2012 Annual Report for the Big Tujunga Wash Mitigation Area Los Angeles County, California

Prepared for:

County of Los Angeles
Department of Public Works
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March 2013

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Guide to Compliance with the Terms and Conditions in the California Department of Fish and Wildlife Streambed Alteration Agreement #1600-2008-0253-R5 for the Big Tujunga Wash Mitigation Area, Dated January 29, 2009 Expires March 31, 2014

A draft Streambed Alteration Agreement (SAA) (#1600-2008-0253-R5) was submitted to the County of Los Angeles Department of Public Works (LACDPW) from California Department of Fish and Wildlife (CDFW) on January 29, 2009 (Appendix A). The SAA remains in effect through March 31, 2014. The following key provides a quick reference as to how the conditions were addressed and where the explanations of activities associated with the conditions are located in this document.

Resource Protection

Condition 1: Vegetation removal activities did occur between the dates of March 1 and September 1; however, breeding bird pre-removal activity surveys were conducted prior to all exotic vegetation removal activities occurring in 2012. In addition, a qualified biological monitor was present during all exotic vegetation removal activities to ensure that 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-removal activity nesting raptor surveys were conducted prior to all vegetation removal activities occurring within the Mitigation Area in 2012. There were no active raptor nests identified within the active work areas, and therefore no impacts occurred to nesting raptors and fencing of nests was not required (see Section 4.0).

Condition 3: Active bird nests were neither destroyed nor disturbed during the 2012 breeding season, in accordance with the Migratory Bird Treaty Act (MBTA) of 1918. Appropriate measures, such as pre-removal activity surveys and biological monitoring, were taken to prevent impacts to breeding/nesting birds protected under the MBTA.

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

Condition 5: CDFW has been notified of the presence of all listed and sensitive species occurring within the Mitigation Area. There were no other listed species 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-removal activity 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 activities occurring in the Mitigation Area. No wildlife exclusionary devices were necessary, thus none were constructed. No work was conducted on site without the presence of a biological monitor (see 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 served as an informational brochure that was handed out to recreational user groups as part of the public outreach program (see Section 14.0). In addition, the biological monitor conducted tailgate worker education sessions each morning prior to 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 2012 annual report will be submitted to CDFW.

Condition 10: CDFW did not determine that any threatened or endangered species will be affected by the implementation of the Master Mitigation Plan (MMP); therefore, no application was made for a State Take Permit.

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

Condition 12: Hunting was not permitted or authorized within the Mitigation Area in 2012.

Work Areas and Vegetation Removal

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

Condition 14: All personnel who conducted activities within site boundaries were provided maps, and no native vegetation was removed within the boundaries of the site. The work areas were clearly delineated and unnecessary impacts did not occur to ephemeral streams or 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: Vegetation with a diameter at breast height (dbh) larger than 3 inches was not removed, except as stated in the MMP and approved by CDFW.

Condition 16: Native vegetation was not removed from the channel, bed, or banks of the stream except as provided for in the SAA.

Equipment and Access

Condition 17: Vehicles and equipment were neither operated nor driven though water-covered portions of the stream.

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

Fill and Spoil

Condition 19: Fill was not placed in any area of the Mitigation Area.

Structures

Condition 20: Materials associated with the MMP activities were not placed in any seasonally dry portions of the stream.

Condition 21: Installation of erosion control structures was not conducted during 2012, nor was there a need for such structures.

Condition 22: Bridges, culverts, and other structures were not constructed as part of activities associated with the MMP.

Condition 23: There was no construction of any temporary or permanent dams, structures, or flow restrictions as part of the activities associated with the MMP. 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 14.0)

Pollution, Sedimentation, and Litter

Condition 24: All litter and pollution laws were adhered to by the contractors, subcontractors, and employees of LACDPW. Trash pickup was conducted regularly by the site users, the landscape contractor, and volunteers during an organized Trail Cleanup Day (see Section 12.3).

Condition 25: Equipment maintenance was not conducted in the Mitigation Area.

Condition 26: There were no hazardous spills of any kind in the Mitigation Area during 2012.

Condition 27: Activities conducted within the Mitigation Area in 2012 did not result in any turbid water (from dewatering or other activities) entering existing water courses.

Condition 28: Activities involving equipment washing (or other similar activities) were not conducted in the Mitigation Area in 2012 that would have resulted in the production of water containing mud, silt, or other pollutants.

Condition 29: Alteration to the stream's low-flow channel, bed, or banks was not conducted as a result of the implementation of activities in the Mitigation Area.

Condition 30: As stated under Condition 24, the only movement of rocks within the bed or banks of the stream occurred during the removal of rock dams created by recreational users. Removal of the rock dams was conducted by biologists who are familiar with the sensitive fishes in the stream (see Section 14.0). These activities were conducted 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. Rock dam removal eliminates habitat that is better suited for exotic wildlife (bullfrogs [*Lithobates catesbeianus*], largemouth bass [*Micropterus salmoides*], etc.) that pose a threat to this species.

Permitting and Safeguards

Condition 31: The CDFW, United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) were consulted very early in the development of the implementation plan for the Mitigation Area (referred to as the Big Tujunga Conservation Area in the SAA). The USACE stated that they did not need to issue a permit because there would not be any fill within their jurisdiction. The continued implementation of the MMP and the Long-term Maintenance and Monitoring Plan (LTMMP) for the Mitigation is not expected to have any impact on USACE 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. Additional work on the CE was not conducted in 2012.

Administrative-Miscellaneous

Condition 33: No amendments to the SAA were submitted to CDFW during the 2012 reporting period. CDFW did not identify any breaches of the SAA during the 2012 period.

Condition 34: There were no violations of any terms or conditions of the SAA during the 2012 period.

Condition 35: Copies of the SAA were provided to all 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. Additional meetings were not necessary during 2012.

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

Conditions 38 and 39: CDFW did not request any site visits during the 2012 reporting period.

Conditions 40 through 42: CDFW did not issue a suspension or cancellation of the SAA in 2012.

1.0 INTRODUCTION

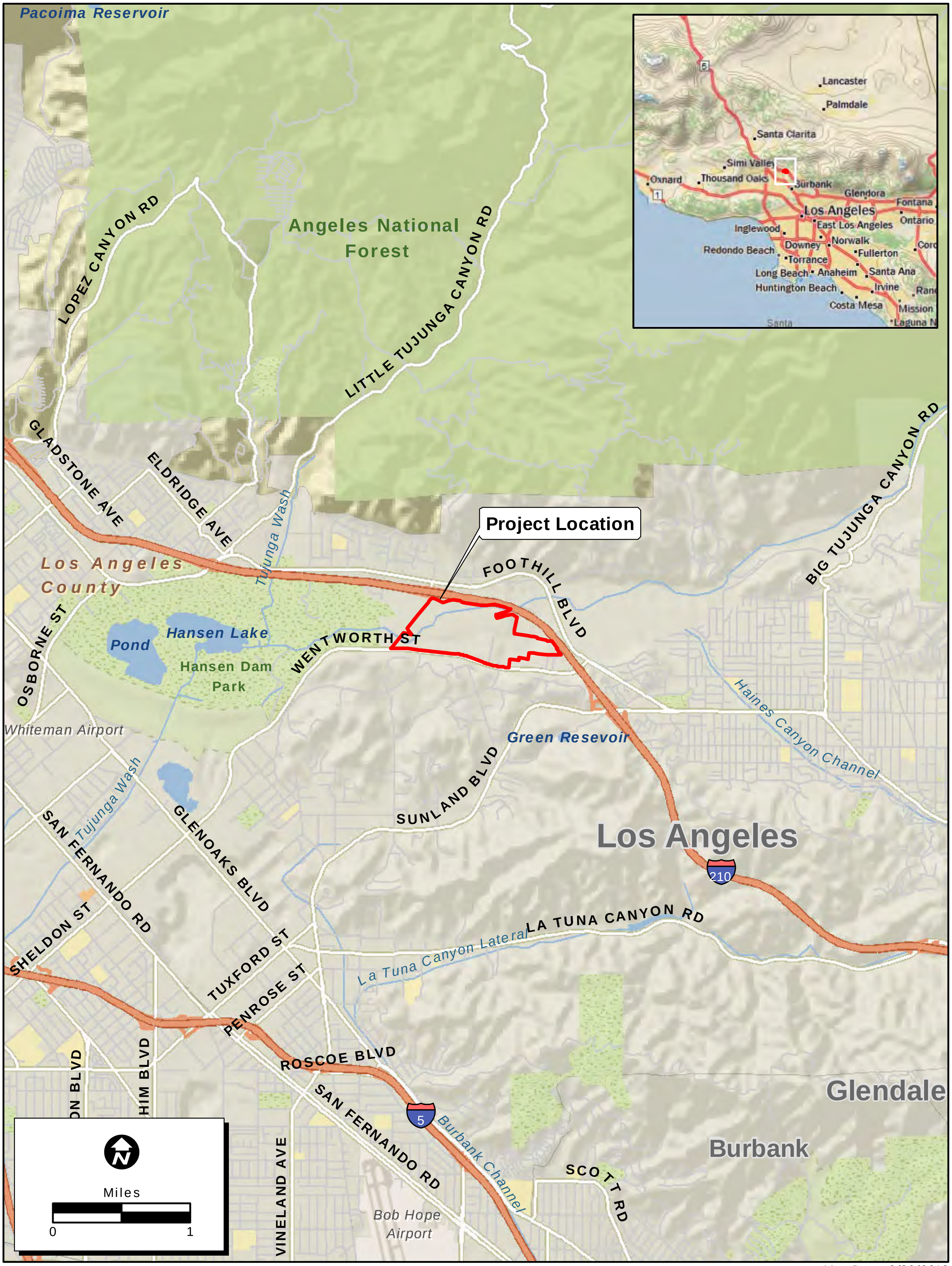
1.1 Purpose

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 2012. These activities were conducted in accordance with the Master Mitigation Plan (MMP) for the Mitigation Area (Chambers Group 2000). The MMP was first 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 Wildlife (CDFW) requirement for the preparation of a management plan for the site. The ultimate goal of the Mitigation Area is to provide for long-term preservation, management, and enhancement of biological resources for the benefit of the state's fish and wildlife resources. The MMP encompasses strategies to enhance and protect existing habitat for wildlife and to create additional natural areas that could be used by native wildlife and numerous user (recreational) groups. In addition, the MMP includes 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 a public awareness and education program at the site. Implementation of the MMP 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 County of Los Angeles Department of Public Works (LACDPW) in July 2007 to continue MMP activities as part of implementation of the Long-term Maintenance and Monitoring Plan (LTMMP) (Chambers Group 2006). This report summarizes all activities conducted in the Mitigation Area between January and December 2012.

1.2 Location and Setting

The Mitigation Area is located in Big Tujunga Wash, just downstream of the Interstate (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 by I-210, on the east by I-210 and the County of Los Angeles Department of Parks and Recreation Tujunga Ponds, 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, in the northern portion 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 in the southern portion 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 (Safford and Quinn 1998; CDFW 2012). The nearby Tujunga Ponds and surrounding habitat are located adjacent to 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 in Figure 1-2.



Map Date: 3/20/2013
Source: ESRI

Figure 1-1. Project Location

2010-116 Big Tujunga Wash Mitigation Area

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Location: N-116/Big Tujunga Mitigation Area/AerialMaps/Tujunga_Bank_Aerial_v3_2010.mxd

Aerial Date: USGS Dec 2010
12/19/2012

Figure 1-2. Big Tujunga Wash Mitigation Area

2010-116.006 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 MMP that were implemented between January and December 2012. This list of tasks was revised in July of 2012 due to a revision to the MMP implementation contract. Due to this revision, the 2012 Annual Report document organization has changed slightly from previous years, as many tasks from the previous contract were combined into larger, more comprehensive tasks during this revision. The only task that was removed during the contract revision was the Habitat Restoration Program. Details on this omission can be found in Section 3.0. All other tasks, however, were implemented during the 2012 contract year.

Certain tasks in the MMP were not conducted in previous years because the scope of work requires that they be done once during a three-year period and that they be conducted during an average or better than average rainfall 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 conducted in 2012 because surveys were last conducted in 2009. One new task was implemented in 2012; the monitoring and removal of an illegal structure constructed in the Mitigation Area (see Section 17.0).

Table 1-1. Mitigation and Monitoring Tasks Implemented and/or Continued in 2012

Implemented and/or Continued in 2012	
	TASK 1 – Continue Brown-headed Cowbird Trapping Program
x	Brown-headed Cowbird Trapping Program
x	Final Trapping Report
x	Trap Storage
	TASK 2 – Continue Exotic Plant Eradication Program
x	Combined Exotic Plant Removal and Maintenance Program
x	Exotic Plant Memos
	TASK 3 – Water Lettuce Control Program
x	Water Lettuce Herbicide Application
x	Follow-up Inspections and Memos
	TASK 4 – Continue Exotic Wildlife Eradication Program
x	Exotic Wildlife Removal Efforts
x	Exotic Wildlife Memos
x	Final Exotic Wildlife Removal Report

Implemented and/or Continued in 2012	
	TASK 5 – Native Fish Monitoring Program
x	Native Fish Surveys and Report
	TASK 6 – Least Bell's Vireo and Southwestern Willow Flycatcher Surveys
x	Least Bell's Vireo Surveys and Report
x	Southwestern Willow Flycatcher Surveys and Report
	TASK 7 – Arroyo Toad Surveys
x	Arroyo Toad Surveys and Report
	TASK 8 – Functional Assessment and Success Monitoring
x	Functional Assessment and Success Monitoring
x	Functional Assessment and Success Monitoring Memo
	TASK 9 – Water Quality Monitoring Program
x	Water Quality Monitoring
x	Water Quality Results Report
	TASK 10 – Trails Monitoring Program
x	Trails Maintenance and Monitoring Site Visits and Memos
x	Trail Cleanup Day
	TASK 11 – Community Awareness Program
x	Biannual Newsletters
x	Community Advisory Committee Meetings
x	Community Advisory Committee Meeting Minutes
	TASK 12 – Public Outreach Program
x	Public Outreach Weekend Site Visits
x	Public Outreach Final Memo
	TASK 15 – Long-term Management Plan
x	Finalize Long-term Management Plan
	TASK 17 – Annual Report
x	2012 Annual Report

Implemented and/or Continued in 2012	
	TASK 18 – Meetings
x	Meetings with LACDPW, Agencies, Public, and Consultants
	TASK 19 – Structure Monitoring and Removal
x	Illegal Structure Site Visit
x	Illegal Structure Removal Suggestions/Guidelines Memo
x	Illegal Structure Removal Biological Monitoring and Memo

1.3.1 Continuation of Brown-headed Cowbird Trapping Program

Brown-headed cowbird trapping was conducted in and around the Mitigation Area in the spring and summer of 2012. This program is outlined in the MMP 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. One cowbird trap was placed within the Mitigation Area and three traps were placed outside the Mitigation Area in suitable cowbird foraging habitat. A total of 137 cowbirds were removed from the four traps between April 2 and June 30, 2012. Details of the brown-headed cowbird trapping program are found in Section 2.0.

