLIENT LAB ID	MATRIX *	Field Data	Field Data	SAMPLER COMMENTS
11/19	0935 3/13	BTW111910	1	RSW			
11/19	1010	TJPO111910	2	RSW			BWM 11/19/10 13:13
11/19	1050	TJPi111910	3	RSW			
11/19	1140	HCC111910	4	RSW			

(2010)

* **MATRIX TYPES:** RSW = Raw Surface Water, RGW = Raw Ground Water, CFW = Chlor(am)inated Finished Water, FW = Other Finished Water, SEAW = Sea Water, WW = Waste Water, BW = Bottled Water, SW = Storm Water, SO = Soil, SL = Sludge, O = Other - Please Identify

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	[signature]	SARAH GARBER	MWH	11/19/10	
RECEIVED BY:					
RELINQUISHED BY:					
RECEIVED BY:	[signature]	Salvador Mota	MWH	11/19/10	1247

PAGE ____ OF ____

MWH Laboratories, a Division of MWH Americas, Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016 (626) 386-1100 FAX (626) 386-1124

Bottle Order for MWH Americas - Arcadia

Group#
Date Sampled
Date Received

David S Tripp **Your MWHL Project Manager**

BO #: 25998

Created By: DST

Order Date: 11/09/2010

Bottle Orders

Sampler: please return this paper with your samples

Client Code MWH-ECORP

Project Code BIG-TUJUNGA Bottle Orders

Group Name Water Quality Monitoring

PO# / Job# 1009944.011601

Ship By:
10/30/2010

Ship Sample Kits to
MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attn: Sarah Garber
Phone: 626-568-6910
Fax:

Send Report to
MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attn: Sarah Garber
Phone: 626-568-6910
Fax:

Billing Address
MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attn: Sarah Garber
Phone: 626-568-6910
Fax:

# of Samples	Tests	Qteline#	Bottles - Qty for each sample, type & preservative if any	UN DOT #
4	@8081A, @DIAZEDD Subbed		4 1L amber glass no preservative	
4	Ammonia Nitrogen, Total Kjeldahl Nitrogen, Total phosphorus as P		1 250ml poly 0.5ml H2SO4 (50%)	
4	Fecal Coliform Bacteria, Total Coliform Bacteria		1 250ml poly sterilized 0.25ml thio (8%)	
4	Glyphosate		1 125ml amber glass no preservative	
4	Nitrate as Nitrogen by IC, Nitrate as NO3 (calc), Nitrite Nitrogen by IC, Orthophosphate as P, Turbidity		1 125ml poly no preservative	
4	Orthophosphate as PO4		1 125ml poly OPO4_no preservative	
4	Total Chlorine Residual		1 125ml amber glass CHL_no preservative	

Comments

SHIPPING: Please prepare 4 separate coolers, each labeled "BIG T WASH"
Client will pickup the sample kits on Tuesday 11/9.

SAMPLER: Please place ice packs in a freezer over night and return samples on ice packs or wet ice to the lab same day collected.

Code	Status	Date Shipped	Via	Tracking #	# of Coolers	Prepared By

MWH LABORATORIES
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Laboratory Comments
Report: #349439

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Group Comments

8141, 8081 - to be recollected (see 350056) due to timing issue with the sublab - 121610dst

Flags Legend:

H1 - Sample analysis performed past holding time. Data not acceptable for regulatory compliance.

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Laboratory
Hits Report: 349439

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
11/19/2010

Analyzed		Analyte	Sample ID	Result	Federal MCL	Units	MRL
	201011200100		**BTW111910**				
11/19/2010	15:55	Fecal Coliform Bacteria		30		MPN/100 ml	2
11/19/2010	17:33	Orthophosphate as P		0.013		mg/L	0.01
11/22/2010	11:41	Orthophosphate as PO4		0.040		mg/L	0.031
11/19/2010	15:55	Total Coliform Bacteria		110		MPN/100 ml	2
11/23/2010	20:22	Total phosphorus as P		0.022		mg/L	0.02
11/19/2010	16:13	Turbidity		2.3	5	NTU	0.05
	201011200101		**TJP0111910**				
11/19/2010	15:55	Fecal Coliform Bacteria		70		MPN/100 ml	2
11/19/2010	14:54	Nitrate as Nitrogen by IC		6.4	10	mg/L	0.2
11/19/2010	14:54	Nitrate as NO3 (calc)		28	45	mg/L	0.88
11/19/2010	15:55	Total Coliform Bacteria		170		MPN/100 ml	2
11/19/2010	16:14	Turbidity		0.23	5	NTU	0.05
	201011200102		**TJPI111910**				
11/19/2010	15:55	Fecal Coliform Bacteria		23		MPN/100 ml	2
11/19/2010	15:07	Nitrate as Nitrogen by IC		9.2	10	mg/L	0.2
11/19/2010	15:07	Nitrate as NO3 (calc)		40	45	mg/L	0.88
11/19/2010	17:30	Orthophosphate as P		0.026		mg/L	0.01
11/22/2010	11:41	Orthophosphate as PO4		0.080		mg/L	0.031
11/19/2010	15:55	Total Coliform Bacteria		1600		MPN/100 ml	2
11/23/2010	20:31	Total phosphorus as P		0.033		mg/L	0.02
11/19/2010	16:15	Turbidity		0.39	5	NTU	0.05
	201011200103		**HCC111910**				
11/19/2010	15:55	Fecal Coliform Bacteria		80		MPN/100 ml	2
11/19/2010	15:20	Nitrate as Nitrogen by IC		6.0	10	mg/L	0.2
11/19/2010	15:20	Nitrate as NO3 (calc)		26	45	mg/L	0.88
11/19/2010	17:32	Orthophosphate as P		0.013		mg/L	0.01
11/22/2010	11:41	Orthophosphate as PO4		0.040		mg/L	0.031
11/19/2010	15:55	Total Coliform Bacteria		500		MPN/100 ml	2
11/19/2010	16:16	Turbidity		0.52	5	NTU	0.05

SUMMARY OF POSITIVE DATA ONLY

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Laboratory Data Report: 349439

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on: 11/19/2010

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
BTW111910 (201011200100)					**Sampled on 11/19/2010 0915**			
			EPA 351.2 - Total Kjeldahl Nitrogen					
11/24/2010	16:56	578050	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
			EPA 350.1 - Ammonia Nitrogen					
11/22/2010	17:29	577492	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
			SM 9221C - Fecal Coliform Bacteria					
11/19/2010	15:55	577627	(SM 9221C)	Fecal Coliform Bacteria	30	MPN/100 mL	2	1
			SM 9221B - Total Coliform Bacteria					
11/19/2010	15:55	577626	(SM 9221B)	Total Coliform Bacteria	110	MPN/100 mL	2	1
			SM 4500-CL G - Total Chlorine Residual					
12/08/2010	10:00	578981	(SM 4500-CL G)	Total Chlorine Residual	ND (H1)	mg/L	0.1	1
			EPA 547 - Glyphosate					
11/20/2010	0:01	577402	(EPA 547)	Glyphosate	ND	ug/L	6	1
			EPA 300.0 - Nitrate, Nitrite by EPA 300.0					
11/19/2010	15:32	577192	(EPA 300.0)	Nitrate as Nitrogen by IC	ND	mg/L	0.2	2
11/19/2010	15:32	577192	(EPA 300.0)	Nitrate as NO3 (calc)	ND	mg/L	0.88	2
11/19/2010	15:32	577192	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
			SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)					
11/23/2010	20:22	577851	(SM4500-PE/EPA 365.1)	Total phosphorus as P	0.022	mg/L	0.02	1
			4500P-E/365.1 - Orthophosphate as PO4 (CAL)					
11/22/2010	11:41		(4500P-E/365.1)	Orthophosphate as PO4	0.040	mg/L	0.031	1
			EPA 180.1 - Turbidity					
11/19/2010	16:13	577558	(EPA 180.1)	Turbidity	2.3	NTU	0.05	1
			4500P-E/365.1 - Orthophosphate as P (OPO4)					
11/19/2010	17:33	577414	(4500P-E/365.1)	Orthophosphate as P	0.013	mg/L	0.01	1
TJP0111910 (201011200101)					**Sampled on 11/19/2010 1010**			
			EPA 351.2 - Total Kjeldahl Nitrogen					
11/24/2010	16:57	578050	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
			EPA 350.1 - Ammonia Nitrogen					
11/22/2010	17:30	577492	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
			SM 9221C - Fecal Coliform Bacteria					
11/19/2010	15:55	577627	(SM 9221C)	Fecal Coliform Bacteria	70	MPN/100 mL	2	1
			SM 9221B - Total Coliform Bacteria					

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory Data
Report: 349439

MWH Americas - Arcadia
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Arcadia, CA 91007

Samples Received on:
11/19/2010

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
	11/19/2010	15:55	577626	(SM 9221B)	Total Coliform Bacteria	170	MPN/100 mL	2	1
		SM 4500-CL G - Total Chlorine Residual							
	12/08/2010	10:00	578981	(SM 4500-CL G)	Total Chlorine Residual	ND (H1)	mg/L	0.1	1
		EPA 547 - Glyphosate							
	11/19/2010	23:50	577402	(EPA 547)	Glyphosate	ND	ug/L	6	1
		EPA 300.0 - Nitrate, Nitrite by EPA 300.0							
	11/19/2010	14:54	577192	(EPA 300.0)	Nitrate as Nitrogen by IC	6.4	mg/L	0.2	2
	11/19/2010	14:54	577192	(EPA 300.0)	Nitrate as NO3 (calc)	28	mg/L	0.88	2
	11/19/2010	14:54	577192	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
		SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)							
	11/23/2010	20:28	577851	(SM4500-PE/EPA 365.1)	Total phosphorus as P	ND	mg/L	0.02	1
		4500P-E/365.1 - Orthophosphate as PO4 (CAL)							
	11/22/2010	11:41		(4500P-E/365.1)	Orthophosphate as PO4	ND	mg/L	0.031	1
		EPA 180.1 - Turbidity							
	11/19/2010	16:14	577558	(EPA 180.1)	Turbidity	0.23	NTU	0.05	1
		4500P-E/365.1 - Orthophosphate as P (OPO4)							
	11/19/2010	17:31	577414	(4500P-E/365.1)	Orthophosphate as P	ND	mg/L	0.01	1