1.3.2 Continuation of Exotic Plant Eradication Program

This task consisted of ongoing monitoring of past exotic plant removal efforts and continued removal of exotic and invasive vegetation. Periodic site visits were conducted to determine the locations of exotic plant species removal efforts, to strategize the best course of action, 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 removal techniques would coincide with the exotic plant species' growth cycles. The major focus of this task for the 2012 period was cutting or girdling exotic trees and treating exotic plant species (such as giant reed [*Arundo donax*] and eupatory [*Ageratina adenophora*]) with CDFW-approved herbicides. The exotic plant species eradication activities that were conducted in 2012 are summarized in Section 4.0.

1.3.3 Water Lettuce Control Program

A new task, water lettuce (*Pistia stratiotes*) removal, was added to the Exotic Plant Eradication Program in 2011 due to infestation of this non-native plant in the Tujunga Ponds. Following manual removal in early January 2012, remaining patches of water lettuce were treated with CDFW-approved herbicide in January, July, August, and September. Activities associated with this program are summarized in Section 5.0.

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 adults) in an effort to maximize the efficiency of the removal program. A total of three exotic removal efforts occurred during the 2012 reporting period. Exotic wildlife removal tasks implemented in 2012 are summarized in Section 6.0.

1.3.5 Native Fish Monitoring

A native fish monitoring survey was conducted within the Mitigation Area during 2012. These surveys focused on three sensitive species: Santa Ana sucker (*Catostomus santaanae*), arroyo chub (*Gila orcuttii*), and Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3). A summary of the results of this study can be found in Section 7.0.

1.3.6 Least Bell's Vireo and Southwestern Willow Flycatcher Surveys

Focused surveys for least Bell's vireo and southwestern willow flycatcher were conducted in the Mitigation Area's riparian habitats during spring and summer of 2012. Numbers and locations of brown-headed cowbirds were also recorded, in accordance with the least Bell's vireo survey protocol. Survey results for both species were negative, although two migratory willow flycatchers (of a different subspecies) were detected. Details of these surveys are discussed in Section 8.0.

1.3.7 Arroyo Toad Surveys

Focused surveys for arroyo toad were conducted in Big Tujunga Wash during spring and summer of 2012. Six field surveys were conducted between April and July. Arroyo toads were not detected within the Mitigation Area. Details of the survey methodology and results for 2012 are summarized in Section 9.0.

1.3.8 Functional Assessment and Success Monitoring

Annual functional analyses have been conducted in the Mitigation Area to quantitatively assess the progress of the restoration effort. Evaluation variables assess riparian habitat functions (e.g., cover, structure), hydrologic and biogeochemical functions, and wildlife values. Success monitoring and analysis, implemented in 2009, was also included as a quantitative method to evaluate the performance of the riparian restoration areas. Field sampling for both of these components was conducted on August 14, 15, and 16, 2012. A summary of the 2012 study results and discussion of these results can be found in Section 10.0.

1.3.9 Water Quality Monitoring Program

Water quality sampling for the Mitigation Area was conducted by MWH Laboratories on November 27, 2012. A summary of the results of this monitoring is included in Section 11.0.

1.3.10 Continuation of Trails Monitoring Program

The Trails Monitoring Program aims to allow recreational use of the Mitigation Area while still preserving sensitive wildlife and their habitats. Three site visits were conducted in 2012 to look for areas that might qualify for trail closure, identify areas where trails were blocked by trash or debris, and mark locations of extensive stands of poison oak. Areas that required minor repairs were remedied during the visit or in combination with other task site visits. More extensive problem areas were mapped for repair at a later time. One trail closure occurred in 2012 after a "sink hole" was reported at a creek crossing following heavy rains. The Eighth Annual Trail Cleanup Day was held on Saturday, October 20, 2012. Trail maintenance tasks implemented in 2012 and further information about the trail closure and Trail Cleanup Day are summarized in Section 12.0.

1.3.11 Continuation of Community Awareness Program

This program consists of the continued implementation of the semiannual Community Advisory Committee (CAC) meetings that are held in spring and fall of each year. ECORP assumed the responsibilities 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. The status of the Community Awareness Program and activities conducted in 2012 are summarized in Section 13.0.

1.3.12 Public Outreach Program

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 in 2012 due to its past success. On-site interviews and education about the Mitigation Area were conducted on eight separate occasions by ECORP's bilingual biologists. The biologists handed out bilingual brochures describing the ecological purpose of the Mitigation Area, the importance of protecting sensitive biological resources, and permitted recreational uses within the Mitigation Area. While on site, they documented the presence of rock dams within Haines Canyon Creek and any unusual observations or circumstances. A full description of the outreach effort, as well as several notable incidents in 2012, are included in Section 14.0.

1.3.13 Long-term Management Plan

ECORP submitted a draft version of the Long-term Management Plan (LTMP) to LACDPW in October 2012 and is awaiting comments. The LTMP was submitted as a stand-alone document (ECORP 2012a) and is not included in this annual report (see Section 15.0).

1.3.14 Preparation and Submittal of Annual Report

This task refers to the preparation of the annual report 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 attended meetings as necessary with the LACDPW regarding various aspects of the MMP implementation. One meeting was held at the Mitigation Area on June 12, 2012 with USFWS, LACDPW, and Los Angeles County Department of Parks and Recreation (LACDPR) to discuss how to continually improve Santa Ana sucker habitat within the Mitigation Area. This is discussed in Section 16.0.

1.3.16 Illegal Structure Monitoring and Removal

An illegally-built structure was discovered in the Mitigation Area on July 16, 2012. An initial site visit was conducted on July 17, 2012 by ECORP biologists to identify impacts resulting from the illegal structure construction. Following a pre-removal activity nesting bird survey and biological resources briefing, a crew removed the structure and cleaned the site. A summary of the initial site visit, pre-removal activity survey, and biological monitoring during structure removal is included in Section 17.0.

1.3.17 Mitigation Area Permitting Guidance

ECORP was asked by LACDPW to assist in establishing guidelines for issuing permits for organized activities occurring within and adjacent to the Mitigation Area. This task is expected to be completed in January 2013 and the guidelines will be submitted to LACDPW as a stand-alone document (see Section 18.0).

2.0 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 parasitism 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 and again in 2009, 2010, and 2011. Trapping was not conducted in 2007 and 2008, as it was one of the tasks originally scheduled to occur once every three years. Based on the new SAA, CDFW is requesting that this task be completed every year. Griffith Wildlife Biology operated one cowbird trap within the Mitigation Area and three traps adjacent to the Mitigation Area between April 2 and June 30, 2012. The methodology, results, and discussion of the 2012 trapping are presented below and a full copy of the report is included as Appendix C.

2.1 Brown-headed Cowbird Natural History

Brown-headed cowbirds are brood parasites. Cowbirds do not make a nest of their own, nor do they contribute in raising their young. This species parasitizes the nests of native host species by laying their larger egg(s) in the host species' nests and leaving the egg(s) and chick(s) to be reared by the native host. Brown-headed cowbird young are often larger and more demanding than their host offspring, resulting in the host birds raising the cowbird chick and neglecting their own young. Female cowbirds can lay up to 40 eggs during the breeding season (ranging from two to four months; Scott and Ankney 1980).

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 parasitism rates by brown-headed cowbirds. In many areas, the reduction or elimination of brown-headed cowbirds through trapping has been directly related to increases in native bird populations.

2.2 Methodology

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

Document Path: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2012\Tujunga_Cowbird_Traps_2012.mxd

Aerial Date: USGS Dec 2010
12/19/2012

Figure 2-1. 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 each trap explaining the significance of the trap and urging recreational users not to tamper with the trap. At the start of trapping, one male and one female decoy cowbird were placed in the traps. After April 11, the preferred ratio of male to female decoys was established, with at least 2 males for every 3 females (up to 3 males and 5 females). The traps were opened on April 2 and operated every day until June 30, 2012. Each trap was serviced daily by either the Principal Investigator or a trapping assistant. 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, and 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, 2012. Cowbirds not used as decoys were euthanized with carbon monoxide and moved off-site to be provided as forage for raptor rehabilitation/reintroduction facilities.

2.3 Results

A total of 137 cowbirds were removed during the 2012 trapping season (68 males, 68 females, and 1 juvenile). Most cowbirds were captured and removed during the first seven weeks of the 13-week trapping period (between April 2 and May 19). Trap vandalism did not occur during the 2012 trapping season so there were no losses of decoys or trapping days.

A total of 281 non-target birds were captured in the traps and then quickly released. Six non-target species were captured, including spotted towhee (*Pipilo maculatus*), California towhee (*Pipilo crissalis*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), white-crowned sparrow (*Zonotrichia leucophrys*), and the CDFW Species of Special Concern (SSC) yellow-headed blackbird (*Xanthocephalus xanthocephalus*). All non-target birds captured during the trapping period, including the three yellow-headed blackbirds, were released unharmed and in good health. Banded cowbirds and/or banded non-target species were 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 in the trap. Additionally, there were no mortalities of decoy or non-target birds due to predation inside the traps during the 13 weeks of trapping.

2.4 Discussion

The number of brown-headed cowbirds trapped during the 2012 season was consistent with the average number of 123 cowbirds removed per year between 2001 and 2012 (trapping was conducted 10 of the past 12 trapping seasons). Locally-raised juveniles 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 2012 trapping season, possibly indicating that nest parasitism levels were low but not eliminated 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 has been effective at reducing nest parasitism 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 (4), or the dates and duration of cowbird trapping (13 weeks, April 1 to June 30).

3.0 HABITAT RESTORATION PROGRAM

The habitat restoration program was originally established to preserve, improve, and create habitat for Santa Ana sucker, Santa Ana speckled dace, arroyo chub, 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 focused on the restoration of cottonwood-willow riparian habitat. The goal of the initial habitat restoration plan was to remove invasive, non-native, and weedy species, such as giant reed, and to replant these areas with native riparian species. 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. 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.

When ECORP took over the contract for the implementation of the MMP in mid-2007, the habitat restoration plan was revised in order to better address the changing needs of the Mitigation Area and address the long-term maintenance needs of the restoration areas. The habitat restoration plan was also updated in 2009 (ECORP 2009) and is included in Appendix C of the 2009 Annual Report for the Mitigation Area (ECORP 2010).

3.1 Summary of the Original Habitat Restoration Efforts

The original habitat restoration efforts conducted in the Mitigation Area are 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 focused on planting new riparian woodland overstory and understory plants 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 throughout 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 more effective at filling 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 losses of these container plants were noted following the watering program.

3.2 Current Status of the Habitat Restoration Program

The planting and maintenance portions of the habitat restoration program were terminated in 2010 (ECORP 2011). The exotic plant removal component of the habitat restoration program, however, was continued and the exotic plant removal task was absorbed into the new exotic plant eradication and maintenance program during the contract revision in 2012. The exotic plant eradication and maintenance program is discussed in Section 4.0.

4.0 CONTINUATION OF EXOTIC PLANT ERADICATION AND MAINTENANCE PROGRAM

The purpose of the exotic plant eradication and maintenance program at the Mitigation Area is to increase the ecological value of the existing native vegetation communities. The original exotic plant removal program targeted the riparian communities in and around Haines Canyon Creek, Big Tujunga Wash, and the Tujunga Ponds, however, this program has since been expanded due to the MMP implementation contract revision in 2012 to encompass the cottonwood/willow restoration area maintenance and oak-sycamore woodland weeding activities. By removing exotic plant species and continually performing maintenance in these areas throughout the Mitigation Area, 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 increased chances of success within the restoration areas, which 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. Table 4-1 lists the exotic plant species targeted for eradication and Table 4-2 lists all the additional exotic plant species observed within the Mitigation Area.