TJPI111910 (201011200102) — **Sampled on 11/19/2010 1050**

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
		EPA 351.2 - Total Kjeldahl Nitrogen							
	11/24/2010	16:59	578050	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
		EPA 350.1 - Ammonia Nitrogen							
	11/22/2010	17:32	577492	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
		SM 9221C - Fecal Coliform Bacteria							
	11/19/2010	15:55	577627	(SM 9221C)	Fecal Coliform Bacteria	23	MPN/100 mL	2	1
		SM 9221B - Total Coliform Bacteria							
	11/19/2010	15:55	577626	(SM 9221B)	Total Coliform Bacteria	1600	MPN/100 mL	2	1
		SM 4500-CL G - Total Chlorine Residual							
	12/08/2010	10:00	578981	(SM 4500-CL G)	Total Chlorine Residual	ND (H1)	mg/L	0.1	1
		EPA 547 - Glyphosate							
	11/20/2010	0:12	577402	(EPA 547)	Glyphosate	ND	ug/L	6	1
		EPA 300.0 - Nitrate, Nitrite by EPA 300.0							
	11/19/2010	15:07	577192	(EPA 300.0)	Nitrate as Nitrogen by IC	9.2	mg/L	0.2	2
	11/19/2010	15:07	577192	(EPA 300.0)	Nitrate as NO3 (calc)	40	mg/L	0.88	2
	11/19/2010	15:07	577192	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory Data Report: 349439

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
11/19/2010

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
			SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)					
11/23/2010	20:31	577851	(SM4500-PE/EPA 365.1)	Total phosphorus as P	0.033	mg/L	0.02	1
			4500P-E/365.1 - Orthophosphate as PO4 (CAL)					
11/22/2010	11:41		(4500P-E/365.1)	Orthophosphate as PO4	0.080	mg/L	0.031	1
			EPA 180.1 - Turbidity					
11/19/2010	16:15	577558	(EPA 180.1)	Turbidity	0.39	NTU	0.05	1
			4500P-E/365.1 - Orthophosphate as P (OPO4)					
11/19/2010	17:30	577414	(4500P-E/365.1)	Orthophosphate as P	0.026	mg/L	0.01	1
HCC111910 (201011200103)						**Sampled on 11/19/2010 1140**		
			EPA 351.2 - Total Kjeldahl Nitrogen					
11/24/2010	17:00	578050	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
			EPA 350.1 - Ammonia Nitrogen					
11/22/2010	17:33	577492	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
			SM 9221C - Fecal Coliform Bacteria					
11/19/2010	15:55	577627	(SM 9221C)	Fecal Coliform Bacteria	80	MPN/100 mL	2	1
			SM 9221B - Total Coliform Bacteria					
11/19/2010	15:55	577626	(SM 9221B)	Total Coliform Bacteria	500	MPN/100 mL	2	1
			SM 4500-CL G - Total Chlorine Residual					
12/08/2010	10:00	578981	(SM 4500-CL G)	Total Chlorine Residual	ND (H1)	mg/L	0.1	1
			EPA 547 - Glyphosate					
11/20/2010	0:23	577402	(EPA 547)	Glyphosate	ND	ug/L	6	1
			EPA 300.0 - Nitrate, Nitrite by EPA 300.0					
11/19/2010	15:20	577192	(EPA 300.0)	Nitrate as Nitrogen by IC	6.0	mg/L	0.2	2
11/19/2010	15:20	577192	(EPA 300.0)	Nitrate as NO3 (calc)	26	mg/L	0.88	2
11/19/2010	15:20	577192	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
			SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)					
11/23/2010	20:32	577851	(SM4500-PE/EPA 365.1)	Total phosphorus as P	ND	mg/L	0.02	1
			4500P-E/365.1 - Orthophosphate as PO4 (CAL)					
11/22/2010	11:41		(4500P-E/365.1)	Orthophosphate as PO4	0.040	mg/L	0.031	1
			EPA 180.1 - Turbidity					
11/19/2010	16:16	577558	(EPA 180.1)	Turbidity	0.52	NTU	0.05	1
			4500P-E/365.1 - Orthophosphate as P (OPO4)					
11/19/2010	17:32	577414	(4500P-E/365.1)	Orthophosphate as P	0.013	mg/L	0.01	1

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory
QC Summary: 349439

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QC Ref # 577192 - Nitrate, Nitrite by EPA 300.0 — **Analysis Date: 11/19/2010**

201011200100	BTW111910	Analyzed by: SXK
201011200101	TJP0111910	Analyzed by: SXK
201011200102	TJPI111910	Analyzed by: SXK
201011200103	HCC111910	Analyzed by: SXK

QC Ref # 577402 - Glyphosate — **Analysis Date: 11/20/2010**

201011200100	BTW111910	Analyzed by: SZZ
201011200101	TJP0111910	Analyzed by: SZZ
201011200102	TJPI111910	Analyzed by: SZZ
201011200103	HCC111910	Analyzed by: SZZ

QC Ref # 577414 - Orthophosphate as P (OPO4) — **Analysis Date: 11/19/2010**

201011200100	BTW111910	Analyzed by: CYP
201011200101	TJP0111910	Analyzed by: CYP
201011200102	TJPI111910	Analyzed by: CYP
201011200103	HCC111910	Analyzed by: CYP

QC Ref # 577492 - Ammonia Nitrogen — **Analysis Date: 11/22/2010**

201011200100	BTW111910	Analyzed by: NJR
201011200101	TJP0111910	Analyzed by: NJR
201011200102	TJPI111910	Analyzed by: NJR
201011200103	HCC111910	Analyzed by: NJR

QC Ref # 577558 - Turbidity — **Analysis Date: 11/19/2010**

201011200100	BTW111910	Analyzed by: NEM
201011200101	TJP0111910	Analyzed by: NEM
201011200102	TJPI111910	Analyzed by: NEM
201011200103	HCC111910	Analyzed by: NEM

QC Ref # 577626 - Total Coliform Bacteria — **Analysis Date: 11/19/2010**

201011200100	BTW111910	Analyzed by: TXM
201011200101	TJP0111910	Analyzed by: TXM
201011200102	TJPI111910	Analyzed by: TXM
201011200103	HCC111910	Analyzed by: TXM

QC Ref # 577627 - Fecal Coliform Bacteria — **Analysis Date: 11/19/2010**

201011200100	BTW111910	Analyzed by: TXM
201011200101	TJP0111910	Analyzed by: TXM
201011200102	TJPI111910	Analyzed by: TXM
201011200103	HCC111910	Analyzed by: TXM

QC Ref # 577851 - Total phosphorus as P (T-P) — **Analysis Date: 11/23/2010**

201011200100	BTW111910	Analyzed by: NJR
201011200101	TJP0111910	Analyzed by: NJR
201011200102	TJPI111910	Analyzed by: NJR
201011200103	HCC111910	Analyzed by: NJR

QC Ref # 578050 - Total Kjeldahl Nitrogen — **Analysis Date: 11/24/2010**

201011200100	BTW111910	Analyzed by: NJR

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(continued)

201011200101	TJP0111910	Analyzed by: NJR
201011200102	TJPI111910	Analyzed by: NJR
201011200103	HCC111910	Analyzed by: NJR

QC Ref # 578981 - Total Chlorine Residual **Analysis Date: 12/08/2010**

201011200100	BTW111910	Analyzed by: MCP
201011200101	TJP0111910	Analyzed by: MCP
201011200102	TJPI111910	Analyzed by: MCP
201011200103	HCC111910	Analyzed by: MCP

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Laboratory
QC Report: 349439

MWH Americas - Arcadia

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
QC Ref# 577192 - Nitrate, Nitrite by EPA 300.0 by EPA 300.0						**Analysis Date: 11/19/2010**			
LCS1	Nitrate as Nitrogen by IC		2.5	2.6	mg/L	104	(90-110)		
LCS2	Nitrate as Nitrogen by IC		2.5	2.56	mg/L	103	(90-110)	20	1.6
MBLK	Nitrate as Nitrogen by IC			<0.10	mg/L				
MRL_CHK	Nitrate as Nitrogen by IC		0.05	0.0574	mg/L	115	(50-150)		
MS_201011200083	Nitrate as Nitrogen by IC	5.6	1.3	12.5	mg/L	111	(80-120)		
MS_201011200100	Nitrate as Nitrogen by IC	ND	1.3	2.79	mg/L	111	(80-120)		
MSD_201011200083	Nitrate as Nitrogen by IC	5.6	1.3	12.6	mg/L	111	(80-120)	20	0.0
MSD_201011200100	Nitrate as Nitrogen by IC	ND	1.3	2.78	mg/L	111	(80-120)	20	0.0
LCS1	Nitrite Nitrogen by IC		1.0	0.986	mg/L	99	(90-110)		
LCS2	Nitrite Nitrogen by IC		1.0	0.973	mg/L	97	(90-110)	20	1.3
MBLK	Nitrite Nitrogen by IC			<0.10	mg/L				
MRL_CHK	Nitrite Nitrogen by IC		0.05	0.0528	mg/L	106	(50-150)		
MS_201011200083	Nitrite Nitrogen by IC	ND	0.5	2.48	mg/L	99	(80-120)		
MS_201011200100	Nitrite Nitrogen by IC	ND	0.5	1.04	mg/L	104	(80-120)		
MSD_201011200083	Nitrite Nitrogen by IC	ND	0.5	2.49	mg/L	99	(80-120)	20	0.20
MSD_201011200100	Nitrite Nitrogen by IC	ND	0.5	1.02	mg/L	102	(80-120)	20	1.9
QC Ref# 577402 - Glyphosate by EPA 547						**Analysis Date: 11/19/2010**			
CCCH	Glyphosate		25	22.7	ug/L	91	(80-120)		
CCCM	Glyphosate		10	10.6	ug/L	106	(80-120)		
LCS1	Glyphosate		10	9.04	ug/L	90	(80-120)		
MBLK	Glyphosate			<6	ug/L				
MRL_CHK	Glyphosate		6.0	6.47	ug/L	108	(50-150)		
MS_201011180044	Glyphosate	ND	10	13.9	ug/L	**139**	(83-119)		
MS2_201011180045	Glyphosate	ND	10	20.9	ug/L	**209**	(83-119)		
MSD_201011180044	Glyphosate	ND	10	13.9	ug/L	**139**	(83-119)	20	0.0
QC Ref# 577414 - Orthophosphate as P (OPO4) by 4500P-E/365.1						**Analysis Date: 11/19/2010**			
LCS1	Orthophosphate as P		0.25	0.246	mg/L	98	(90-110)		
LCS2	Orthophosphate as P		0.25	0.246	mg/L	98	(90-110)	20	0.0
MBLK	Orthophosphate as P			<0.01	mg/L				
MRL_CHK	Orthophosphate as P		0.01	0.00800	mg/L	80	(50-150)		
MS_201011190333	Orthophosphate as P	0.11	0.5	0.633	mg/L	105	(90-110)		
MSD_201011190333	Orthophosphate as P	0.11	0.5	0.651	mg/L	108	(90-110)	20	2.8
QC Ref# 577492 - Ammonia Nitrogen by EPA 350.1						**Analysis Date: 11/22/2010**			
LCS1	Ammonia Nitrogen		1.0	1.07	mg/L	107	(90-110)		
LCS2	Ammonia Nitrogen		1.0	1.08	mg/L	108	(90-110)	20	0.93