Table 4-1. Target Exotic Plant 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*
Non-native weedy thistles	*Cirsium* sp.
Water hyacinth	*Eichhornia crassipes*
Eucalyptus	*Eucalyptus* sp.
Fennel	*Foeniculum vulgare*
Tree tobacco	*Nicotiana glauca*
Castor bean	*Ricinus communis*
Pepper trees	*Schinus* sp.
Milk thistle	*Silybum marianum*
Tamarisk	*Tamarix ramosissima*
<u>Non-native annual grasses</u> Wild oat 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*

Common Name	Scientific Name
<u>Non-native perennial grasses</u>	
Pampas grass	*Cortaderia selloana*
Bermuda grass	*Cynodon dactylon*
Fountain grass	*Pennisetum setaceum*
Smilo grass	*Piptatherum miliaceum*

Table 4-2. Additional Exotic Plant Species Observed in the Mitigation Area

Common Name	Scientific Name
Bentgrass	*Agrostis viridis*
Tree of heaven	*Ailanthus altissima*
Aloe vera	*Aloe* sp.
Belladonna lily	*Amaryllis belladonna*
Scarlet pimpernel	*Anagallis arvensis*
Southern catalpa	*Catalpa bignonioides*
Tocalote	*Centaurea melitensis*
Spotted spurge	*Chamaesyce maculata*
Umbrella plant	*Cyperus involucratus*
Poison hemlock	*Conium maculatum*
Pride of Madeira	*Echium candicans*
Red-stemmed filaree	*Erodium cicutarium*
Petty spurge	*Euphorbia peplus*
Roundleaf geranium	*Geranium rotundifolium*
Shortpod mustard	*Hirschfeldia incana*
Smooth cat's ear	*Hypochaeris glabra*
Glossy privet	*Ligustrum lucidum*
Sweet alyssum	*Lobularia maritima*
Cheeseweed	*Malva parviflora*
High mallow	*Malva sylvestris*
Horehound	*Marrubium vulgare*
Alfalfa	*Medicago sativa*
Marvel of Peru	*Mirabilis jalapa*
Common plantain	*Plantago major*
Sand plantain	*Plantago psyllium*
Curly dock	*Rumex crispus*
Fiddle dock	*Rumex pulcher*
Tumble mustard	*Sisymbrium altissimum*
Spanish broom	*Spartium junceum*
Spiny sowthistle	*Sonchus asper*
Common sowthistle	*Sonchus oleraceus*
Common chickweed	*Stellaria media*

Common Name	Scientific Name
Feverfew	*Tanacetum parthenium*
Common dandelion	*Taraxacum officinale*
Puncture vine	*Tribulus terrestris*
Chinese elm	*Ulmus parvifolia*
Wand mullein	*Verbascum virgatum*
Water speedwell	*Veronica anagallis-aquatica*
Periwinkle	*Vinca major*
Non-native annual grasses Red brome Barnyard grass Common wheat	 *Bromus rubens* *Echinochloa crus-galli* *Triticum aestivum*
Non-native perennial grasses Perennial veldtgrass Perennial ryegrass	 *Ehrharta calycina* *Lolium perenne*

The revised approach to the exotic plant eradication and maintenance program also includes a more aggressive program of targeting the elimination of the large, non-native trees that create the dense overstory within the Mitigation Area. Removal of these exotic tree species will create a more open canopy within the Mitigation Area, which will allow more sunlight to reach the native plant species growing beneath the canopy. The tree species targeted under the exotic plant eradication and maintenance program are listed in Table 4-3.

Table 4-3. 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*
Japanese privet	*Ligustrum japonicum*
Liquidambar	*Liquidambar stryraciflua*
Mulberry	*Morus alba*
Wild tobacco	*Nicotiana glauca*
Castor bean	*Ricinus communis*
California pepper	*Schinus molle*
Brazilian pepper	*Schinus terebinifolius*
Chinese elm	*Ulmus parvifolius*
Palm trees	*Washingtonia* spp., *Phoenix canariensis*, etc.

4.1 Exotic Plant Eradication Methods

Exotic plant eradication activities took place throughout the riparian and upland portions of the entire Mitigation Area. These eradication activities also included weeding in the upland area between Big Tujunga Wash and the northern boundary of the Mitigation Area. This area was not previously part of the areas that were actively weeded on a regular basis in the past, but infestations of invasive exotic plant species (fountain grass [*Pennisetum setaceum*]) and weeds (thistle [*Cirsium* spp.] and mustard [*Brassica* spp.] species) are now present at levels that need to be controlled. Although exotic plant eradication efforts were conducted throughout the entire Mitigation Area, Figure 4-1 shows the areas that are considered high priority for targeting exotic plant species.

Pre-removal activity surveys were conducted by qualified biologists prior to each exotic plant eradication effort to document exotic plant locations and any sensitive biological resources to avoid during the removal efforts. During the pre-removal activity surveys, the biologists conducted a walkthrough of all trails in the riparian and upland areas. Coordinates of new exotic plant species locations or sensitive biological resources (such as active bird nests) were taken with a global positioning system unit (GPS) and recorded on data sheets. CDFW was notified prior to the commencement of all removal activities, in accordance with the Mitigation Area's SAA (see Appendix D).

During the exotic plant eradication efforts, a biological monitor was present to ensure that crews conducted work within the appropriate pre-defined work areas and that the removal activities did not result in impacts to sensitive biological resources such as nesting bird activity. The biological monitor also 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 (see Appendix B). The biological monitor was responsible for showing the removal crews locations of exotic plant species that had been recorded during previous site visits and pre-removal activity surveys. Newly identified stands of exotic vegetation were treated as they were discovered. Plants and trees treated with herbicide were flagged with survey flagging to aid detection during follow-up visits to determine success. All treated areas were documented by the biological monitor and digital photographs were taken to document removal efforts. Following the completion of each eradication effort, a memo was prepared that documented the eradication activities and locations, as well as the presence of any sensitive biological resources. All exotic plant removal efforts were conducted according to the terms and conditions of the SAA.

Aerial Date: USGS Dec 2010
12/19/2012

Figure 4-1. High Priority Exotic Plant Removal Locations

2010-116 Big Tujunga Wash Mitigation Area

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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. Large exotic trees were treated by girdling the trunk of the tree with a saw or hand tool and painting herbicide on the area that was girdled. Locations within a 15-foot distance from permanent (Haines Canyon Creek, Tujunga Ponds) or temporary (ephemeral ponds from rains) bodies of water were treated with an approved water-certified herbicide (such as AquaMaster™). All other locations were treated with either Razor Pro® or, when girdling, with Garlon 4® herbicide. 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 placed in areas that would not impede visitor traffic or pose a safety hazard.

Weed removal activities in the oak/sycamore area near the Cottonwood Avenue entrance to the Mitigation Area were conducted by hand using Round-Up® herbicide, hand tools, and gasoline-powered weed whackers. The weed removal efforts were timed to remove weeds and non-native grasses during the growing season and prior to deposition of new seeds in the restoration area.

4.2 Exotic Plant Eradication Efforts in 2012

Site-wide exotic plant eradication occurred during four different efforts in 2012: March 22, 23, 27 through 30, and April 2 (first effort); August 2, 3, 6 through 9, 13 through 15, and 20 (combined second and third efforts); and December 10 through 12 and 17 (fourth effort). ECORP biologists Tania Asef, Kristina Day, Carley Lancaster, Kristen Mobraaten, Cara Snellen, Amy Trost, and Phillip Wasz conducted the pre-removal activity surveys and/or the biological monitoring for exotic plant eradication efforts.

Exotic plant and tree eradication efforts were conducted throughout the entire Mitigation Area. The eradication activities did not result in impacts to any sensitive biological resources. During the pre-removal activity survey of the upland areas, two American goldfinches (*Spinus tristis*) were observed carrying nest material and nest-building along the northern extent of Cottonwood Avenue. A 300-foot buffer was established in this area to prevent disturbing bird breeding activity. Weeding activities were restricted to the areas outside of this buffer. Notes and representative site photographs were taken and the coordinates of additional weed/exotic plant locations were recorded using a handheld GPS unit.

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

5.0 WATER LETTUCE CONTROL PROGRAM

In March 2011 during an exotic wildlife removal effort, aquatic biologists noticed that the Tujunga Ponds were becoming infested with water lettuce, an invasive plant commonly used in aquariums and ponds. Within one month of the initial observation, the entire East Tujunga Pond was completely covered with the surface-growing plant. Within two months the entire West Tujunga Pond was covered. The infestation was so great that the waterways between the ponds and Haines Canyon Creek were becoming suffocated. Water lettuce is listed under the United States Department of Agriculture's Plant Database as an invasive and noxious weed and is thought to spread via dumping of aquariums (USDA NRCS 2011). The water lettuce at the Tujunga Ponds has the potential to threaten habitat for endangered species such as the Santa Ana sucker, as well as have a negative impact on the native turtle and bird species that use the ponds as habitat. ECORP immediately contacted LACDPW to create a plan for water lettuce removal from the Mitigation Area waterways.

Intensive water lettuce removal efforts were immediately initiated to control the infestation. Physical removal efforts were conducted between June and December 2011, with the last physical removal of the water lettuce completed on January 5, 2012. A detailed description of the physical removal efforts can be found in the 2011 Annual Report for the Big Tujunga Wash Mitigation Area (ECORP 2012b). A memo documenting the physical removal effort in January 2012 is included in Appendix E.

Following the physical removal efforts of the water lettuce, a monitoring and maintenance program was established in 2012 to keep the water lettuce populations in check and prevent another infestation from occurring in the Tujunga Ponds and Connector Channel. The program consisted of monthly herbicide applications conducted on an as-needed basis that were paired with follow-up site inspections to monitor the success of the herbicide application. A memo was prepared following each application and follow-up site visit. Four herbicide application efforts were conducted in 2012 and are summarized below.

Renovate®, an herbicide designed for use within aquatic environments and approved by CDFW for use within the Mitigation Area, was applied to patches of hard-to-reach water lettuce within cattails and other vegetation around the pond perimeters between January 6 and January 11, 2012. Additional herbicide applications were scheduled to follow on a monthly basis as needed. However, monthly maintenance was not necessary until the end of July, after additional water lettuce re-growth was observed.

A second water lettuce herbicide application was conducted between July 30 and August 2, 2012. ECORP biologists Cara Snellen and Tania Asef conducted a site visit on August 14, 2012 to document the success of the application. The biologists walked along the perimeter of both ponds and inspected the water for presence of water lettuce. The biologists did not observe any evidence of water lettuce; however, both ponds had large amounts of algae at the surface. The algae growth was likely an annual, naturally-occurring result of prolonged high summer temperatures in the area. The absence of water lettuce during the site visit provided evidence that the water lettuce herbicide application in late July/early August was successful.

The third and fourth herbicide application efforts were conducted between September 5 through 7 and between September 26 through 28, 2012. Following the two herbicide applications, ECORP biologist Ben Smith conducted a site visit on October 15, 2012 to inspect for presence of water lettuce. Again, water lettuce was not observed, but algal growth in the ponds was still prevalent. There was no need to conduct additional water lettuce herbicide application efforts for the remainder of the year. It will be important, however, to be diligent about monitoring for this plant as temperatures begin to warm up in the early spring months, as an infestation can occur very quickly once the plants begin active reproduction again.

The memos documenting the January removal effort, the four herbicide application efforts, and the follow up site visits are included as Appendix E.

6.0 EXOTIC AQUATIC WILDLIFE ERADICATION PROGRAM

The overall purpose of the exotic wildlife removal program is to maintain, restore, and create suitable habitat for native aquatic species, and to remove and eliminate ecological pressures resulting from the presence of exotic species. The 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 MMP. The MMP 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 outcompete natives for available space and food resources. Exotics can also directly impact 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 implementation of the MMP. 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 summarize the results of three exotic removal efforts conducted during 2012. A copy of the full report can be found in Appendix F.

6.1 Methodology

A wide range of sampling techniques was used 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 used to capture and remove exotic aquatic species: fyke net trapping, spearfishing (day and night), dip-netting/hand capturing, bullfrog gigging, two-person seining, minnow trapping, turtle trapping, and gillnetting.

Fyke net trapping was conducted solely in the Connector Channel. All spearfishing and hand-capturing efforts were conducted while snorkeling. Dip-netting was performed in Haines Canyon Creek during diurnal removal efforts. Bullfrog gigging was primarily done at night by patrolling the perimeter of the ponds and upper portions of Haines Canyon Creek. Seining was accomplished using both 9- and 16-foot un-bagged seines mounted on poles within Haines Canyon Creek. Turtle and crayfish/minnow traps were baited with small cans of sardines and cat food with small holes punched into them. All traps remained open overnight. Gillnets were used in the ponds and were checked every eight hours during the removal efforts. Additionally, during snorkeling activities any Centrarchid (Sunfish Family) nests or bullfrog egg masses observed were destroyed or removed.

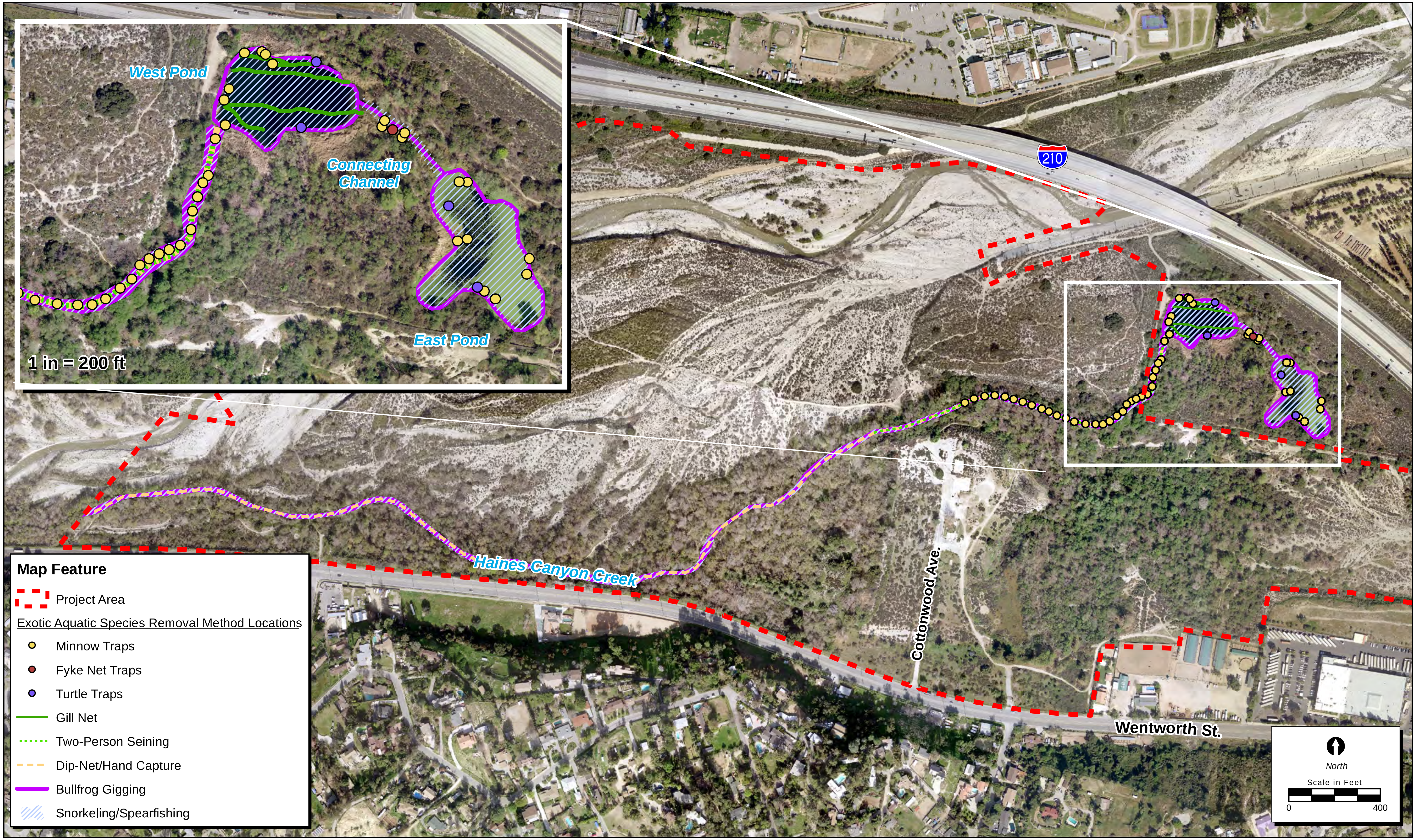
An evaluation of sampling locations and methods was conducted prior to each removal effort. Sampling locations were generally selected in areas with the highest probability for detection and capture of exotic aquatic species, based on the following criteria: presence of access points, habitat suitability (e.g., pooled habitats lacking aquatic vegetation), and overall crew safety. With the sampling locations selected, sampling methods were generally determined by the habitat type and effectiveness of a method at removing these species. In addition to the exotic aquatic species removal efforts in the creek, efforts were also made to remove rock dams and foot bridges.

The 2012 removal of exotic aquatic species (fish, amphibian, reptile, and invertebrate) from the Mitigation Area was conducted over a total of three removal efforts: May 29 through 31 (effort number 1), September 4 through 6 (effort number 2), and December 4 through 6 (effort number 3). All sampling was conducted under the direction of USFWS 10(a)(1)(A) recovery permit holders for Santa Ana sucker, Todd Chapman and Brian Zitt (TE-110094-2 and TE-27460A-0, respectively). 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 6-1.

6.2 Results

A total of 2,490 individuals were captured, consisting of 12 exotic aquatic species (10 fishes, one amphibian, and one invertebrate) and 3 native fishes during the 2012 removal efforts (Table 6-1). Of the total, 98.0 percent (number of individuals [n] =2,439) of the individuals captured were exotic and removed from the site. Haines Canyon Creek accounted for 80.5 percent of the total catch (n=1,950), while the remaining 19.5 percent were captured in the remaining water features: West Pond (n=256), Connector Channel (n=123), and East Pond (n=110). All three native fishes (Santa Ana sucker [n=45], arroyo chub [n=5], and Santa Ana speckled dace [n=1]) were collected in Haines Canyon Creek. These individuals were in good overall health and immediately released back into the creek.

The three removal efforts resulted in the capture and removal of 1,847 red swamp crayfish, 469 largemouth bass, 33 bullfrogs (22 adults, 8 juveniles, and 3 tadpoles), 26 bluegill, 18 green sunfish, 17 common carp (*Cyprinus carpio*), 16 mosquitofish, 8 goldfish (*Carassius auratus*), 2 Mozambique tilapia (*Oreochromis mossambicus*), 1 fathead minnow (*Pimephales promelas*), 1 black bullhead (*Ameiurus melas*), and 1 channel catfish (*Ictalurus punctatus*). A complete listing of all aquatic species captured during the 2012 sampling efforts is included in the full report presented in Appendix F.



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12/19/2012

Figure 6-1. Exotic Aquatic Wildlife Species Sampling Locations

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Table 6-1. Summary of Aquatic Species Removal by Location and Efforts, 2012

Removal Location	Removal Dates	Exotic Species														Native Species			Grand Total
		Goldfish	Common carp	Fathead minnow	Black bullhead	Channel catfish	Mosquitofish	Green sunfish	Bluegill	Largemouth bass	Mozambique tilapia	Bullfrog adult	Bullfrog juvenile	Bullfrog tadpole	Red swamp crayfish	Arroyo chub	Santa Ana speckled dace	Santa Ana sucker	
Haines Canyon Creek																			
	May 29 - May 31, 2012			1	1		4	3		38		2			607	3			659
	September 4 - September 6, 2012	1	8				1			167		5	3	1	800	2	1	7	996
	December 4 - December 6, 2012	5					11	1		108					183			38	346
	Subtotal	**6**	**8**	**1**	**1**		**16**	**4**		**313**		**7**	**3**	**1**	**1,590**	**5**	**1**	**45**	**2,001**
West Pond																			
	May 29 - May 31, 2012							3	12	50		6[a]			39				110
	September 4 - September 6, 2012		2						2	11		1	3		4				23
	December 4 - December 6, 2012		7			1		10	12	80			2[b]	1	10				123
	Subtotal		**9**			**1**		**13**	**26**	**141**		**7**	**5**	**1**	**53**				**256**
Connector Channel																			
	May 29 - May 31, 2012											3							3
	September 4 - September 6, 2012									2					73				75
	December 4 - December 6, 2012							1		6				1	37				45
	Subtotal							**1**		**8**		**3**		**1**	**110**				**123**
East Pond																			
	May 29 - May 31, 2012	1								1		3			63				68
	September 4 - September 6, 2012											1			8				9
	December 4 - December 6, 2012	1								6	2	1			23				33
	Subtotal	**2**								**7**	**2**	**5**			**94**				**110**
Grand Total		**8**	**17**	**1**	**1**	**1**	**16**	**18**	**26**	**469**	**2**	**22**	**8**	**3**	**1,847**	**5**	**1**	**45**	**2,490**

[a] Two individuals captured in the freeway drainage adjacent to the West Pond

[b] Individuals captured in the freeway drainage adjacent to the West Pond

6.3 Discussion

During the three exotic removal efforts conducted in 2012 a total of 2,490 individuals, consisting of 12 exotic aquatic species and three native fishes were removed. The majority of exotic aquatic species captured and removed came out of Haines Canyon Creek (80.5 percent). Of this total, red swamp crayfish and juvenile largemouth bass accounted for 97.6 percent of the individuals removed. Both of these species were observed in high densities, along with Santa Ana sucker, during the 2012 surveys in Haines Canyon Creek. Conversely, there were no native fishes, amphibians, or reptiles observed in the Tujunga Ponds, as the captures there were exclusively comprised of exotic fishes, bullfrogs, turtles, and red swamp crayfish. Although the ponds and Connector Channel only accounted for 19.5 percent of the total exotic aquatic species removal, the overall biomass of these individuals far exceeded that removed from the creek, as the majority of the individuals were large adults.

The slow moving, deep water habitat that exists in the ponds provides an ideal location for exotic aquatic species to forage, breed, and take up shelter. Haines Canyon Creek is a swift moving, shallow water stream that contains a limited number of pools. The majority the habitat within Haines Canyon Creek would not be considered ideal for exotic aquatic species; however, in recent years (observation during the 2011 and 2012 removal efforts) exotic fish densities have become more prolific and widespread throughout the creek. In 2011, the ponds experienced an outbreak of water lettuce, a noxious aquatic plant that completely covered the surfaces of both ponds. Two large scale water lettuce removal efforts took place in 2011, and in 2012 these efforts were followed by several spot treatments of herbicide. It is unclear what affect the water lettuce had on the aquatic species assemblages, but it appears exotic aquatic species are migrating downstream of the ponds and becoming established in Haines Canyon Creek.

Two-person seining was used to target pools and shallow undercuts of Haines Canyon Creek. It was the most effective method used in 2012 for removing red swamp crayfish (46.5 percent of individuals captured) and juvenile exotic fishes (58.5 percent of the individuals captured). Two-person seining was used in combination with dip-netting and hand captures in the creek. Combined, these sampling methods removed nearly 80 percent of the exotic species in 2012. Minnow trapping continues to be an effective removal method for capturing red swamp crayfish, juvenile fishes, and bullfrog tadpoles.

Bullfrog gigging remains the most effective method for capturing adult and juvenile bullfrogs. In addition to the bullfrogs that were removed within the Mitigation Area, four bullfrogs (two adults and two juveniles), added to the West Pond's total, were captured in the I-210 freeway drainage channel. This drainage retains water throughout the year and provides breeding and foraging habitat for bullfrogs. In addition to the bullfrog captured during the removal efforts, 19 bullfrogs (13 adults, 5 juveniles, and 1 tadpole) were removed from Big Tujunga Wash during focused arroyo toad surveys earlier in the year.

Spearfishing continues to be an effective method for capturing and removing large exotic fishes. The nighttime spearfishing surveys produced more captures than daytime spearfishing, as fish are typically easier to approach at night. Spearfishing surveys allowed biologists insight into the current underwater habitat features, species specific habitat preferences, and approximate locations of exotic aquatic species aggregations. Two Mozambique tilapia were removed during spearfishing efforts in the East Pond. This is a new recording of this species at the Mitigation Area. This is an invasive species that, if left unchecked, has the potential to flourish within the Mitigation Area.

Gillnetting was also an effective method of capturing and removing large exotic fishes. Spearfishing around the gillnets often caused fish to get flushed into the nets. Combined, gillnetting and spearfishing accounted for 35.8 percent of the exotic fishes captured. These individuals were primarily adult largemouth bass removed from the West Pond. In addition to those individuals removed, snorkeling surveys allowed for several sunfish nests to be destroyed, and areas around downed trees, snags, and undercut banks to be examined for the presence of exotic turtles. There were no turtles (native or exotic) observed during snorkeling surveys.

The depth and width of the Connector Channel provides an optimal setting for the deployment of a fyke net trap, as it completely blocks off the channel. The fyke net was another sampling method that proved effective at capturing large adult fishes. Turtle trapping was the least effective method used in 2012, only capturing two red swamp crayfish. No exotic turtles were observed or captured during the 2012 removal efforts.

Removal effort #1 (May 2012) captured a total of 840 individuals, while removal effort #2 (September 2012) yielded the highest catch at 1,103 individuals. Removal effort #3 took place in December following a few winter storms and produced lower numbers compared to the first two removal efforts with 547 individuals. Fewer adult red swamp crayfish were observed in the creek during removal effort #3 which is typical during cold weather patterns and following winter storms.

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

7.0 NATIVE FISH MONITORING

ECORP conducted focused surveys for three native fishes (Santa Ana sucker, federally listed threatened and a CDFW SSC; arroyo chub, a CDFW SSC; and Santa Ana speckled dace, also a CDFW SSC) in the sections of Haines Canyon Creek and the Big Tujunga Wash that lie within the Mitigation Area boundaries. All three native species were detected during the surveys in Big Tujunga Wash, and two of the three species, Santa Ana Sucker and Santa Ana speckled dace, were detected during the surveys in Haines Canyon Creek. In addition, the following non-native species were observed: goldfish, common carp, brown bullhead (*Ameirus nebulosus*), western mosquitofish, green sunfish, bluegill, largemouth bass, red swamp crayfish, and bullfrog. A suite of habitat and water quality variables were also collected at each survey site within Haines Canyon Creek and Big Tujunga Wash in an attempt to capture any variation in fish populations and habitat quality within the Mitigation Area boundaries. The surveys in Haines Canyon Creek were conducted on December 10 through 12, 2012, and surveys in Big Tujunga Wash were conducted on December 19 and 20, 2012.

7.1 Methods

Contiguous 82-foot sites were surveyed from the downstream boundary of the Mitigation Area to the West Tujunga Pond within Haines Canyon Creek and from the downstream boundary of the Mitigation Area to the I-210 overpass within Big Tujunga Wash (Figure 6-1 in Section 6.0). At each of the sites, physical habitat characterization (PHAB) and fish population surveys were conducted as detailed below.

PHAB data at each site was recorded using a modified version of California's State Water Resources Control Board (SWRCB) Surface Waters Ambient Monitoring Program (SWAMP) procedures (Fetscher et al. 2009; details on this method are found in the Native Fishes Report in Appendix G). Average and maximum water depth, wetted stream width, instream habitat complexity, still edgewater habitat, flow habitat, substrate type, canopy cover, and human influence were recorded for of each of the sites within the study area.

PHAB data were used to evaluate the quality of habitat for Santa Ana sucker at each site. Four habitat types (canopy cover, maximum depth, substrate type, and flow habitat) were evaluated based on San Marino Environmental Associates' (SMEA) habitat suitability study of Big Tujunga Creek (SMEA 2009). Each site was given four separate habitat value scores (fry habitat score, juvenile habitat score, adult habitat score, and an overall habitat score) based on these habitat types. Because the focus of this study was primarily based on the population of Santa Ana sucker in the Mitigation Area, the habitat scores were weighted based on this species individual habitat requirements.

Native fishes surveys were conducted throughout the entire portion of the survey area during daylight hours when water visibility was ideal. Surveys were conducted by a team of one to two divers, using a mask and snorkel, and one data recorder. Divers entered the water downstream of each site proceeding slowly upstream, identifying fish species and providing size class and count data throughout the site. The two divers moved upstream working parallel to one another, covering the entire wetted width of the stream channel in a systematic fashion. The data recorder followed closely behind the divers and recorded their observations onto standardized data sheets.