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
(S) Indicates surrogate compound.
(I) Indicates internal standard compound.
RPD not calculated for LCS2 when different a concentration than LCS1 is used
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level)

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Laboratory
QC Report: 349439

MWH Americas - Arcadia
(continued)

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
MBLK	Ammonia Nitrogen			<0.05	mg/L				
MRL_CHK	Ammonia Nitrogen		0.05	0.0450	mg/L	90	(50-150)		
MS_201011160378	Ammonia Nitrogen	1.7	1.0	3.7	mg/L	102	(90-110)		
MS2_201011160373	Ammonia Nitrogen	1.2	1.0	6.6	mg/L	109	(90-110)		
MSD_201011160378	Ammonia Nitrogen	1.7	1.0	3.76	mg/L	105	(90-110)	20	2.9
QC Ref# 577558 - Turbidity by EPA 180.1						**Analysis Date: 11/19/2010**			
DUP_201011200103	Turbidity	0.52		0.525	NTU		(0-10)	10	0.38
LCS1	Turbidity		20	20.0	NTU	100	(90-110)		
LCS2	Turbidity		20	20.0	NTU	100	(90-110)	20	0.0
MBLK	Turbidity			<0.05	NTU				
MRL_CHK	Turbidity		0.05	0.0500	NTU	100	(50-150)		
QC Ref# 577851 - Total phosphorus as P (T-P) by SM4500-PE/EPA 365.1						**Analysis Date: 11/23/2010**			
LCS1	Total phosphorus as P		0.4	0.381	mg/L	95	(90-110)		
LCS2	Total phosphorus as P		0.4	0.374	mg/L	94	(90-110)	20	1.9
MBLK	Total phosphorus as P			<0.02	mg/L				
MRL_CHK	Total phosphorus as P		0.02	0.0212	mg/L	106	(50-150)		
MS_201011180258	Total phosphorus as P	ND	0.4	0.358	mg/L	**87**	(90-110)		
MS2_201011200101	Total phosphorus as P	ND	0.4	0.382	mg/L	92	(90-110)		
MSD_201011180258	Total phosphorus as P	ND	0.4	0.364	mg/L	**89**	(90-110)	20	1.7
QC Ref# 578050 - Total Kjeldahl Nitrogen by EPA 351.2						**Analysis Date: 11/24/2010**			
LCS1	Kjeldahl Nitrogen		4.0	4.27	mg/L	107	(90-110)		
LCS2	Kjeldahl Nitrogen		4.0	4.19	mg/L	105	(90-110)	20	1.9
MBLK	Kjeldahl Nitrogen			<0.1	mg/L				
MRL_CHK	Kjeldahl Nitrogen		0.2	0.231	mg/L	116	(50-150)		
MS_201011200052	Kjeldahl Nitrogen	ND	4.0	3.96	mg/L	95	(90-110)		
MS2_201011200053	Kjeldahl Nitrogen	0.86	4.0	5.1	mg/L	106	(90-110)		
MSD_201011200052	Kjeldahl Nitrogen	ND	4.0	4.23	mg/L	101	(90-110)	20	6.5

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
(S) Indicates surrogate compound.
(I) Indicates internal standard compound.
RPD not calculated for LCS2 when different a concentration than LCS1 is used
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level)

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Laboratory Report

for

MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attention: Sarah Garber
Fax:

Date of Issue
12/27/2010
MWH LABORATORIES

ACCREDITED IN ACCORDANCE WITH nelac 01114CA

Report#: 350056
Project: BIG-TUJUNGA
Group: Water Quality Monitoring
PO#: 1009944.011601

DST: David S Tripp

Project Manager

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Hits Reports, Comments, QC Summary, QC Report and Regulatory Forms. This report shall not be reproduced except in full, without the written approval of the laboratory.

MWH LABORATORIES

Acknowledgement of Samples Received

MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attn: Sarah Garber
Phone: 626-568-6910

Customer Code: MWH-ECORP
Folder #: 350056
Project: BIG-TUJUNGA
Sample Group: Water Quality Monitoring
Project Manager: David S Tripp
Phone: (626) 386-1158
PO #: 1009944.011601

The following samples were received from you on **December 01, 2010**. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample #	Sample ID	Sample Date
201012010376	BTW120110	Dec 01, 2010 10:50
	@8081A @8141EDD	
201012010377	TJPIN120110	Dec 01, 2010 11:10
	@8081A @8141EDD	
201012010378	TJPOUT120110	Dec 01, 2010 11:25
	@8081A @8141EDD	
201012010379	HCC120110	Dec 01, 2010 11:50
	@8081A @8141EDD	

Test Description

@8081A -- Organochlorine Pesticides

@8141EDD -- Organophosphorous Pesticides (Sub)

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CHAIN OF CUSTODY RECORD

350056

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
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MWH LABS USE ONLY:

LOGIN COMMENTS: ______

SAMPLES CHECKED AGAINST COC BY: JS
SAMPLES LOGGED IN BY: SM
SAMPLES REC'D DAY OF COLLECTION? ✓ (check for yes)

SAMPLE TEMP RECEIVED AT:
☐ Colton / Sacramento / Scottsdale ______ °C (Compliance: 4 ± 2 °C)
☑ Monrovia 14 °C (Compliance: 4 ± 2 °C)

CONDITION OF BLUE ICE: FROZEN ✓ PARTIALLY FROZEN ___ THAWED ___ WET ICE ______

METHOD OF SHIPMENT: Pick-Up / Walk-In / FedEx / UPS / DHL / Area Fast / Top Line / Other: ______

TO BE COMPLETED BY SAMPLER:

COMPANY/AGENCY NAME: MWH-ECORP
PROJECT CODE: 1009944.011601
MWH LABS CLIENT CODE: MWH-ECORP
COC ID:
SAMPLE GROUP:
SAMPLER PRINTED NAME AND SIGNATURE: SARAH GARBER [signature]
TAT requested: rush by adv notice only
STD___ 1 wk ___ 3 day __ 2 day___ 1 day __

COMPLIANCE SAMPLES (check for yes) ☐
- Requires state forms ☐

NON-COMPLIANCE SAMPLES (check for yes) ✓
REGULATION INVOLVED: ______ (eg. SDWA, Phase V, NPDES, FDA,...)

Type of samples (circle one): ROUTINE SPECIAL CONFIRMATION

SEE ATTACHED BOTTLE ORDER FOR ANALYSES ✓ (check for yes), OR
list ANALYSES REQUIRED (enter number of bottles sent for each test for each sample)

SAMPLE DATE	SAMPLE TIME	SAMPLE ID	CLIENT LAB ID	MATRIX *	Field Data	Field Data	SAMPLER COMMENTS
12/1	1030	BTW120110		RSW			
12/1	1110	TJPIN120110		RSW			
12/1	1125	TJPOUT120110		RSW			
12/1	1150	HCC120110		RSW			

3/41

1-2010-1

* MATRIX TYPES: RSW = Raw Surface Water, RGW = Raw Ground Water, CFW = Chlor(am)inated Finished Water, FW = Other Finished Water, SEAW = Sea Water, WW = Waste Water, BW = Bottled Water, SW = Storm Water, SO = Soil, SL = Sludge, O = Other - Please Identify

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	[signature]	SARAH GARBER	MWH	12/1/10	12:50
RECEIVED BY:	Joe Sanchez	Joe Sanchez	MWH	12/1/10	1254
RELINQUISHED BY:					
RECEIVED BY:					

MWH Laboratories, a Division of MWH Americas, Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016 (626) 386-1100 FAX (626) 386-1124

Bottle Order for MWH Americas - Arcadia

Group#	
Date Sampled	
Date Received	

David S Tripp Your MWHL Project Manager

BO #: 26476

Created By: DST

Order Date: 11/29/2010

Bottle Orders

Sampler: please return this paper with your samples

Client Code: MWH-ECORP

Project Code: BIG-TUJUNGA Bottle Orders

Group Name: Water Quality Monitoring

PO# / Job#: 1009944.011601

Ship By:
11/19/2010

Ship Sample Kits to	Send Report to	Billing Address
MWH Americas - Arcadia	MWH Americas - Arcadia	MWH Americas - Arcadia
618 Michillinda Ave.	618 Michillinda Ave.	618 Michillinda Ave.
Suite 200	Suite 200	Suite 200
Arcadia, CA 91007	Arcadia, CA 91007	Arcadia, CA 91007
Attn: Sarah Garber	Attn: Sarah Garber	Attn: Sarah Garber
Phone: 626-568-6910	Phone: 626-568-6910	Phone: 626-568-6910
Fax:	Fax:	Fax:

# of Samples	Tests	Qteline#	Bottles - Qty for each sample, type & preservative if any	UN DOT #
4	@8081A, @DIAZEDD Subbed 4/4/11		4 1L amber glass no preservative	

Comments

SHIPPING: Please label "BIG T WASH"
Client will pickup the sample kits as early as Monday 11/29 in the AM.

SAMPLER: Please place ice packs in a freezer over night and return samples on ice packs or wet ice to the lab same day collected.

Code	Status	Date Shipped	Via	Tracking #	# of Coolers	Prepared By

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Laboratory Comments
Report: #350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Group Comments

Analytical results for 8081, and 8141 are submitted by Emax Laboratories, Inc. Torrance, CA

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Laboratory
Hits Report: 350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/01/2010

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL

SUMMARY OF POSITIVE DATA ONLY

MWH LABORATORIES
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Laboratory Data
Report: 350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/01/2010

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
BTW120110 (201012010376)					**Sampled on**	**12/01/2010 1050**		
		EPA 8141A - Organophosphorous Pesticides (Sub)						
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Azinphos methyl	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Bolstar	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Chlorpyrifos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Coumaphos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Demeton	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Diazinon	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Dichlorvos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Disulfoton	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Ethoprop	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Fensulfothion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Fenthion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Methyl Parathion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Mevinphos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Naled	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Phorate	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Ronnel	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Stirophos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Tokuthion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Trichloronate	ND	ug/L	1	1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Tributylphosphate	95	%		1
12/6/2010	12/07/2010	15:31	(EPA 8141A)	Triphenyl Phosphate	107	%		1
		EPA 8081A - Organochlorine Pesticides						
12/6/2010	12/08/2010	18:16	(EPA 8081A)	4,4-DDD	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	4,4-DDE	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	4,4-DDT	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	Aldrin	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	alpha-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	beta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	delta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	Dieldrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16	(EPA 8081A)	Endosulfan I	ND	ug/L	0.1	1

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory Data Report: 350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/01/2010

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Endosulfan II	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Endrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Endrin Ketone	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Heptachlor	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Methoxychlor	ND	ug/L	1	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Toxaphene	ND	ug/L	2	1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Decachlorobiphenyl	85	%		1
12/6/2010	12/08/2010	18:16		(EPA 8081A)	Tetrachloro-m-xylene	81	%		1

TJPIN120110 (201012010377) **Sampled on 12/01/2010 1110**

EPA 8141A - Organophosphorous Pesticides (Sub)

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Azinphos methyl	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Bolstar	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Chlorpyrifos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Coumaphos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Demeton	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Diazinon	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Dichlorvos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Disulfoton	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Ethoprop	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Fensulfothion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Fenthion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Methyl Parathion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Mevinphos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Naled	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Phorate	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Ronnel	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Stirophos	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Tokuthion	ND	ug/L	1	1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Trichloronate	ND	ug/L	1	1

Rounding on totals after summation.
(c) - indicates calculated results

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1 800 566 LABS (1 800 566 5227)

Laboratory Data
Report: 350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/01/2010

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Tributylphosphate	90	%		1
12/6/2010	12/07/2010	15:55		(EPA 8141A)	Triphenyl Phosphate	99	%		1
		EPA 8081A - Organochlorine Pesticides							
12/6/2010	12/08/2010	18:41		(EPA 8081A)	4,4-DDD	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	4,4-DDE	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	4,4-DDT	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Aldrin	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	alpha-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	beta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	delta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Dieldrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Endosulfan I	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Endosulfan II	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Endrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Endrin Ketone	ND	ug/L	0.2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Heptachlor	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Methoxychlor	ND	ug/L	1	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Toxaphene	ND	ug/L	2	1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Decachlorobiphenyl	86	%		1
12/6/2010	12/08/2010	18:41		(EPA 8081A)	Tetrachloro-m-xylene	85	%		1

TJPOUT120110 (201012010378) **Sampled on 12/01/2010 1125**

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
		EPA 8141A - Organophosphorous Pesticides (Sub)							
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Azinphos methyl	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Bolstar	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Chlorpyrifos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Coumaphos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Demeton	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Diazinon	ND	ug/L	1	1

Rounding on totals after summation.
(c) - indicates calculated results

MWH LABORATORIES
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Data
Report: 350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/01/2010

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Dichlorvos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Disulfoton	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Ethoprop	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Fensulfothion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Fenthion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Methyl Parathion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Mevinphos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Naled	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Phorate	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Ronnel	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Stirophos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Tokuthion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Trichloronate	ND	ug/L	1	1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Tributylphosphate	75	%		1
12/6/2010	12/07/2010	16:18		(EPA 8141A)	Triphenyl Phosphate	88	%		1
		EPA 8081A - Organochlorine Pesticides							
12/6/2010	12/08/2010	19:06		(EPA 8081A)	4,4-DDD	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	4,4-DDE	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	4,4-DDT	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Aldrin	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	alpha-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	beta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	delta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Dieldrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Endosulfan I	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Endosulfan II	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Endrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Endrin Ketone	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Heptachlor	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.1	1

Rounding on totals after summation.
(c) - indicates calculated results

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1 800 566 LABS (1 800 566 5227)

Laboratory Data
Report: 350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/01/2010

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Methoxychlor	ND	ug/L	1	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Toxaphene	ND	ug/L	1.9	1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Decachlorobiphenyl	87	%		1
12/6/2010	12/08/2010	19:06		(EPA 8081A)	Tetrachloro-m-xylene	83	%		1

HCC120110 (201012010379) **Sampled on 12/01/2010 1150**

EPA 8141A - Organophosphorous Pesticides (Sub)

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Azinphos methyl	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Bolstar	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Chlorpyrifos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Coumaphos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Demeton	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Diazinon	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Dichlorvos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Disulfoton	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Ethoprop	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Fensulfothion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Fenthion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Methyl Parathion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Mevinphos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Naled	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Phorate	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Ronnel	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Stirophos	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Tokuthion	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Trichloronate	ND	ug/L	1	1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Tributylphosphate	81	%		1
12/6/2010	12/07/2010	16:41		(EPA 8141A)	Triphenyl Phosphate	93	%		1

EPA 8081A - Organochlorine Pesticides

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/08/2010	19:30		(EPA 8081A)	4,4-DDD	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	4,4-DDE	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	4,4-DDT	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Aldrin	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	alpha-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.1	1

Rounding on totals after summation.
(c) - indicates calculated results

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1 800 566 LABS (1 800 566 5227)

Laboratory Data
Report: 350056

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/01/2010

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
12/6/2010	12/08/2010	19:30		(EPA 8081A)	beta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	delta-BHC	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Dieldrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Endosulfan I	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Endosulfan II	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Endrin	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Endrin Ketone	ND	ug/L	0.2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Heptachlor	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Methoxychlor	ND	ug/L	1	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Toxaphene	ND	ug/L	2	1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Decachlorobiphenyl	86	%		1
12/6/2010	12/08/2010	19:30		(EPA 8081A)	Tetrachloro-m-xylene	84	%		1

Rounding on totals after summation.
(c) - indicates calculated results

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1 800 566 LABS (1 800 566 5227)

Laboratory
QC Summary:

QC Ref # -

Analysis Date:

Analyzed by:

MWH LABORATORIES
A Division of MWH Americas, Inc.

750 Royal Oak Dr., Suite 100
Monrovia, California, 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
QC Report: 350056

MWH Americas - Arcadia

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%

QC Ref# - by **Analysis Date:**

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
(S) Indicates surrogate compound.
(I) Indicates internal standard compound.
RPD not calculated for LCS2 when different a concentration than LCS1 is used
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level)

TABLE OF CONTENTS

CLIENT: **MWH LABORATORIES**

PROJECT: **350056**

SDG: **10L041**

** - Not Requested

EMAX LABORATORIES, INC. 1835 W. 205th Street,Torrance, CA 90501 Tel: (310) 618-8889 Fax: (310) 618-0818

EMAX

LABORATORIES, INC.
1835 W. 205th Street
Torrance, CA 90501
Tel: (310) 618-8889
Fax: (310) 618-0818

Date: 12-16-2010
EMAX Batch No.: 10L041

Attn: Jackie Contreras

MWH Laboratories
750 Royal Oaks Dr., Suite 100
Monrovia CA 91016-3629

Subject: Laboratory Report
Project: 350056

Enclosed is the Laboratory report for samples received on 12/02/10.
The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
201012010376	L041-01	12/01/10	WATER	PESTICIDES ORGANOCHLORINE PESTICIDES ORGANOPHOSPHORUS
201012010377	L041-02	12/01/10	WATER	PESTICIDES ORGANOCHLORINE PESTICIDES ORGANOPHOSPHORUS
201012010378	L041-03	12/01/10	WATER	PESTICIDES ORGANOCHLORINE PESTICIDES ORGANOPHOSPHORUS
201012010379	L041-04	12/01/10	WATER	PESTICIDES ORGANOCHLORINE PESTICIDES ORGANOPHOSPHORUS

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning these results.

Sincerely yours,

Caspar J. Pang
Laboratory Director

EMAX certifies that the results included in this report meet all NELAC requirements unless noted in the Case Narrative.

MWH Laboratories
A Division of MWH Americas, Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

Date 12/2/2010

Submittal Form & Purchase Order 99-07397

REPORTING REQUIRMENTS:** ***Do Not Combine Report with any other samples submitted under different MWH project numbers!
Report & Invoice must have the MWH Project Number **350056** Sub PO# **99-07397** and Job # **1000014**

Report all quality control data according to Method. Include dates analyzed. date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Reports: Jackie Contreras Sub-Contracting Administrator
EMAIL TO: mwhlabs-subcontractreports@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
Phone (626) 386-1165 Fax (626) 386-1122
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide In each Report the Specified State Certification # & Exp Date for requested tests + matrix.
Samples from the State of **CALIFORNIA**

10L041

Ship To
1835 W. 205th St.
EMAX Laboratories, Inc.