Dive lights were used to inspect shaded areas containing woody debris piles or undercut banks. Long-handled dipnets were also used to sample shallow, isolated areas (less than 50 millimeters in depth) usually near the banks over fine sediment or algal mats. Occasionally, these long-handled dipnets were used to capture fish and compare actual lengths to underwater estimates. Divers wore underwater writing slates to assist them in obtaining counts, especially in areas where multiple individuals, species, or size classes were present. Habitat information (e.g., water depth, flow and substrate type, presence of exotic species) was collected in locations were Santa Ana sucker were observed. Estimates of total length were categorized into the following millimeter size groups: less than 50, 51 to 75, 76 to 100, 101 to 125, 126 to 150, greater than 150. Calibration of fish length estimates was achieved by divers carrying foldable meter sticks during the surveys, and also through a comparison of their visual estimates to length measurements collected from fish captured in the dipnets. Aquatic invertebrates and amphibians encountered during the surveys were also counted within each site.

7.2 Results

The native fishes surveys were conducted in Haines Canyon Creek between December 10 and 12, 2012 and in Big Tujunga Wash on December 19 and 20, 2012 under the direction of ECORP biologist Brian Zitt, USFWS 10(a)(1)(A) recovery permit holder for Santa Ana sucker (TE 27460A-0), with assistance by ECORP biologists Adam Schroeder and Terrance Wroblewski. Detailed results for each of the survey components are included in the full report presented in Appendix G. Water quality data were collected at five locations during surveys in Haines Canyon Creek and two locations in Big Tujunga Wash. Water quality data, with the exception of temperature in Big Tujunga Wash, remained relatively constant and were in line with what is expected in these systems. Water discharge velocity data were collected at the upstream and downstream extent of the survey area in Haines Canyon Creek and in Big Tujunga Wash.

7.2.1 Physical Habitat

Results from the PHAB characterization are included in the full report in Appendix G. PHAB data were collected from a total of 69 sites in Haines Canyon Creek. The maximum depth ranged from 9.1 inches to 55.1 inches, and the wetted width ranged from 4.6 feet to 32.8 feet. The predominant flow types within Haines Canyon Creek were glides (51.9 percent), riffles (32.9 percent), and pools (10.9 percent), and the predominant substrate types were sand (30.0 percent), gravel (25.7 percent), cobble (21.2 percent), and fines/silt (13.6 percent). The entire creek possessed a well-developed canopy of riparian vegetation averaging 86.7 percent total cover. Human influence was ubiquitous and widespread throughout Haines Canyon Creek, found mainly in the form of trash and unsanctioned trail building activities, but also included modifications to the stream channel in the form of rock dams. There was also evidence of fishing and swimming/wading in some areas within the creek, while exotic plants were present along most of the stream channel.

The habitat scores for fry Santa Ana sucker ranged from 0.2 to 3.5 in Haines Canyon Creek with an average score of 1.8. Habitat scores for juvenile Santa Ana sucker ranged from 1.2 to 3.8 with an average score of 2.5. Of the 69 sites, 17.4 percent were considered fair, 58.0 percent were considered good, and 24.6 percent were considered excellent habitat for juvenile Santa Ana sucker. Habitat scores for adult Santa Ana sucker ranged from 0.8 to 3.2 with an average score of 1.9. Of the 69 sites, 7.2 percent were considered poor, 49.3 percent were considered fair, 40.6 percent were considered good, and 2.9 percent were considered excellent habitat for adult Santa Ana sucker. Overall habitat scores in Haines Canyon Creek ranged from 1.0 to 2.8 with an average score of 2.1. Of the 69 sites, 1.4 percent were considered poor, 40.6 percent were considered fair, and 58.0 percent were considered good habitat for Santa Ana sucker.

PHAB data were collected from a total of 61 sites in Big Tujunga Wash. The maximum depth ranged from 7.9 inches to 28.3 inches, and the wetted width ranged from 7.5 feet to 46.9 feet. The predominant flow types within Big Tujunga Wash were riffles (58.5 percent) and glides (38.2 percent), and the predominant substrate types were cobble (36.2 percent), gravel (22.5 percent), boulders (18.5 percent), sand (11.3 percent) and fines/silt (11.2 percent). Big Tujunga Wash contains very little canopy cover of riparian vegetation averaging only 5.8 percent total cover. Human influence was ubiquitous and widespread throughout Big Tujunga Wash, found mainly in the form of trash, but also included modifications to the stream channel in the form of rock dams. There was evidence of swimming/wading in some areas within Big Tujunga Wash, and exotic plants were present in and adjacent to the water in many areas.

The habitat scores for fry Santa Ana sucker ranged from 0.7 to 3.9 in Big Tujunga Wash with an average score of 1.8. Habitat scores for juvenile Santa Ana sucker ranged from 1.2 to 3.2 with an average score of 2.6. Of the 61 sites, 11.5 percent were considered fair, 85.2 percent were considered good, and 3.3 percent were considered excellent habitat for juvenile Santa Ana sucker. Habitat scores for adult Santa Ana sucker ranged from 1.1 to 3.0 with an average score of 2.1. Of the 61 sites, 31.1 percent were considered fair, and 68.9 percent were considered good habitat for adult Santa Ana sucker. Overall habitat scores in Big Tujunga Wash ranged from 1.6 to 2.9 with an average score of 2.2. Of the 61 sites, 24.6 percent were considered fair, and 75.4 percent were considered good habitat for Santa Ana sucker.

7.2.2 Fish Population Surveys

A total of 2,939 individuals representing 12 species were observed during the native fishes surveys in December 2012 (Table 7-1). Of the total, 829 were native fishes consisting of Santa Ana sucker (n=596), Santa Ana speckled dace (n=88), and arroyo chub (n=145). All three species appeared to be in good health with no observable abnormalities. The remaining 2,110 individuals were exotic species consisting of primarily largemouth bass (n=836) and red swamp crayfish (n=1,159).

Table 7-1. Total Number of Species Observed within Haines Creek and Big Tujunga Wash, 2012.

		Native Species			Exotic Species									
Survey Location	**Survey Dates**	**Arroyo chub**	**Santa Ana speckled dace**	**Santa Ana sucker**	**Red swamp crayfish**	**Goldfish**	**Common carp**	**Brown bullhead**	**Western mosquitofish**	**Green sunfish**	**Bluegill**	**Largemouth bass**	**American bullfrog**	**Total**
Haines Creek	December 10 - December 12, 2012	0	74	592	1,159	3	1	1	0	5	24	833	0	**2,692**
Big Tujunga Wash	December 19 - December 20, 2012	145	14	4	0	0	0	0	80	0	0	3	1	**247**
	Total	**145**	**88**	**596**	**1,159**	**3**	**1**	**1**	**80**	**5**	**24**	**836**	**1**	**2,939**

A total of 1,533 fishes were observed during the survey of Haines Canyon Creek, of which 666 were native fishes consisting of Santa Ana sucker (*n*=592) and Santa Ana speckled dace (*n*=74). The remaining 867 individuals were represented by six species of exotic fish: goldfish (*n*=3), common carp (*n*=1), brown bullhead (*n*=1), green sunfish (*n*=5), bluegill (*n*=24), and largemouth bass (*n*=833). Additionally, red swamp crayfish (*n*=1,159) were observed during the surveys.

Of the 592 Santa Ana sucker observed in Haines Canyon Creek, 90 individuals were considered juvenile (75 millimeters or less total length), and the remaining 502 individuals were considered adults. Based on the habitat scores for juvenile Santa Ana sucker, 17 individuals were observed in sites containing fair habitat, 61 individuals were observed in sites containing good habitat, and 12 individuals were observed in sites containing excellent habitat. Based on the habitat scores for adult Santa Ana sucker, 16 individuals were observed in sites containing poor habitat, 231 individuals were observed in sites containing fair habitat, 220 individuals were observed in sites containing good habitat, and 35 individuals were observed in sites containing excellent habitat. Based on the overall habitat scores 225 Santa Ana sucker were observed in sites containing fair habitat and the remaining 367 individuals were observed in sites containing good habitat.

A total of 246 fishes were observed during the surveys in Big Tujunga Wash, of which 163 were native fishes consisting of Santa Ana sucker (*n*=4), Santa Ana speckled dace (*n*=14), and arroyo chub (*n*=145). The remaining 83 individuals were represented by two species of exotic fish, western mosquitofish (*n*=80) and largemouth bass (*n*=3). Additionally, a juvenile bullfrog (*n*=1) was observed during the surveys. This individual was captured and removed from the site.

Four adult Santa Ana sucker were observed in the Wash. All four individuals were found within sites containing good habitat based on the adult and overall habitat ranking scores for Santa Ana sucker.

7.3 Discussion

7.3.1 Physical Habitat

The PHAB characterization analysis ranked the habitat based on the individual requirements of each life stages of Santa Ana sucker (i.e., fry, juvenile, and adults) and provided an overall score for all Santa Ana sucker. The percentage of excellent habitat present in Haines Canyon Creek based on the individual habitat scores for fry, juvenile, and adult Santa Ana sucker was 31.9 percent, 24.6 percent, and 2.9 percent, respectively. After calculating the overall habitat scores for Haines Canyon Creek there were zero sites with habitat ranked as excellent. In order to receive an excellent habitat ranking, a particular site would need to contain a minimum amount of favorable habitat for each life stage. While many sites contained habitat that was considered excellent for one of the life stages, none of the sites contained a mix of habitats that were favorable to all of the life stages. The majority of the overall habitat within Haines Canyon Creek was ranked as fair to good (40.6 percent to 58.0 percent of the available habitat, respectively), with a small proportion ranked as poor (1.4 percent).

Although the abundance of Santa Ana sucker were much lower in Big Tujunga Wash in comparison to Haines Canyon Creek, the amount of fair to good habitat was found to be higher. Big Tujunga Wash contained a greater proportion of riffles and cobble substrates, and was lacking pools, an established riparian canopy, and a well-balanced mix of instream habitat complexity that was present in Haines Canyon Creek. An established riparian bank could help maintain bank stability, limit fluctuations in water temperature throughout the year, as well as provide woody debris, live tree roots, and other sources of instream habitat complexity. This canopy cover helps to keep dissolved oxygen levels and water temperatures stable during the warm summer months, but could restrict primary production and the abundance of periphyton (a complex mixture of algae, cyanobacteria, microbes, and detritus) that are key components in the life stages of many native fishes and amphibians.

7.3.2 Fish Population Surveys

Distribution and Density

Native fishes surveys in Haines Canyon Creek resulted in the observation of two out of the three native fish species. Santa Ana sucker was the most abundant native fish observed, accounting for 88.9 percent of the native fish community, while Santa Ana speckled dace accounted for the remaining 11.1 percent. Although arroyo chub were observed (*n*=5) in Haines Canyon Creek earlier in 2012 during exotic species removal efforts (Section 6.0), there were no observations of this species during this current study. Prior surveys conducted in Haines Canyon Creek between 2010 and 2012 have only detected adult arroyo chub above the Cottonwood Avenue area equestrian crossing (approximately 1,500 feet downstream of the Tujunga Ponds). For Santa Ana sucker, adults represented the majority of the individuals observed in this study (84.8 percent), while juveniles represented the remaining 15.2 percent. No Santa Ana sucker fry were observed, but this would be expected as the surveys were conducted late in the season and these fry would have grown to a juvenile size by the time the surveys were conducted.

Independent of the overall habitat scores, adult Santa Ana sucker were observed more frequently in sites with good to fair scores (89.8 percent of the adults observed), which combined represented the majority of sites (89.9 percent). The majority of sites with good habitat for juvenile Santa Ana sucker (58 percent of the sites) coincided with the highest proportion of individuals utilizing this habitat (67.8 percent of the juveniles observed). The remainder of sites ranked juvenile habitat as excellent (24.6 percent of the sites) with 13.3 percent of the individuals observed, and fair (17.4 percent of the sites) with 18.9 percent of the individuals observed.

Overall, Santa Ana sucker in Haines Canyon Creek were often found in large congregations in or near woody debris piles or along undercut banks in depths greater than 40 centimeters. Most of these observations found Santa Ana sucker over sand and gravel substrates immediately downstream of swift moving riffles. Largemouth bass and red swamp crayfish, both known predators of Santa Ana sucker, were also observed in high densities throughout Haines Canyon Creek. They were often seen occupying the same habitat areas preferred by the Santa Ana sucker. Exotics species densities outnumbered native species in Haines Canyon Creek by a factor of 3 to 1. This is likely due to the presence of source populations of exotic species in the Tujunga Ponds which flow directly into Haines Canyon Creek. Although exotic species were observed throughout Haines Canyon Creek, their overall densities were greatest in the sites closest in proximity to the Tujunga Ponds, with their numbers steadily decreasing with an increase in distance downstream. The opposite was observed with Santa Ana sucker and Santa Ana speckled dace, which appeared to have greater densities with increasing distance from the Tujunga Ponds.

Native fishes surveys in Big Tujunga Wash resulted in the observation of all three native fish species. Arroyo chub was the most abundant native fish observed in Big Tujunga Wash, followed by Santa Ana speckled dace and Santa Ana sucker. Although recruitment in all three species was observed earlier in the year during focused surveys for arroyo toad in Big Tujunga Wash (Section 9.0), no juvenile Santa Ana sucker were observed. Only four adult Santa Ana sucker were observed during these surveys, which is far fewer than what was observed between April and July 2012. Santa Ana sucker in Big Tujunga Wash were only found in good habitat, which was represented by over 75 percent of the available habitat. Overall, far fewer exotic species were observed in Big Tujunga Wash as compared to Haines Canyon Creek, which is likely attributed to the seasonal drying out of Big Tujunga Wash and the connectivity of the Tujunga Ponds with Haines Canyon Creek. Conclusions on the fish population distribution and density study can be found in the full report in Appendix G.