Torrance, CA 90501

310-618-8889 Fax 310-618-0818

MWH Project #	**Report Due:**	**Sub PO#**
350056	**12/16/2010**	**99-07397**

JLS 17001

		Use MWH Lab Sample # for ID	*Client Sample ID for reference only*	Analysis Requested	Sample Date & Time	Matrix	PWS Systemcode	PWSID
EPA 8081A	@8081A	201012010376	BTW120110	Organochlorine Pesticides	12/01/10 1050	Water	1	
EPA 8141A	@8141EDD	201012010376	BTW120110	Organophosphorous Pesticides (Sub)	12/01/10 1050	Water		
EPA 8081A	@8081A	201012010377	TJPIN120110	Organochlorine Pesticides	12/01/10 1110	Water	2	
EPA 8141A	@8141EDD	201012010377	TJPIN120110	Organophosphorous Pesticides (Sub)	12/01/10 1110	Water		
EPA 8081A	@8081A	201012010378	TJPOUT120110	Organochlorine Pesticides	12/01/10 1125	Water	3	
EPA 8141A	@8141EDD	201012010378	TJPOUT120110	Organophosphorous Pesticides (Sub)	12/01/10 1125	Water		
EPA 8081A	@8081A	201012010379	HCC120110	Organochlorine Pesticides	12/01/10 1150	Water	4	
EPA 8141A	@8141EDD	201012010379	HCC120110	Organophosphorous Pesticides (Sub)	12/01/10 1150	Water		

2) 3.0°C
3) 4.0°C

1001

Relinquished by: Sample Control Date 1241 Time 12/2/10 MUST HAVE NOTIFICATION IF TEMP IS GREATER THAN 6 OR LESS THAN CELSIUS

Received by: Date 1241 Time 12/2/10 An Acknowledgement of Receipt Is requested to attn: **Christine Lewis**

EMAX LABORATORIES, INC.

SAMPLE RECEIPT FORM 1

Type of Delivery	Delivered By/Airbill	ECN 10L041
☐ EMAX Courier		Recepient J-LUNA
☑ Client Delivery	See COC	Date 12-2-10
☐ Third Party		Time 1241

COC Inspection

☑ Client Name ☑ Client PM/FC ☐ Sampler Name NA ☑ Sampling Date/Time/Location ☑ Sample ID ☑ Matrix

☑ Address ☑ Tel # / Fax # ☑ Courier Signature ☑ Analysis Required ☐ Preservative (if any) ☑ TAT

Safety Issues ☑ None ☐ High concentrations expected ☐ Superfund Site samples ☐ Rad screening required

Comments:

Packaging Inspection

Container ☑ Cooler ☐ Box ☐ Other

Condition ☐ Custody Seal ☐ Intact ☐ Damaged

Packaging ☑ Bubble Pack ☐ Styrofoam ☐ Popcorn ☐ Sufficient ☐ ______

Temperatures (Cool, ≤6 °C but not frozen) A ☑ Cooler 1 3.6 °C A ☑ Cooler 2 3.0 °C ☐ Cooler 3 ____ °C ☐ Cooler 4 ____ °C ☐ Cooler 5 ____ °C

☐ Cooler 6 ____ °C ☐ Cooler 7 ____ °C ☐ Cooler 8 ____ °C ☐ Cooler 9 ____ °C ☐ Cooler 10 ____ °C

Thermometer: *A - S/N 101541371* *B - S/N 101541382*

Comments: ☐ **PM was informed on non-compliant coolers immediately.**

DISCREPANCIES

LSID	LSCID	Sample Label ID/COC ID	Discrepancy Code	Corrective Action Code

REVIEWS

Sample Labeling [signature] Date 12/2/10 CX

SRF [signature] Date 12/2/10

PM RB Date 12/3/10

LEGEND:

Code	Description- Sample Management	Code	Description-Sample Management	Code	Description-Project Management
A1	Analysis is not indicated in COC	D1	Date and/or time is not indicated in COC	R1	Hold sample(s); wait for further instructions
A2	Analysis is not indicated in label	D2	Date and/or time is not indicated in label	R2	Proceed as indicated in COC
A3	Analysis is inconsistent in COC vis-à-vis label	D3	Date and/or time is inconsistent in COC vis-à-vis label	R3	Refer to attached instruction
A4	______	E1	Insuficient preservative	R4	Cancel the analysis
B1	Sample ID is not indicated in COC	E2	Improper preservation	R5	______
B2	Sample ID is not indicated in label	F1	Insufficient Sample	R6	______
B3	Sample ID is inconsistent in COC vis-à-vis label	F2	Bubble is> 6mm		______
B4	______	G1	Temperature is out of range		______
C1	Wrong container	G2	Out of Holding Time		______
C2	Broken container	G3	>20 % solid particle		______
C3	Leaking container	H1	______		______
C	______	H2	______		______

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than RL but greater than MDL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LABORATORY REPORT FOR

MWH LABORATORIES

350056

METHOD 3520C/8081A
PESTICIDES

SDG#: 10L041

CASE NARRATIVE

Client : MWH LABORATORIES

Project : 350056

SDG : 10L041

METHOD 3520C/8081A
PESTICIDES

A total of four (4) water samples were received on 12/02/10 for Pesticides Organochlorine analysis, Method 3520C/8081A in accordance with USEPA Wastewater Test Methods at 40 CFR Part 136.

Holding Time
Samples were analyzed within the prescribed holding time.

Instrument Performance and Calibration
Instrument performance was checked prior to calibration. DDT and Endrin breakdown were within specification. Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using secondary source (ICV). Continuing calibration (CCV) was carried on at a frequency required by the project. All project calibration requirements were satisfied. Refer to calibration summary forms for ICAL, ICV and CCV for details.

Method Blank
Method blank was analyzed at the frequency required by the project. For this SDG, one method blank was analyzed with the samples. Result was compliant to project requirement.

Lab Control Sample
A set of LCS/LCD was analyzed with the samples in this SDG.
Percent recoveries for CPL006WL/C were all within QC limits.

Matrix QC Sample
No matrix QC sample was designated in this SDG.

Surrogate
Surrogates were added on QC and field samples. Surrogate recoveries were within project QC limits.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. All project requirements were met otherwise anomalies were discussed within the associated QC parameter. Positive sample results were confirmed by a second column. Relative percentage difference (RPD) between the two results were evaluated. If RPD is less than 40% and peaks are well defined the higher result is reported. Where RPD is greater than 40% the chromatogram is checked for anomalies and results are selected based on processed knowledge. If there is no evidence of any chromatographic ambiguity, the higher result is reported.

LAB CHRONICLE
PESTICIDES

Client : MWH LABORATORIES
Project : 350056

SDG NO. : 10L041
Instrument ID : GCT008

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1W	CPL006WB	1	NA	12/08/1016:37	12/06/1011:30	SL08010A	SL08007A	CPL006W	Method Blank
LCS1W	CPL006WL	1	NA	12/08/1017:02	12/06/1011:30	SL08011A	SL08007A	CPL006W	Lab Control Sample (LCS)
LCD1W	CPL006WC	1	NA	12/08/1017:27	12/06/1011:30	SL08012A	SL08007A	CPL006W	LCS Duplicate
201012010376	L041-01	0.94	NA	12/08/1018:16	12/06/1011:30	SL08014A	SL08007A	CPL006W	Field Sample
201012010377	L041-02	0.94	NA	12/08/1018:41	12/06/1011:30	SL08015A	SL08007A	CPL006W	Field Sample
201012010378	L041-03	0.94	NA	12/08/1019:06	12/06/1011:30	SL08016A	SL08007A	CPL006W	Field Sample
201012010379	L041-04	0.94	NA	12/08/1019:30	12/06/1011:30	SL08017A	SL08007A	CPL006W	Field Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD 3520C/8081A
PESTICIDES

Client : MWH LABORATORIES	Date Collected: 12/01/10
Project : 350056	Date Received: 12/02/10
Batch No. : 10L041	Date Extracted: 12/06/10 11:30
Sample ID: 201012010376	Date Analyzed: 12/08/10 18:16
Lab Samp ID: L041-01	Dilution Factor: 0.94
Lab File ID: SL08014A	Matrix : WATER
Ext Btch ID: CPL006W	% Moisture : NA
Calib. Ref.: SL08007A	Instrument ID : GCT008

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.094	0.019|0.019
GAMMA-BHC (LINDANE)	(ND)|ND	0.094	0.019|0.019
BETA-BHC	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR	(ND)|ND	0.094	0.019|0.019
DELTA-BHC	(ND)|ND	0.094	0.019|0.019
ALDRIN	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR EPOXIDE	(ND)|ND	0.094	0.019|0.019
GAMMA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ALPHA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ENDOSULFAN I	(ND)|ND	0.094	0.019|0.019
4,4'-DDE	(ND)|ND	0.19	0.019|0.019
DIELDRIN	(ND)|ND	0.19	0.019|0.019
ENDRIN	(ND)|ND	0.19	0.019|0.019
4,4'-DDD	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN II	(ND)|ND	0.19	0.019|0.019
4,4'-DDT	(ND)|ND	0.19	0.019|0.019
ENDRIN ALDEHYDE	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN SULFATE	(ND)|ND	0.19	0.019|0.019
ENDRIN KETONE	(ND)|ND	0.19	0.019|0.019
METHOXYCHLOR	(ND)|ND	0.94	0.19|0.19
TOXAPHENE	(ND)|ND	1.9	0.94|0.94

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.28|(0.30)	0.376	74|(81)	30-140
DECACHLOROBIPHENYL	0.30|(0.32)	0.376	81|(85)	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD 3520C/8081A
PESTICIDES

Client	: MWH LABORATORIES	Date Collected:	12/01/10
Project	: 350056	Date Received:	12/02/10
Batch No.	: 10L041	Date Extracted:	12/06/10 11:30
Sample ID:	201012010377	Date Analyzed:	12/08/10 18:41
Lab Samp ID:	L041-02	Dilution Factor:	0.94
Lab File ID:	SL08015A	Matrix	: WATER
Ext Btch ID:	CPL006W	% Moisture	: NA
Calib. Ref.:	SL08007A	Instrument ID	: GCT008

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.094	0.019|0.019
GAMMA-BHC (LINDANE)	(ND)|ND	0.094	0.019|0.019
BETA-BHC	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR	(ND)|ND	0.094	0.019|0.019
DELTA-BHC	(ND)|ND	0.094	0.019|0.019
ALDRIN	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR EPOXIDE	(ND)|ND	0.094	0.019|0.019
GAMMA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ALPHA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ENDOSULFAN I	(ND)|ND	0.094	0.019|0.019
4,4'-DDE	(ND)|ND	0.19	0.019|0.019
DIELDRIN	(ND)|ND	0.19	0.019|0.019
ENDRIN	(ND)|ND	0.19	0.019|0.019
4,4'-DDD	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN II	(ND)|ND	0.19	0.019|0.019
4,4'-DDT	(ND)|ND	0.19	0.019|0.019
ENDRIN ALDEHYDE	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN SULFATE	(ND)|ND	0.19	0.019|0.019
ENDRIN KETONE	(ND)|ND	0.19	0.019|0.019
METHOXYCHLOR	(ND)|ND	0.94	0.19|0.19
TOXAPHENE	(ND)|ND	1.9	0.94|0.94

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.30|(0.32)	0.376	81|(85)	30-140
DECACHLOROBIPHENYL	0.30|(0.33)	0.376	80|(86)	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD 3520C/8081A
PESTICIDES

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Client	: MWH LABORATORIES	Date Collected:	12/01/10
Project	: 350056	Date Received:	12/02/10
Batch No.	: 10L041	Date Extracted:	12/06/10 11:30
Sample ID:	201012010378	Date Analyzed:	12/08/10 19:06
Lab Samp ID:	L041-03	Dilution Factor:	0.94
Lab File ID:	SL08016A	Matrix	: WATER
Ext Btch ID:	CPL006W	% Moisture	: NA
Calib. Ref.:	SL08007A	Instrument ID	: GCT008

==

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
----------	------	------	------
ALPHA-BHC	(ND)|ND	0.094	0.019|0.019
GAMMA-BHC (LINDANE)	(ND)|ND	0.094	0.019|0.019
BETA-BHC	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR	(ND)|ND	0.094	0.019|0.019
DELTA-BHC	(ND)|ND	0.094	0.019|0.019
ALDRIN	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR EPOXIDE	(ND)|ND	0.094	0.019|0.019
GAMMA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ALPHA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ENDOSULFAN I	(ND)|ND	0.094	0.019|0.019
4,4'-DDE	(ND)|ND	0.19	0.019|0.019
DIELDRIN	(ND)|ND	0.19	0.019|0.019
ENDRIN	(ND)|ND	0.19	0.019|0.019
4,4'-DDD	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN II	(ND)|ND	0.19	0.019|0.019
4,4'-DDT	(ND)|ND	0.19	0.019|0.019
ENDRIN ALDEHYDE	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN SULFATE	(ND)|ND	0.19	0.019|0.019
ENDRIN KETONE	(ND)|ND	0.19	0.019|0.019
METHOXYCHLOR	(ND)|ND	0.94	0.19|0.19
TOXAPHENE	(ND)|ND	1.9	0.94|0.94

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
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TETRACHLORO-M-XYLENE	0.30|(0.31)	0.376	80|(83)	30-140
DECACHLOROBIPHENYL	0.31|(0.33)	0.376	83|(87)	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD 3520C/8081A
PESTICIDES

Client : MWH LABORATORIES	Date Collected: 12/01/10
Project : 350056	Date Received: 12/02/10
Batch No. : 10L041	Date Extracted: 12/06/10 11:30
Sample ID: 201012010379	Date Analyzed: 12/08/10 19:30
Lab Samp ID: L041-04	Dilution Factor: 0.94
Lab File ID: SL08017A	Matrix : WATER
Ext Btch ID: CPL006W	% Moisture : NA
Calib. Ref.: SL08007A	Instrument ID : GCT008

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.094	0.019|0.019
GAMMA-BHC (LINDANE)	(ND)|ND	0.094	0.019|0.019
BETA-BHC	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR	(ND)|ND	0.094	0.019|0.019
DELTA-BHC	(ND)|ND	0.094	0.019|0.019
ALDRIN	(ND)|ND	0.094	0.019|0.019
HEPTACHLOR EPOXIDE	(ND)|ND	0.094	0.019|0.019
GAMMA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ALPHA-CHLORDANE	(ND)|ND	0.094	0.019|0.019
ENDOSULFAN I	(ND)|ND	0.094	0.019|0.019
4,4'-DDE	(ND)|ND	0.19	0.019|0.019
DIELDRIN	(ND)|ND	0.19	0.019|0.019
ENDRIN	(ND)|ND	0.19	0.019|0.019
4,4'-DDD	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN II	(ND)|ND	0.19	0.019|0.019
4,4'-DDT	(ND)|ND	0.19	0.019|0.019
ENDRIN ALDEHYDE	(ND)|ND	0.19	0.019|0.019
ENDOSULFAN SULFATE	(ND)|ND	0.19	0.019|0.019
ENDRIN KETONE	(ND)|ND	0.19	0.019|0.019
METHOXYCHLOR	(ND)|ND	0.94	0.19|0.19
TOXAPHENE	(ND)|ND	1.9	0.94|0.94

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.30|(0.32)	0.376	79|(84)	30-140
DECACHLOROBIPHENYL	0.31|(0.32)	0.376	82|(86)	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

QC SUMMARIES

METHOD 3520C/8081A
PESTICIDES

Client : MWH LABORATORIES	Date Collected: NA
Project : 350056	Date Received: 12/06/10
Batch No. : 10L041	Date Extracted: 12/06/10 11:30
Sample ID: MBLK1W	Date Analyzed: 12/08/10 16:37
Lab Samp ID: CPL006WB	Dilution Factor: 1
Lab File ID: SL08010A	Matrix : WATER
Ext Btch ID: CPL006W	% Moisture : NA
Calib. Ref.: SL08007A	Instrument ID : GCT008

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.10	0.020|0.020
GAMMA-BHC (LINDANE)	(ND)|ND	0.10	0.020|0.020
BETA-BHC	(ND)|ND	0.10	0.020|0.020
HEPTACHLOR	(ND)|ND	0.10	0.020|0.020
DELTA-BHC	(ND)|ND	0.10	0.020|0.020
ALDRIN	(ND)|ND	0.10	0.020|0.020
HEPTACHLOR EPOXIDE	(ND)|ND	0.10	0.020|0.020
GAMMA-CHLORDANE	(ND)|ND	0.10	0.020|0.020
ALPHA-CHLORDANE	(ND)|ND	0.10	0.020|0.020
ENDOSULFAN I	(ND)|ND	0.10	0.020|0.020
4,4'-DDE	(ND)|ND	0.20	0.020|0.020
DIELDRIN	(ND)|ND	0.20	0.020|0.020
ENDRIN	(ND)|ND	0.20	0.020|0.020
4,4'-DDD	(ND)|ND	0.20	0.020|0.020
ENDOSULFAN II	(ND)|ND	0.20	0.020|0.020
4,4'-DDT	(ND)|ND	0.20	0.020|0.020
ENDRIN ALDEHYDE	(ND)|ND	0.20	0.020|0.020
ENDOSULFAN SULFATE	(ND)|ND	0.20	0.020|0.020
ENDRIN KETONE	(ND)|ND	0.20	0.020|0.020
METHOXYCHLOR	(ND)|ND	1.0	0.20|0.20
TOXAPHENE	(ND)|ND	2.0	1.0|1.0

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.32|(0.33)	0.400	79|(83)	30-130
DECACHLOROBIPHENYL	0.33|(0.35)	0.400	83|(87)	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT:	MWH LABORATORIES		
PROJECT:	350056		
BATCH NO.:	10L041		
METHOD:	METHOD 3520C/8081A		

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	CPL006WB	CPL006WL	CPL006WC		
LAB FILE ID:	SL08010A	SL08011A	SL08012A		
DATE EXTRACTED:	12/06/1011:30	12/06/1011:30	12/06/1011:30	DATE COLLECTED:	NA
DATE ANALYZED:	12/08/1016:37	12/08/1017:02	12/08/1017:27	DATE RECEIVED:	12/06/10
PREP. BATCH:	CPL006W	CPL006W	CPL006W		
CALIB. REF:	SL08007A	SL08007A	SL08007A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
gamma-BHC (Lindane)	(ND)|ND	0.400	(0.406)|0.405	(101)|101	0.400	(0.389)|0.389	(97)|97	(4)|4	40-130	30
Heptachlor	(ND)|ND	0.400	(0.380)|0.364	(95)|91	0.400	(0.365)|0.357	(91)|89	(4)|2	30-140	30
Aldrin	(ND)|ND	0.400	0.414|(0.421)	104|(105)	0.400	0.395|(0.404)	99|(101)	5|(4)	40-130	30
Dieldrin	(ND)|ND	0.400	0.424|(0.445)	106|(111)	0.400	0.401|(0.429)	100|(107)	6|(4)	60-140	30
Endrin	(ND)|ND	0.400	(0.390)|0.386	(97)|96	0.400	0.375|(0.377)	94|(94)	4|(2)	50-140	30
4,4'-DDT	(ND)|ND	0.400	(0.444)|0.404	(111)|101	0.400	(0.419)|0.376	(105)|94	(6)|7	60-140	30

SURROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
Tetrachloro-m-xylene	0.400	0.339|(0.351)	85|(88)	0.400	0.328|(0.342)	82|(85)	30-130
Decachlorobiphenyl	0.400	0.345|(0.364)	86|(91)	0.400	0.323|(0.344)	81|(86)	40-150

3041

LABORATORY REPORT FOR

MWH LABORATORIES

350056

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

SDG#: 10L041

CASE NARRATIVE

Client : MWH LABORATORIES

Project : 350056

SDG : 10L041

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

A total of four (4) water samples were received on 12/02/10 for Pesticides Organophosphorus analysis, Method 3520C/8141A in accordance with USEPA SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

Holding Time
Samples were analyzed within the prescribed holding time.

Calibration
Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using a secondary source (ICV). Continuing calibration (CCV) verifications were carried on a frequency specified by the project. All calibration requirements were within acceptance criteria.

Method Blank
Method blank was analyzed at the frequency required by the project. For this SDG, one method blank was analyzed with the samples. Result was compliant to project requirement.

Lab Control Sample
A set of LCS/LCD was analyzed with the samples in this SDG. Percent recoveries for NPL002WL/C were all within QC limits.

Matrix QC Sample
No matrix QC sample was designated in this SDG.

Surrogate
Surrogates were added on QC and field samples. Surrogate recoveries were within project QC limits.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. All project requirements were met otherwise anomalies were discussed within the associated QC parameter.