Comparison between 2009 and 2012

In 2009, the native fishes survey conducted in Haines Canyon Creek identified five sites that were sampled using two backpack electrofishing units with a three-pass depletion sampling technique (ECORP 2010). In this current study the same five sites were resampled using visual mask and snorkel survey techniques to obtain fish counts and length data. Both sampling efforts were conducted during similar times of the year, under suitable sampling conditions for capturing/observing fish. Water quality parameters were comparable between the two sampling periods; however, recent rains prior to the 2012 surveys may have caused an increase in water discharge measurements from 1.27 cubic feet per second (cfs) in 2009 to 2.59 cfs in 2012.

When comparing the five sampling sites between the two studies, only one site (Site 3 in 2012 [referenced as Site 1 in 2009]) was noticeably different as it had shifted locations. In 2009 this site had meandered into a portion of an equestrian trail; however, in 2012 the site had been redirected back into the main channel of the stream course. This shift increased the habitat score from fair (2009) to good (2012) and the number of Santa Ana sucker greatly increased in this site of Haines Canyon Creek (from one individual in 2009 to 51 in 2012). In 2012, Site 55 (referenced as Site 4 in 2009) was the only site that remained unchanged in nearly every PHAB parameter collected between the two studies. This site received identical habitat scores in 2009 and 2012. Although the habitat at this site remained unchanged, the abundance of Santa Ana sucker has appeared to more than double during the three year period. In 2012, Site 68 [located furthest upstream, nearest the Tujunga Ponds (referenced as Site 5 in 2009)] decreased from good (2009) to fair (2012) in its habitat score based on an increase in sand and fine substrates and the flow habitat shifting from riffle/pool to riffle/glide complex. No Santa Ana sucker were observed at this site during either sampling effort. The other two sites (referenced as 2 and 3 in 2009 and 19 and 38 in 2012, respectively) contained slight shifts in their habitat scores and totals of Santa Ana sucker.

Arroyo chub and Santa Ana speckled dace numbers were low in 2009, with only two arroyo chub detected at a single site and 13 Santa Ana speckled dace detected at the three downstream sites (Table 7-2). In 2012, these numbers decreased with only seven Santa Ana speckled dace being observed at two of the three sites where it was previously detected, and no arroyo chub were observed within any of the sites. In 2012, all exotic species totals decreased except in the case of bluegill, where the total increased by one individual.

Table 7-2. Comparison between Abundance of Native and Exotic Species in Haines Creek, 2009 and 2012.

2012 (2009) Survey Location	Native Fish Species						Exotic Species									
	Arroyo chub		Santa Ana speckled dace		Santa Ana sucker		Western mosquitofish		Green sunfish		Bluegill		Largemouth bass		Red swamp crayfish	
	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012
Site 3 (1)	2	0	1	5	1	51	0	0	1	0	0	1	36	2	30	3
Site 19 (2)	0	0	4	0	2	0	0	0	1	0	0	0	12	5	30	3
Site 38 (3)	0	0	8	2	21	24	0	0	0	0	0	0	3	2	12	3
Site 55 (4)	0	0	0	0	17	35	0	0	10	0	0	0	12	2	23	0
Site 68 (5)	0	0	0	0	0	0	3	0	2	0	0	0	34	10	39	11
Totals	**2**	**0**	**13**	**7**	**41**	**110**	**3**	**0**	**14**	**0**	**0**	**1**	**97**	**21**	**134**	**20**

8.0 LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER SURVEYS

Focused surveys for least Bell's vireo and southwestern willow flycatcher were conducted by ECORP biologists in 2012. Rainfall totals for 2012 in the Sunland area were suitable for conducting presence/absence surveys for these wildlife species, with the region experiencing approximately 5 to 6 inches of precipitation between January and April 2012 (http://www.accuweather.com). Areas surveyed for least Bell's vireo and southwestern willow flycatcher are shown in Figure 8-1.

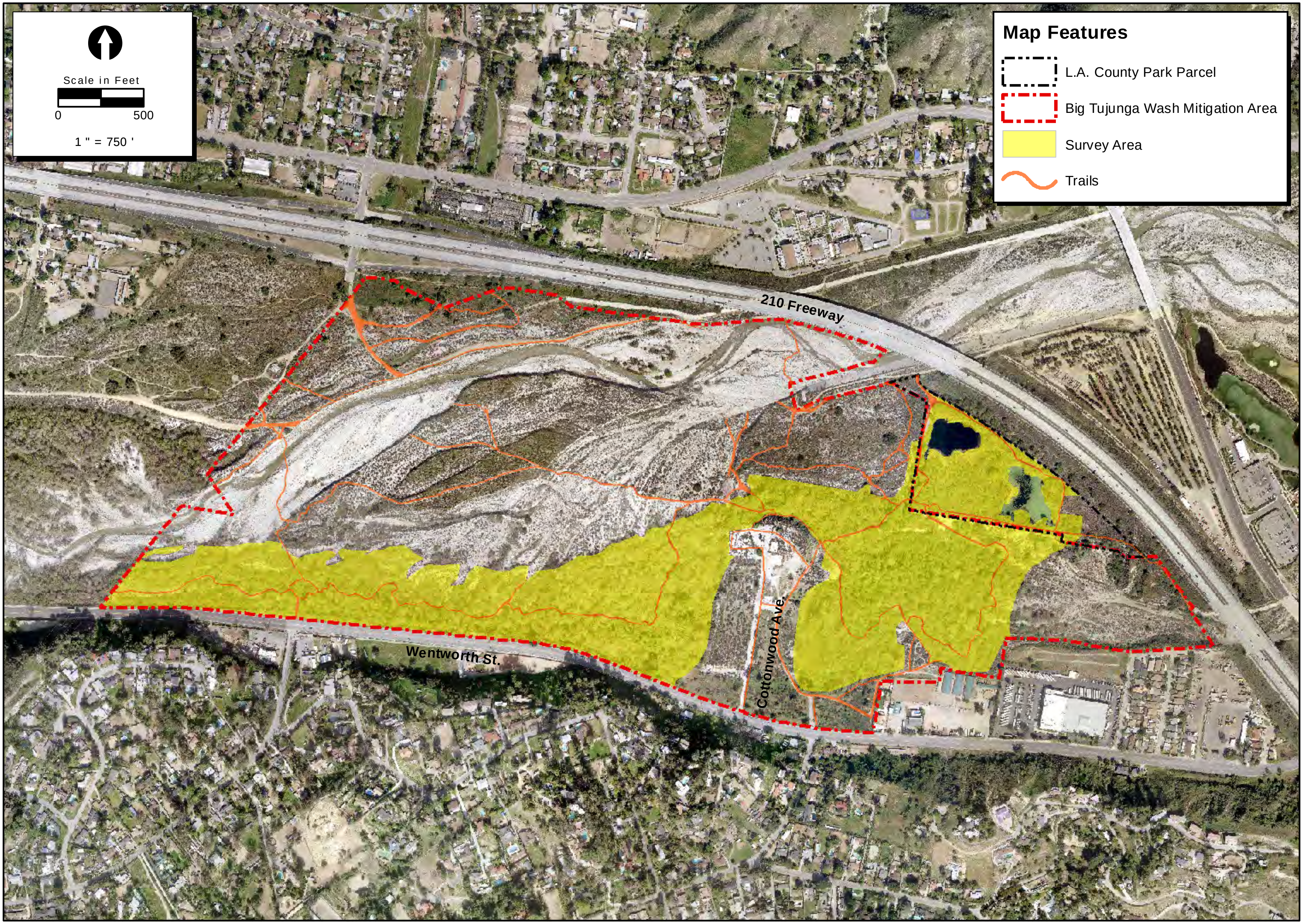
8.1 Least Bell's Vireo

Focused surveys were conducted in 2012 for least Bell's vireo in the Mitigation Area's riparian habitats. Surveys were conducted according to the USFWS Least Bell's Vireo Survey Guidelines (2001) from late April through late July. All surveys were conducted at least ten days apart. Surveys were conducted by biologists familiar with the calls, songs, and plumage characteristics of the least Bell's vireo and other riparian bird species. Each survey was conducted between 0530 and 1130. Surveys were not conducted during mornings with unacceptable weather conditions such as sustained high winds (greater than 10 miles per hour), extreme temperatures (less than 55 degrees Fahrenheit [ºF] or greater than 100ºF taken at six inches above the ground in the shade), rain, hail, or dense fog.

Brian Leatherman and ECORP biologists Shannon Shaffer, Terrance Wroblewski, and Becky Valdez conducted the surveys on foot through suitable habitat while listening for least Bell's vireo vocalizations and scanning the canopy with binoculars to identify bird species. The dates and weather conditions during the surveys are shown below in Table 8-1. All wildlife species observed were recorded in field notes. Numbers and locations of brown-headed cowbirds were recorded in accordance with the protocol. Survey results for least Bell's vireo were negative. A copy of this report is included as Appendix H.

Table 8-1. Least Bell's Vireo Survey Dates and Weather

Date	Surveyors	Time	Temperature (°F)	Wind (mph)	Cloud Cover (%)
4/30/2012	S. Shaffer B. Valdez	0715-1115	57-73	0-1	95
5/10/2012	S. Shaffer T. Wroblewski	0615-0945	62-68	0-1	100
5/21/2012	B. Leatherman	0530-1130	59-86	0-2	0
6/4/2012	B. Leatherman	0530-1100	65-67	0-4	75
6/18/2012	B. Leatherman	0530-1030	61-74	0-4	40
7/2/2012	B. Leatherman	0530-1130	57-84	0-4	50
7/16/2012	B. Leatherman	0530-1130	57-76	0-1	45
7/26/2012	S. Shaffer	0600-1105	65-76	0-1	70



Location: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2012\Tujunga_LBVISurveyArea_2012.mxd *(MGuidry, 12/19/2012)* - mguidry

Map Date: 12/19/2012
Photo Source: USGS Dec 2010

Figure 8-1. Least Bell's Vireo and Southwestern Willow Flycatcher Survey Area

2010-116.006 Big Tujunga Wash Mitigation Area

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8.2 Southwestern Willow Flycatcher

Focused surveys for southwestern willow flycatcher were conducted in suitable riparian habitat in the Mitigation Area during the 2012 breeding season. The five surveys were conducted in accordance with the protocol developed by Sogge et al. (2010) and guidance by the USFWS (2000) between May and July 2012. Surveys were conducted concurrently with those for least Bell's vireo, and thus during weather that was conducive to high levels of bird activity (e.g., no surveys were conducted during rain events, high winds, cold temperatures, etc.). Dates of each survey and weather are presented below in Table 8-2. Two willow flycatchers were observed during the first survey on May 21, 2012. Both flycatchers appeared to be solitary birds and neither exhibited nesting behavior. Willow flycatchers were not observed during the subsequent four focused surveys. Based on the guidelines provided in Sogge et al. (2010), this suggests that these individuals were migrants. Migrant flycatchers in this area usually belong to the more common northern subspecies (*E.t. brewsteri* and *E.t. adastus*) and not the federally endangered southwestern subspecies (*E.t. extimus*; Unitt 1987). Due to the lack of records for the region and the negative survey results for the last four surveys, the southwestern willow flycatcher is likely absent at this time. A copy of this report is included as Appendix I.

Table 8-2. Southwestern Willow Flycatcher Survey Dates and Weather

Date	Time	Temperature (°F)	Wind (mph)	Cloud Cover (%)
5/21/2012	0530-1130	59-86	0-2	0
6/4/2012	0430-0630	60-61	1	75
6/18/2012	0530-1030	61-74	0-4	40
7/2/2012	0530-1115	59-76	0-4	0
7/16/2012	0530-1130	57-84	0-4	60

9.0 ARROYO TOAD SURVEYS

Focused surveys for the arroyo toad were conducted in 2012 in the Big Tujunga Wash following the U.S. Fish and Wildlife Service (USFWS) Survey Protocol (USWFS 1999) (Figure 9-1). Six field surveys were conducted between April and July, with at least seven days between each survey and at least one survey performed in April, May, and June.

ECORP biologists Adam Schroeder and Brian Zitt conducted daytime and nighttime surveys on days that had weather conducive to observing arroyo toads (new or partial moons, air temperature greater than 55°F). The locations of biological observations were recorded using a handheld GPS unit. The daytime survey component included an assessment of arroyo toad habitat suitability, as well as documenting the presence of any arroyo toad eggs, larvae, or juveniles. The entire portion of the stream channel was surveyed and appropriate routes for the nighttime survey were selected. Selected routes provided the most efficient access to allow for suitable listening stations for toad calls. Nighttime surveys consisted of walking slowly and carefully along stream banks to avoid impacting eggs and/or creation of excess siltation affecting water clarity. Headlights and flashlights were used sparingly during the survey to reach suitable listening stations. Once there, surveyors remained still and silent for approximately 15 minutes listening for the toad's call. If no calls were detected, surveyors searched along the stream channel to visually locate toads using eye-shine techniques.

Survey results were negative for eggs, larval, juvenile, and adult arroyo toads. Table 9-1 displays survey dates, surveyors, and weather during each survey. A copy of this report is included as Appendix J.

Table 9-1. Arroyo Toad Survey Dates and Weather

Date	Surveyors	Time	Temperature (°F)	Wind (mph)	Cloud Cover (%)
4/23/2012	B. Zitt A. Schroeder	1530-1851	59-60	2-4	100
		2031-2254	58-60	0-2	100
5/15/2012	B. Zitt A. Schroeder	1730-1925	72-86	0-2	0
		2050-2400	60-65	0-2	0
6/12/2012	B. Zitt A. Schroeder	1934-2029	74-76	0-2	0
		2150-0120	61-74	0-2	0
6/19/2012	B. Zitt A. Schroeder	1850-2015	71-77	0-2	0
		2135-0008	62-68	2-5	0
6/26/2012	B. Zitt A. Schroeder	1830-2010	70-83	3-5	0
		2130-2400	60-67	0-2	0
7/16/2012	B. Zitt A. Schroeder	1640-1845	78-84	3-5	0
		2200-0018	62-64	3-5	0

Location: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2012\Tujunga_ArroyoToadSurveyArea_2012.mxd (EKeethe;MGuidry, 12/19/2012)

Aerial Date: USGS Dec 2012
Map Date: 2012

Figure 9-1. Arroyo Toad Survey Area

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2012 Focused Arroyo Toad Surveys
Big Tujunga Wash Mitigation Area
2010-116

10.0 FUNCTIONAL ASSESSMENT AND 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 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.