LAB CHRONICLE
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client : MWH LABORATORIES
Project : 350056

SDG NO. : 10L041
Instrument ID : GCT012

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1W	NPL002WB	1	NA	12/07/1014:21	12/06/1013:15	ZL07003A	ZL07002A	NPL002W	Method Blank
LCS1W	NPL002WL	1	NA	12/07/1014:45	12/06/1013:15	ZL07004A	ZL07002A	NPL002W	Lab Control Sample (LCS)
LCD1W	NPL002WC	1	NA	12/07/1015:08	12/06/1013:15	ZL07005A	ZL07002A	NPL002W	LCS Duplicate
201012010376	L041-01	.94	NA	12/07/1015:31	12/06/1013:15	ZL07006A	ZL07002A	NPL002W	Field Sample
201012010377	L041-02	.94	NA	12/07/1015:55	12/06/1013:15	ZL07007A	ZL07002A	NPL002W	Field Sample
201012010378	L041-03	.94	NA	12/07/1016:18	12/06/1013:15	ZL07008A	ZL07002A	NPL002W	Field Sample
201012010379	L041-04	.94	NA	12/07/1016:41	12/06/1013:15	ZL07009A	ZL07002A	NPL002W	Field Sample

FN - Filename
% Moist - Percent Moisture

33/41

SAMPLE RESULTS

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: MWH LABORATORIES	Date Collected:	12/01/10
Project	: 350056	Date Received:	12/02/10
Batch No.	: 10L041	Date Extracted:	12/06/10 13:15
Sample ID:	201012010376	Date Analyzed:	12/07/10 15:31
Lab Samp ID:	L041-01	Dilution Factor:	.94
Lab File ID:	ZL07006A	Matrix	: WATER
Ext Btch ID:	NPL002W	% Moisture	: NA
Calib. Ref.:	ZL07002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	ND	0.94	0.47
MEVINPHOS	ND	0.94	0.47
DEMETON	ND	0.94	0.47
ETHOPROP	ND	0.94	0.47
PHORATE	ND	0.94	0.47
NALED	ND	0.94	0.47
DIAZINON	ND	0.94	0.47
DISULFOTON	ND	0.94	0.47
RONNEL	ND	0.94	0.47
CHLORPYRIFOS	ND	0.94	0.47
FENTHION	ND	0.94	0.47
TRICHLORONATE	ND	0.94	0.47
METHYL PARATHION	ND	0.94	0.47
TOKUTHION	ND	0.94	0.47
STIROPHOS	ND	0.94	0.47
BOLSTAR	ND	0.94	0.47
FENSULFOTHION	ND	0.94	0.47
AZINPHOS-METHYL	ND	0.94	0.47
COUMAPHOS	ND	0.94	0.47

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.33	1.41	95	30-130
TRIPHENYL PHOSPHATE	1.51	1.41	107	50-130

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: MWH LABORATORIES	Date Collected:	12/01/10
Project	: 350056	Date Received:	12/02/10
Batch No.	: 10L041	Date Extracted:	12/06/10 13:15
Sample ID:	201012010377	Date Analyzed:	12/07/10 15:55
Lab Samp ID:	L041-02	Dilution Factor:	.94
Lab File ID:	ZL07007A	Matrix	: WATER
Ext Btch ID:	NPL002W	% Moisture	: NA
Calib. Ref.:	ZL07002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	ND	0.94	0.47
MEVINPHOS	ND	0.94	0.47
DEMETON	ND	0.94	0.47
ETHOPROP	ND	0.94	0.47
PHORATE	ND	0.94	0.47
NALED	ND	0.94	0.47
DIAZINON	ND	0.94	0.47
DISULFOTON	ND	0.94	0.47
RONNEL	ND	0.94	0.47
CHLORPYRIFOS	ND	0.94	0.47
FENTHION	ND	0.94	0.47
TRICHLORONATE	ND	0.94	0.47
METHYL PARATHION	ND	0.94	0.47
TOKUTHION	ND	0.94	0.47
STIROPHOS	ND	0.94	0.47
BOLSTAR	ND	0.94	0.47
FENSULFOTHION	ND	0.94	0.47
AZINPHOS-METHYL	ND	0.94	0.47
COUMAPHOS	ND	0.94	0.47

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.27	1.41	90	30-130
TRIPHENYL PHOSPHATE	1.40	1.41	99	50-130

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: MWH LABORATORIES	Date Collected:	12/01/10
Project	: 350056	Date Received:	12/02/10
Batch No.	: 10L041	Date Extracted:	12/06/10 13:15
Sample ID:	201012010378	Date Analyzed:	12/07/10 16:18
Lab Samp ID:	L041-03	Dilution Factor:	.94
Lab File ID:	ZL07008A	Matrix	: WATER
Ext Btch ID:	NPL002W	% Moisture	: NA
Calib. Ref.:	ZL07002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	ND	0.94	0.47
MEVINPHOS	ND	0.94	0.47
DEMETON	ND	0.94	0.47
ETHOPROP	ND	0.94	0.47
PHORATE	ND	0.94	0.47
NALED	ND	0.94	0.47
DIAZINON	ND	0.94	0.47
DISULFOTON	ND	0.94	0.47
RONNEL	ND	0.94	0.47
CHLORPYRIFOS	ND	0.94	0.47
FENTHION	ND	0.94	0.47
TRICHLORONATE	ND	0.94	0.47
METHYL PARATHION	ND	0.94	0.47
TOKUTHION	ND	0.94	0.47
STIROPHOS	ND	0.94	0.47
BOLSTAR	ND	0.94	0.47
FENSULFOTHION	ND	0.94	0.47
AZINPHOS-METHYL	ND	0.94	0.47
COUMAPHOS	ND	0.94	0.47

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.06	1.41	75	30-130
TRIPHENYL PHOSPHATE	1.24	1.41	88	50-130

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: MWH LABORATORIES	Date Collected:	12/01/10
Project	: 350056	Date Received:	12/02/10
Batch No.	: 10L041	Date Extracted:	12/06/10 13:15
Sample ID:	201012010379	Date Analyzed:	12/07/10 16:41
Lab Samp ID:	L041-04	Dilution Factor:	.94
Lab File ID:	ZL07009A	Matrix	: WATER
Ext Btch ID:	NPL002W	% Moisture	: NA
Calib. Ref.:	ZL07002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	ND	0.94	0.47
MEVINPHOS	ND	0.94	0.47
DEMETON	ND	0.94	0.47
ETHOPROP	ND	0.94	0.47
PHORATE	ND	0.94	0.47
NALED	ND	0.94	0.47
DIAZINON	ND	0.94	0.47
DISULFOTON	ND	0.94	0.47
RONNEL	ND	0.94	0.47
CHLORPYRIFOS	ND	0.94	0.47
FENTHION	ND	0.94	0.47
TRICHLORONATE	ND	0.94	0.47
METHYL PARATHION	ND	0.94	0.47
TOKUTHION	ND	0.94	0.47
STIROPHOS	ND	0.94	0.47
BOLSTAR	ND	0.94	0.47
FENSULFOTHION	ND	0.94	0.47
AZINPHOS-METHYL	ND	0.94	0.47
COUMAPHOS	ND	0.94	0.47

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.15	1.41	81	30-130
TRIPHENYL PHOSPHATE	1.31	1.41	93	50-130

QC SUMMARIES

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: MWH LABORATORIES	Date Collected:	NA
Project	: 350056	Date Received:	12/06/10
Batch No.	: 10L041	Date Extracted:	12/06/10 13:15
Sample ID:	MBLK1W	Date Analyzed:	12/07/10 14:21
Lab Samp ID:	NPL002WB	Dilution Factor:	1
Lab File ID:	ZL07003A	Matrix	: WATER
Ext Btch ID:	NPL002W	% Moisture	: NA
Calib. Ref.:	ZL07002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	ND	1.0	0.50
MEVINPHOS	ND	1.0	0.50
DEMETON	ND	1.0	0.50
ETHOPROP	ND	1.0	0.50
PHORATE	ND	1.0	0.50
NALED	ND	1.0	0.50
DIAZINON	ND	1.0	0.50
DISULFOTON	ND	1.0	0.50
RONNEL	ND	1.0	0.50
CHLORPYRIFOS	ND	1.0	0.50
FENTHION	ND	1.0	0.50
TRICHLORONATE	ND	1.0	0.50
METHYL PARATHION	ND	1.0	0.50
TOKUTHION	ND	1.0	0.50
STIROPHOS	ND	1.0	0.50
BOLSTAR	ND	1.0	0.50
FENSULFOTHION	ND	1.0	0.50
AZINPHOS-METHYL	ND	1.0	0.50
COUMAPHOS	ND	1.0	0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.28	1.50	85	30-130
TRIPHENYL PHOSPHATE	1.67	1.50	112	50-130

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: MWH LABORATORIES
PROJECT: 350056
BATCH NO.: 10L041
METHOD: METHOD 3520C/8141A

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	NPL002WB	NPL002WL	NPL002WC		
LAB FILE ID:	*ZL07003A*	*ZL07004A*	ZL07005A		
DATE EXTRACTED:	12/06/1013:15	12/06/1013:15	12/06/1013:15	DATE COLLECTED:	NA
DATE ANALYZED:	12/07/1014:21	12/07/1014:45	12/07/1015:08	DATE RECEIVED:	12/06/10
PREP. BATCH:	NPL002W	NPL002W	NPL002W		
CALIB. REF:	ZL07002A	ZL07002A	ZL07002A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Phorate	ND	1.50	1.17	78	1.50	1.19	79	2	10-130	30
Ronnel	ND	1.50	1.46	98	1.50	1.48	99	1	30-140	30
Chlorpyrifos	ND	1.50	1.57	105	1.50	1.53	102	3	40-140	30
Tokuthion	ND	1.50	1.60	107	1.50	1.48	99	8	40-130	30
Bolstar	ND	1.50	1.65	110	1.50	1.45	97	13	20-130	30

SURROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
Tributyl Phosphate	1.50	1.39	93	1.50	1.33	89	30-130
Triphenyl Phosphate	1.50	1.77	118	1.50	1.66	111	50-130

APPENDIX O

Restoration of 11-Acre Oak/Sycamore Woodland Quarterly Reports

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

March 30, 2010
(2007-110/C/C3)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 Task C3 – Third Quarter (January – March 2010) Status Report on the Weeding of the Oak/Sycamore Upland Area Big Tujunga Wash Mitigation Area, Los Angeles County, California (Revised)

Dear Ms. Kwan:

This letter serves as an update to the Oak/Sycamore upland weed removal activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) during the third quarter, January through March 2010.