This section presents a summary of the 2012 study results and discussion of these results. Appendix K contains the full methods and results for the functional assessment and success monitoring study conducted in 2012.

Annual functional analyses have been conducted in the Mitigation Area 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 2012 annual functional analysis was conducted on August 14, 15, and 16, 2012 by ECORP botanist Cara Snellen and ECORP biologists Tania Asef and Carley Lancaster. The functional analysis sampling point locations for the Mitigation Area are shown in Figure 10-1.

Success monitoring and analysis, 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 Ms. Snellen, Ms. Asef, and Ms. Lancaster on August 14, 15, and 16, 2012. Success monitoring transect locations within the sampled restoration areas for the Mitigation Area are shown in Figure 10-2. A summary of the results is presented below.

10.1 Annual Performance Monitoring

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 Appendix K. 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 Appendix K. Copies of all data sheets are included in the report found in Appendix K.

10.1.1 Functional Analysis of the Riparian Habitat

Vegetation cover of mature plants was moderate for 2012, with approximately 57 trees and 111 shrubs per acre found in the riparian habitat at the Mitigation Area. All of the trees and approximately 90 percent of the shrubs encountered were native species. The tree canopy forms a dense multi-layered canopy throughout the site in most areas

Location: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2012\Tujunga_Function_Sampling_2012.mxd (mguidry 12/19/2012)

Aerial Date: USGS Dec 2010
Map Date: 12/19/2012

Figure 10-1. Functional Analysis Sampling Points

2010-116 Big Tujunga Wash Mitigation Area

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Aerial Date: USGS Dec 2010
Map Date: 12/19/2012

Figure 10-2. Success Analysis Transect Locations

2010-116 Big Tujunga Wash Mitigation Area

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(61.9 percent cover overall) and shrubs form an open understory of approximately 10 percent cover. The relative density of trees and shrubs at the community level was approximately 32 percent trees and 68 percent shrubs. However, overall tree cover dominated the community with a relative dominance value of approximately 86 percent. Furthermore, overall tree cover consists primarily of native species. Despite the apparently underdeveloped understory (only 10 percent overall), native shrubs are well-represented with a relative dominance value of approximately 98.5 percent. The results for overall density, relative density, dominance (percent cover), and relative dominance for the Mitigation Area riparian habitat are summarized in Table 10-1.

Table 10-1. 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	56.9	100.0	61.9	100.0
Shrubs	110.5	89.7	10.2	98.5
Non-native Species				
Trees	0.0	0.0	0.0	0.0
Shrubs	12.6	10.3	0.2	1.5
Summary All Species				
Trees	56.9	31.6	61.9	85.7
Shrubs	123.1	68.4	10.3	14.3

Overall organic cover was moderate at approximately 60 percent; however, cover of annual grasses was relatively low at approximately 9 percent. The average number of topographic features encountered per 330 feet was approximately 20. 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, average tree height, and average topography score measurements for the riparian habitat within the Mitigation Area are summarized in Table 10-2.

Table 10-2. 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 m)
60.1	8.8	2.9	20.3

Standardized data sheets used during functional analysis field sampling are found in Appendix K and a compendium of all plant species encountered, including trees and shrubs, in the willow riparian habitat is found in Appendix L. A compendium of all wildlife species encountered is also found in Appendix L.

For the riparian system, the Functional Unit (FU) is calculated to be 0.88 per acre. In previous functional analysis reports for the Mitigation Area, a total of 76.0 acres of willow riparian habitat was used to calculate the Functional Capacity Unit

(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 Geographic Information Systems (GIS) software. In order to get a more accurate estimate of the acres of willow riparian habitat, GIS was also used 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 2012 is:

$$\mathbf{FCU_{\text{Big T}} = (0.88_{\text{FU willows}})(91.2 \text{ acres of willows}) = 80.26}$$

The FCU value of the riparian habitat at the Mitigation Area has increased from 59.74 in 1997 to 80.26 in 2012. The target functional value for the enhanced riparian habitat along Haines Canyon Creek (as set forth by the MMP) is 0.87 with a functional capacity unit value of 66.12. The FU and the the overall functional capacity for the riparian habitat within the Big Tujunga Wash have both exceeded the fifth-year standards. The results and further discussion of the Functional Analysis is found in Appendix K.

10.1.2 Success Monitoring of Restoration Areas

Native tree species comprised a relatively open tree layer with approximately 29 percent cover; no non-native trees were present in the restoration areas. The shrub layer was poorly developed with native species accounting for approximately 13 percent and non-natives for 4 percent. Ground cover was slightly dominated by non-native species (25 percent) while cover of natives was approximately 11 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 10-3.

Table 10-3. Percent Cover by Vegetation Layer and Plant Category

	Percent Cover	
Vegetation Layer	**Native**	**Non-native**
Tree	28.7	0.0
Shrub	12.7	3.8
Ground	10.5	25.0

Additionally, total percent cover in the restoration areas was determined for native and non-native species (Table 10-4). Native plant cover was moderate at approximately 55 percent cover; non-native plant cover was relatively low (28.8 percent). Bare ground accounted for approximately 30 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 10-4. 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**
55.2	28.8	30.2

Standardized data sheets used during success analysis field sampling are found in Appendix K and representative photographs of restoration sites are found in Appendix K.

Survival and percent cover requirements of plantings were established such that the original MMP 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 2008). 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 are no longer collected as part of the sampling 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.

10.1.3 Riparian Area Survival

In 2009, ECORP submitted a Revised Habitat Restoration Plan for the Mitigation Area (ECORP 2009). 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 fifth 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). 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 percent and shrubs 13.2 percent) as compared to the riparian habitat (native trees 148.5 percent and shrubs 19.2 percent).

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 SAA was issued by CDFW. The removal program has proved extremely successful in eradicating non-native trees (0 percent cover). Non-native shrubs have also been limited in the restoration areas; cover decreased from approximately 9 percent in 2010 to only approximately 4 percent in 2012. However, the creation of open, unshaded space provided ample opportunity for invasive non-native ground species, such as prickly lettuce (*Lactuca serriola*), tocalote (*Centaurea* *melitensis*), sowthistle (*Sonchus* spp.), shortpod mustard (*Hirschfeldia incana*), and brome (*Bromus* spp.), to become established. Additional open space was created by debris flows from the 2009 Station Fire as well as overland runoff during rain events. As a result, non-native ground cover increased to approximately 75 percent in 2011 (90.8 percent overall) from approximately 37 percent in 2010 (59.6 percent overall). This trend was reversed in 2012; non-native cover decreased drastically to just 25 percent (10.3 percent overall), likely resulting from the regrowth of native species in these open spaces and the success of the exotic plant eradication program. In 2011, native cover in the tree, shrub, and ground layers were approximately 35, 5, and 8 percent, respectively. This year, native tree cover was limited to approximately 29 percent; however, shrubs increased to 13 percent, and ground species to 10.5 percent. Overall, native cover has increased over 18 percent from 44 percent in 2011 to approximately 52 percent in 2012.

Non-native trees have also been eradicated from the restoration areas. The eradication of the non-native trees in the restoration areas indicates that the non-native plant removal program has been effective on some level. The overall health of the riparian habitat within the Mitigation Area, as determined by the functional analysis and field observations, further indicates the program's effectiveness.

A major goal of the MMP 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. High cover of native riparian trees and shrubs is essential for these sensitive species; however, success analysis results in 2009, the first year of implementation, 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 in the riparian habitat overall, as indicated by this year's functional analysis.

11.0 WATER QUALITY MONITORING PROGRAM

ECORP's subconsultant, MWH Laboratories, conducted the annual water quality sampling for the site in 2012. 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 YSI 550A Field DO meter with thermometer and an Orion 230A pH meter with HACH 51935 electrode. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Laboratory analysis of pesticides was performed at Emax Laboratories in Torrance, California. All other analyses were performed by Eurofin Eaton Laboratories in Monrovia, California. Quality assurance/quality control (QA/QC) procedures in each laboratory followed the methods described in their respective Quality Assurance Manuals. In addition to the water quality monitoring, flows in the outlet from the 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.

11.1 Baseline Water Quality

Sampling and analysis conducted by LACDPW 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 listed in Table 11-1 and provided in the 2012 Water Quality Monitoring Report that is included as Appendix M. 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 11-1. 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

11.2 Water Quality Sampling Results for 2012

Results of analyses conducted by Emax and Eurofin Eaton Laboratories are summarized in Table 11-2. 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 MMP 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 11-2. Summary of Water Quality (November 26, 2012)

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	19.3	18.1	13.8	18.2
Dissolved Oxygen	mg/L	5.0	5.2	9.9	10.3
pH	std units	7.41	7.52	9.14	8.50
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	8.4	4.9	ND	4.6
Orthophosphate-P	mg/L	0.034	0.023	0.013	0.026
Total phosphorus-P	mg/L	0.042	0.024	<0.02	0.026
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	1.1	0.64	0.37	0.48
Fecal Coliform Bacteria	(MPN/100 ml)	230	330	11	130
Total Coliform Bacteria	(MPN/100 ml)	1100	790	79	230

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

* 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.

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

11.2.1 Discharge Measurements

Using the field technique described in the methodology section, flows in the outlet from the Tujunga Ponds, in Haines Canyon Creek (leaving the site), and in Big Tujunga Wash were approximated. Estimated flows for November 2012 are summarized in Table 11-3.

Table 11-3. Estimated Flows for November 2012

Sampling Date	Approximate Flow (cubic feet per second)		
	Haines Canyon Creek, Outflow from Tujunga Ponds	Haines Canyon Creek, just before exit from site	Big Tujunga Wash
11/26/2012	3	3	4

11.2.2 Comparison of Results with Aquatic Life Criteria

Table 11-4 provides the results of the November 2012 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 11-4. Discussion of November 2012 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 (DO) levels ranged from 5.0 mg/L in the inflow to the Tujunga Ponds to 10.3 in Haines Canyon Creek leaving the site. DO levels at all stations were at or above the recommended minimum (5.0 mg/L) for warmwater fish species. DO levels in the Tujunga Ponds were below the recommended mean (7.0 mg/L) for warmwater fish species.
pH	• Lowest pH was observed in the inflow to Tujunga Ponds (7.41), with highest pH observed in Big Tujunga Wash (9.14). On this date, pH readings in Haines Canyon Creek and the Tujunga Ponds were within the 6.5 to 8.5 range identified in the Basin plan. The pH of Big Tujunga Wash was above the high end of the range.
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 four stations was <0.02 to 0.042 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 very low (1.1 NTU or less) at all stations.
Bacteria	• The fresh water bacteria standard for water contact recreation is for *E. coli* (126 MPN/100 ml geometric mean, 235 MPN/100 ml single sample limits). The observed fecal coliform level in Big Tujunga Wash was well below the standards. Fecal coliform levels in Haines Canyon Creek and the Big Tujunga Ponds ranged from 130 to 330 MPN/100 ml. Previously, the water contact standard was 200 MPN/100 ml fecal coliform. Sampling specifically for *E. coli* was not conducted. • Total coliform levels ranged from 79 MPN/100 ml in Big Tujunga Wast to 1,100 MPN/100 ml in Haines Canyon Creek inflow to Tujunjga Ponds. [Note that recreation standards are for *E. coli*. Total coliform standards apply to waterbodies where shelfish can be harvested for human consumption.]

12.0 TRAILS MONITORING PROGRAM

12.1 Trails System Maintenance

The 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. The Mitigation Area contains both equestrian and hiking trails (Figure 12-1). The preservation of authorized trails is an essential component 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 authorized 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 (e.g., camping, making fires) will be reduced. Maintenance and monitoring of the trail system is a necessary component of the overall restoration and enhancement program.

Three site visits were conducted in 2012 to look for areas that might qualify for trail closure, identify areas where trails were blocked by trash or debris, and mark locations of extensive stands of poison oak. Assessment of trail signs, information kiosks, portable toilets, site fencing, and gated entrances was included in each survey. Areas that required minor repairs were remedied during the three sets of site visits or in combination with other site visits. More extensive problem areas were mapped for repair at a later time.

Trail maintenance was conducted by Natures Image and supervised by ECORP biologists that were present on site at the time of maintenance. During the site visits, the biologist assessed trail conditions and identified locations that were in need of maintenance. Examples of maintenance issues identified during these site visits included:

- Fallen trees and branches obstructing trails;
- Overhanging tree branches at hiker and equestrian-height;
- Dense vegetation crowding trails;
- Erosion;
- Large dead trees with the potential to fall on the trail;
- Safety concerns;
- Poison oak overgrowth; and
- Unauthorized trail establishment by recreational users.

Maintenance activities to address the trail issues were monitored by ECORP biologists. Prior to any work, all members of the trail maintenance crew 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. These efforts were summarized following each of the three maintenance visits. These reports are included as Appendix N.

Location: Document Path: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2012\Tujunga_Trails_Analysis_2012.mxd

Aerial Date: USGS Dec 2010
Map Date: 2012

Figure 12-1. Trails in the Mitigation Area

2010-116 Big Tujunga Wash Mitigation Area

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12.2 Trail Closures

On April 2, 2012 a local resident contacted LACDPW and ECORP regarding a “sink hole” that had developed at one of the creek crossings after the heavy stream flows resulting from recent heavy rains. The area of concern was located north of the Cottonwood Avenue upland area, and accesses the Big Tujunga Wash to the north from Haines Canyon Creek. ECORP biologist Phillip Wasz inspected the crossing and concluded that the section of the trail system should be permanently closed due to a dramatic drop off from the stream bank into a deep sandy portion of the stream. The trail closure was conducted shortly after the problem was reported. After that portion of the trail was closed, all trail traffic was directed to creek crossings located upstream and downstream of the “sink hole” area. This trail closure is discussed in the trails maintenance and monitoring memo dated April 3, 2012 in Appendix N.