Reconnaissance in the oak/sycamore upland area was conducted on March 5 and 16, 2009 by ECORP biologists Kristen Mobraaten and Gregorio Benavides. These two March surveys occurred at the start of the bird breeding season to identify the following: areas with exotic invasive plant growth and areas where breeding and nesting activity was occurring. This survey was instrumental in coordinating the removal effort slated for April 2010 by Nature's Image.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Kristen Mobraaten DATE: 3/30/10

Kristen Mobraaten
Biologist

ECORP Consulting, Inc.
1801 Park Court Place, Building B Suite 103, Santa Ana, California 92701
Phone: (714) 648-0630 ● Fax: (714) 648-0935 ● Email: Ecorp@ecorpconsulting.com

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

May 31, 2010
(2007-110/C/C3)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 3 Task C3 – Fourth Quarter (April – May 2010) Status Report on the Weeding of the Oak/Sycamore Upland Area Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Kwan:

This letter serves as an update to the Oak/Sycamore upland weed removal activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) during the fourth quarter (April through May) of 2010.

ECORP biologists monitored and directed the removal of weeding vegetation in the upland area on May 4 and 5, 2010. Pre-construction surveys were conducted on April 29 and 30 focusing on delineating areas where bird activity (nesting and territorial/courtship behavior) might preclude removal activity.

Two portions of the upland area were flagged off to weeding activity because significant bird activity was observed in those areas. Those areas were situated to the east of the Cottonwood Street entrance and in the northwest portion of the upland area. The remainder of the upland area was targeted for weeding activity, focusing on the removal of mustard.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides   DATE: 5/31/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

October 1, 2010
(2007-110/C/C3)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 4 Task C3 – First Quarter (July through September 2010) Status Report on the Weeding of the Oak/Sycamore Upland Area Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

This letter serves as an update to the Oak/Sycamore upland weed removal activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) between July and September, 2010. Weed removal activities did not occur in the Mitigation Area during this period. ECORP biologists conducted site visits on September 4 and 11, 2010, however, weed removal issues in the upland areas were not addressed during these site visits.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 10/1/10

Gregorio Benavides
Biologist

December 30, 2010
(2010-116/C/C2)

Valerie De La Cruz
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: YEAR 4 TASK C3 – Second Quarter (October through December 2010) Weeding in the Sycamore Upland Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. De La Cruz:

This letter serves as a notice of the continuation of the weed removal effort in the Sycamore upland areas at the Big Tujunga Wash Mitigation Area (Mitigation Area) during the second quarter of year 4 (October through December 2010).

The weed removal was performed by Nature's Image personnel on December 28, 2010. The removal effort was conducted on either side of the Cottonwood and Mary Bell entrances to the Mitigation Area using hand tools such as machetes and weed whackers. Efforts were focused on non-native weeds growing around the base of native shrubs and trees. Pre-construction surveys conducted by a qualified ECORP biologist were conducted in these areas prior to weed removal.

Prior to any work, all Natures Image field technicians received an onsite orientation and instruction on the Mitigation Area's regulations and concerns relating to the Mitigation Area's sensitive species and habitat by a qualified ECORP biologist.

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED: Gregorio Benavides DATE: 12/30/10

Gregorio Benavides
Biologist

ECORP Consulting, Inc.
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APPENDIX P

Station Fire Post-catastrophic Damage Assessment Memo

April 5, 2010
(2007-110/L/L1)

Belinda Kwan
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803-1331

SUBJECT: Task L1 – Third Quarter (December through March 2010) Natural Disaster Monitoring Report Big Tujunga Wash Mitigation Area, Los Angeles County, California (Revised)

Dear Ms. Kwan:

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, ECORP Consulting, Inc. (ECORP) has conducted post-Station Fire surveys of the Mitigation Area. A short period of moderate rainfall followed shortly after the fire that necessitated a thorough investigation of the riparian restoration area and Haines Canyon Creek.

ECORP biologists Gregorio Benavides and Kristen Mobraaten conducted two site visits during the third quarter of Year 3 (March 5 and 16) to document and assess the status of the following issues of concern that resulted from the post-fire rains: trail erosion and stability, debris and garbage, damage to vegetation, flooding of understory, and creek condition. Newly formed trails (not related to post-fire rains) were closed off.

The entire length of the Mitigation Area trail system was surveyed on both days, and problem areas were recorded with a global positioning system (GPS) unit (Universal Transverse Mercator [UTM] coordinates, North American Datum 1983, Zone 11 S) and documented with digital photography (Figures 1 through 12). Problem areas were ranked (1 to 3) to prioritize locations that would require immediate attention. Highest priority problems (ranked 1) were those that posed a danger to park visitors (equestrian and hikers) or those that impeded or obstructed flow in Haines Canyon Creek. Next level of priority (ranked 2) was assigned to problem areas where the trail or creek was partially obstructed with debris or garbage but that did not prevent normal trail traffic or water flow. The last level of priority (ranked 3) was assigned to areas that contained debris and garbage that did not pose a danger to park visitors, obstructed trails traffic, or posed a problem to normal water flow in Haines Canyon Creek.

ECORP Consulting, Inc.
1801 Park Court Place, Building B Suite 103, Santa Ana, California 92701
Phone: (714) 648-0630 ● Fax: (714) 648-0935 ● Email: Ecorp@ecorpconsulting.com

I hereby certify that the statements, data, and information presented in this report are true and correct to the best of my knowledge and belief.

SIGNED:______________________ DATE: April 5, 2010

for Gregorio Benavides
Biologist

Figure 1a. Rank: 1. Flooded understory area containing garbage and debris near and on trail (location: 376303/379267).

Figure 1b. Rank: 1. Flooded understory area containing garbage and debris (location: 376303/379267).

Figure 2a. Rank: 1. Undermined trail due to erosion and a fallen tree. Water flow that undermined this trailhead and the trees comes from rain water flowing through Haines Canyon (location: 376419/3792488).

Figure 2b. Rank: 1. Undermined trail; erosion and fallen tree (location: 376419/3792488).

Figure 3. Rank: 1. Water flow from Haines Canyon Wash has further exposed the roots of this fallen tree. This trail, located near Gibson Ranch, is used daily by equestrians and hikers gaining access to the Tujunga Ponds trails (location: 376433/3792482).

Figure 4a. Rank: 1. Overflow in Haines Canyon Wash undermined the roots of this live tree, causing it to block normal trail traffic (location: 376451/3792469).

Figure 4b. Rank: 1. High flows have eroded this trail causing small trees to fall over and block normal traffic flow. At this location, the path width has been narrowed or has been completely submerged by standing water (location: 376520/3792418).

Figure 5a. Rank: 1. High flows in Haines Canyon Wash caused this dead tree to completely block trail traffic. Notice the large pool of standing water in the lower left hand corner of the photo (location: 376535/3792444).

Figure 5b. Rank: 1. This photo shows the trail leading to the fallen tree (not visible in this photo). Note the fallen-over tree in the background over the partially submerged trail (location: 376300/3792624).

Figure 6. Rank: 1. A small grove of dead trees that is located near the main trail that has potential of breaking and falling onto trail; needs immediate attention (location: 376508/3792399).

Figure 7. Rank: 2. Trash and debris washed into the main trail in the restoration area after the post-Station Fire rains (location: 376535/3792436).

Figure 8. Rank: 1. Debris and garbage in the trail washed in after rains following the Station Fire need to be cleared to allow normal trail traffic (location: 376528/3792436).

Figure 9a. Rank: 1. Garbage and debris blocking Haines Canyon Creek that needs to be removed to allow normal creek flow (location: 376373/3792672). Red arrow indicates direction of creek flow.

Figure 9b. Rank: 1. Garbage and debris blocking Haines Canyon Creek that needs to be removed to allow normal creek flow (location: 376373/3792672). Red arrow indicates the direction of creek flow.

Figure 9c. Rank: 1. Garbage and debris blocking Haines Canyon Creek that needs to be removed to allow normal creek flow (location: 376373/3792672). Red arrow indicates direction of creek flow.

Figure 10. Rank: 2. Garbage and debris are partially obstructing normal trail traffic and may pose a danger to hikers and equestrians (location 376281/3792658).

Figure 11a. Rank: 3. Water flow from the Haines Canyon Wash caused this small tree to fall into the trail as a result of undermined roots. The tree does not appear to pose an immediate danger to park users (location: 376392/3792492).

Figure 12a. Rank: 3. Trash and debris in Haines Canyon Wash (location: 376631/3792616).

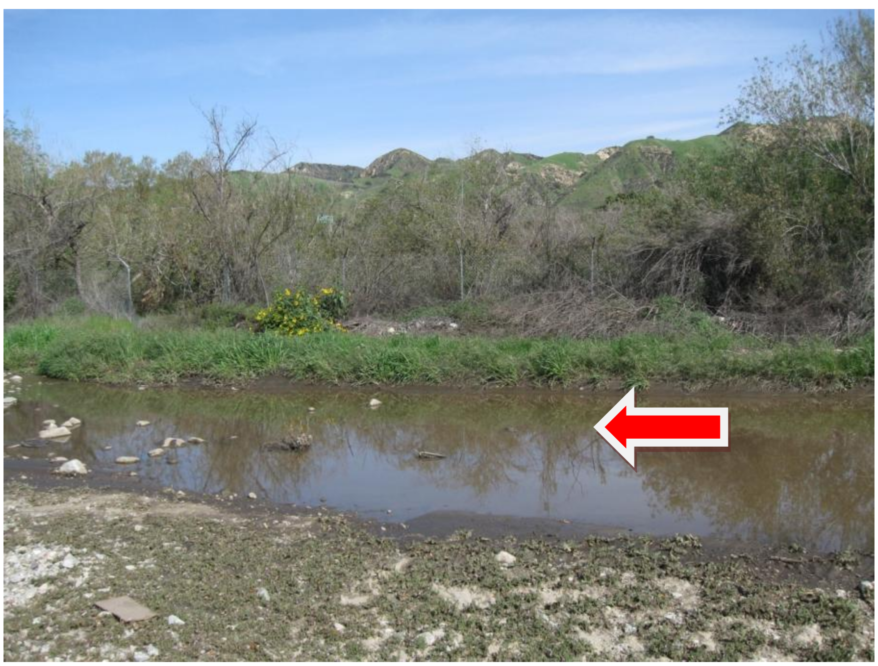

Figure 12b. Rank: 3. Water from the post-Station Fire rains flows through Haines Canyon Wash and empties into Haines Canyon Creek. Arrow indicates direction of water flow (location: 376631/3792616).