12.3 Trail Cleanup Day

In 2012, the official name of the annual volunteer event held at the Mitigation Area changed to Trail Cleanup Day (previously named Trail Maintenance Day). The Eighth Annual Trail Cleanup Day was held on Saturday, October 20, 2012. ECORP worked together with LACDPW to modify the flyers that provided the information for the Eighth Annual Trail Cleanup Day. The flyer was posted on LACDPW’s website and was also distributed to other interested parties. The flyer was mailed to the people and organizations on the mailing list that is used for the CAC meetings and newsletters. A copy of the flyer distributed to the public is included as Figure 12-2.

The Trail Cleanup Day event was attended by approximately twenty volunteers and two project managers from LACDPW. Three biologists from ECORP attended the event to ensure that sensitive resources were not affected by the activities. Various portions of the site were targeted for trash removal during the event, including Haines Canyon Creek and all trails throughout the Mitigation Area. A large amount of trash was removed from throughout the entire Mitigation Area. Some of the larger items removed included a shopping cart, old tires, a footstool, and a wire cage. Photographs taken during the event are included as Figures 12-3 and 12-4.

Figure 12-2. October 2012 Trail Cleanup Day Flyer.

Figure 12-3. Mitigation Area Display at Trail Cleanup Day.

Figure 12-4. Trash Removed from around the Mitigation Area's Cottonwood Avenue Entrance.

13.0 COMMUNITY AWARENESS PROGRAM

The CAC was formed in early 2001 as part of MMP 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 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 2012 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 O.

13.1 Newsletters (Spring, Fall)

ECORP drafted two newsletters during 2012, 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. Hard copies of the newsletters were also mailed to stakeholders and organizations. The newsletters are included in Appendix P.

13.2 CAC Meetings (Spring, Fall)

The CAC meetings were held in the spring and the fall of 2012. The Spring CAC meeting took place on Thursday, April 26, 2012 and the Fall CAC meeting took place on Thursday, September 27, 2012. CAC meetings were held from 6:30 pm to 8:30 pm at LACDPW's Hansen Yard, 10179 Glenoaks Boulevard, Sun Valley, California 91352. The meeting reminder/invitation, meeting agenda, and the minutes from the previous meeting were mailed to the most recent CAC mailing list two weeks prior to each scheduled meeting. Additionally, the meeting agenda and the minutes from the previous CAC meeting were posted to the Mitigation Area website. One week prior to the CAC meeting, a final meeting reminder via electronic mail (e-mail) that included a link to the materials posted on the Mitigation Area website.

ECORP representatives, Ms. Mari Quillman and Ms. Kristen Mobraaten, 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 2012 CAC meetings are summarized in the meeting minutes which are included as Appendix Q. Below is a list of the major issues discussed during the 2012 CAC meetings.

- Site Safety Issues
  - Changes in law enforcement patrolling of the site
  - Increased coordination with and response from the Los Angeles County Sheriff's Department
  - Maintaining access roads and entrances for law enforcement vehicles
  - General trail safety issues
  - Locks on the gates at the entrances to the Mitigation Area

- General site maintenance activities
  - Equestrian-friendly gates at Mitigation Area entrances
  - Permitting for organized events
  - City of Los Angeles district representative change
  - Status of trails
  - 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
  - Los Angeles County Vector Control activities
  - Big Tujunga Dam sediment removal planned for 2014

- Updates on MMP Programs
  - Brown-headed cowbird trapping
  - Focused surveys for sensitive wildlife species
  - Exotic plant removal activities
  - Exotic wildlife removal activities
  - Riparian and upland restoration and maintenance activities
  - Water quality monitoring
  - Trail usage and monitoring
  - Water lettuce removal activities
  - Bilingual community outreach efforts

- Public outreach
  - Target outreach efforts to occur during equestrian events held in or around the Mitigation Area

- Continue public outreach program to educate all types of user groups on the appropriate use of the Mitigation Area
- Organized trail cleanup on October 20, 2012
- Reminding Mitigation Area users about the importance of not removing vegetation during the breeding bird season and the importance of staying on existing trails
- Enforcing acquisition of appropriate use permits from LACDPW for organized events occurring in the Mitigation Area
- Newsletter distribution
- Arranging a tour of the Mitigation Area for County and City officials
- Potentially offering a certificate to children who help during the Trail Cleanup Day as part of a certification program for community service.

14.0 PUBLIC OUTREACH PROGRAM

In an ongoing effort to enhance and protect existing wildlife and habitats at the Mitigation Area, another task was developed and implemented during the 2009 contract year and continued into 2012. This task was the direct result of increasing evidence of problematic areas associated with recreational use 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 approved and prohibited types of recreational activities. This task was continued into the 2012 contract year because of its success during 2009, 2010, and 2011.

During site visits in the spring and summer of 2009, ECORP biologists observed increasing problems with visitors using the waterways (Haines Canyon Creek and the Tujunga Ponds) in the Mitigation Area for recreational activities such as picnicking, fishing, swimming, and wading. In 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 public outreach for the Mitigation Area. The program consisted of weekly site visits conducted by a bilingual biologist on peak use weekends in the spring and summer to educate the various user groups about the approved and prohibited activities within the Mitigation Area. A bilingual educational brochure was developed and distributed to the various user groups during the weekly site visits (Appendix B).

The public outreach program was continued throughout the 2012 contract period. On-site interviews and education about the Mitigation Area were conducted on eight separate occasions by ECORP's bilingual biologists Israel Marquez, Alfredo Aguirre, and J. Freddie Olmos. These efforts occurred in July, August, and September 2012. All outreach efforts took place on weekends, during peak visiting hours between 10:00 AM and 5:00 PM. During these outreach efforts, the biologists handed out the bilingual brochures describing the ecological purpose of the Mitigation Area, the importance of protecting sensitive biological resources, and permitted 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 further contribute to these goals.

The biologists also conducted informal interviews, short question and answer sessions, and explained LACDPW's conservation goals to as many visitors as possible during each outreach event. While the bilingual biologists were on site, they documented the presence of rock dams within Haines Canyon Creek and any unusual observations or circumstances. Several notable events were documented in 2012. In general, biologists noted the presence of many visitor-created rock dams in Haines Canyon Creek.

Removal of these rock dams was conducted by biologists who are knowledgeable about behaviors and habitats used by the sensitive fish species present in Haines Canyon Creek. Dam removal was done with as little silt generation as possible and the rocks were placed back in 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 that occurs in Haines Canyon Creek.

On August 11, ECORP biologist Israel Marquez encountered a recreationist who admitted to consistently building rock dams within and adjacent to the Mitigation Area. After Mr. Marquez informed the recreationist and her companion of the appropriate recreational activities in the Mitigation Area, she showed him the locations of several rock dams she had created, as well as a rock bridge crossing Big Tujunga Wash on the northwest side of the Mitigation Area. This individual was reported to LACDPW.

On September 2, 2012, ECORP's bilingual biologist observed orange flagging northwest of the Big Tujunga Ponds during an outreach visit. On the Monday following the flagging observation, community members reported a mountain bike race event that used portions of the Mitigation Area as the race course. The event was reported to LACDPW, as mountain biking is a prohibited activity in the Mitigation Area. On subsequent visits, all orange flagging not associated with Mitigation Area maintenance and monitoring activities was removed and reported to LACDPW.

Memos documenting the results of the outreach efforts in 2012 are included in Appendix R.

15.0 LONG-TERM MANAGEMENT PLAN

The draft version of the LTMP was submitted to LACDPW for review on October 26, 2012 (ECORP 2012a). Once comments are received, a final version of this document will be prepared and submitted to LACDPW.

16.0 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. One meeting was held at the Mitigation Area on June 12, 2012 with USFWS, LACDPR, LACDPW, and ECORP to discuss how to continually improve the habitat within the Mitigation Area for the Santa Ana sucker. A summary of this site visit can be found in the Fall 2012 community newsletter in Appendix P.

17.0 ILLEGAL STRUCTURE MONITORING AND REMOVAL

On July 16, 2012, an illegally constructed structure was discovered within the Mitigation Area. The structure was located northwest of the Cottonwood gate entrance in a heavily wooded area that was concealed from the trails regularly used by equestrians and recreationists. An initial site visit was conducted on July 17, 2012 by ECORP biologists Kristen Mobraaten, Carley Lancaster, and Tania Asef to identify impacts resulting from the illegal structure construction. Biologists took detailed notes and photographs to aid the LACDPW with planning structure removal and clean-up activities. The structure was located in what had been previously documented as cottonwood-willow riparian habitat. A patio area consisting of a non-cemented cobblestone pathway had been constructed using rocks from the surrounding area adjacent to the structure. The area of disturbance where the structure had been built, including the cobblestone patio area, was approximately 30 feet wide and 40 feet long. Approximately 75 feet northwest of the structure, a large pit had been dug by hand using shovels, presumably in preparation for construction of a latrine. The pit was located under the canopy of an oak tree. Five non-native California pepper trees (*Schinus molle*) were planted adjacent to the trail leading to the main structure. Trash and debris associated with the structure were found in the vicinity of both the structure an apparent latrine pit. Based on their observations, the biologists recommended that a pre-removal activity nesting bird survey be conducted, and that, where possible, structure removal activities be done by hand to minimize impacts to native vegetation.

On July 30, 2012 ECORP biologists Kristen Mobraaten and Carley Lancaster conducted a pre-removal activity survey of the work area. Active bird nests and other sensitive biological resources were not identified in or adjacent to the work area. Following the survey, a biological resources briefing was held for workers to explain the sensitive biological resources and their significance to the Mitigation Area, with specific emphasis on breeding birds and active nests. The crew then began the structure removal and area clean-up. Equipment used included a backhoe, chainsaws, and hand tools. An access route approximately six feet in width was created along the existing access trail as a result of the backhoe's travelling to and from the site. Existing vegetation was crushed rather than removed so that plants would recover faster. In addition, the five California pepper trees were removed. By the end of the day, the structure had been dismantled and removed, and most of the cobblestone patio had been broken up with the stones left on site.

Work continued on July 31, 2012, focusing on removal of trash and debris. The latrine pit was filled in and the associated human waste was covered and compacted to prevent further erosion during storm events. Boulders were placed at the head of the trail to deter visitors from entering the site. All activities were completed by August 1, 2012. Impacts to sensitive biological resources did not occur as a result of the structure removal. Details of both the initial site visit and biological monitoring during structure removal are included as memos in Appendix S.

18.0 MITIGATION AREA PERMITTING GUIDANCE

In 2012, ECORP was asked by LACDPW to assist in creating a set of guidelines for issuing permits for organized activities occurring within to the Mitigation Area. This task is expected to be completed in the first quarter of 2013 and the guidelines will be submitted to LACDPW as a stand-alone document.

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2012 Annual Report
for the Big Tujunga Wash Mitigation Area
Los Angeles County, California

APPENDICES A — S

Prepared for:

County of Los Angeles
Department of Public Works
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Alhambra, California 91803

Prepared by:

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ENVIRONMENTAL CONSULTANTS

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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* <u>Nutsedge</u>), 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 or bicycles
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 o bicicletas
e. No acampar
f. Los perros deben estar con correas.

¿Preguntas? / Questions?

LADPW: Grace Yu
(626) 458-6139
Water Resources Division
County of Los Angeles
Department of Public Works
P.O. Box 1460
Alhambra, CA 91802

Big T

LOS ANGELES COUNTY PUBLIC WORKS Public Service That 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.

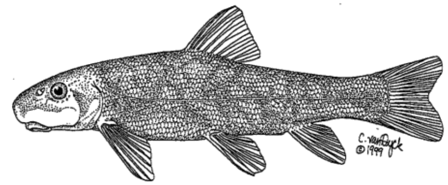
Con el tiempo la isla se ha hecho más pequeña. Big T es sensible a los cambios de su hábitat. Estos cambios pueden causar que un hábitat tan importante desaparezca. Cuando esto sucede los animales y las plantas también pueden desaparecer.

There is no place like Big T

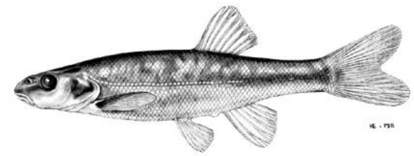
Big T is unique because of the plants and animals that live here. Several of these animals are so rare that regulations have been made to protect where they live. This means that the plants, water, soil, and rocks that make up their homes (or habitat) must not be disturbed or altered.

No hay lugar como Big T

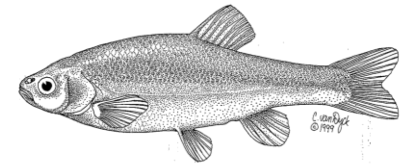
Big T es único por las plantas y los animales que viven aquí. Varios de estos animales son tan únicos que se han hecho regulaciones para proteger el lugar donde viven. Esto significa que las plantas, el agua, la tierra, y las piedras que componen sus hogares (o hábitat) no debe ser dañado.



Santa Ana sucker (*Catostomus santaanae*)

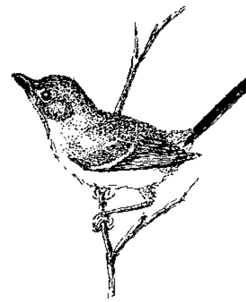


Santa Ana speckled dace / Carpita pinta (*Rhinichthys osculus*)



Arroyo chub (*Gila orcutti*)

Southwestern willow flycatcher (*Empidonax traillii extimus*)



Bell's vireo (*Vireo bellii pusillus*)

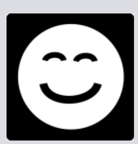
California Sycamore (*Platanus racemosa*)

Black willow (*Salix nigra*)

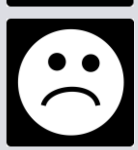
Did you know that these plants and animals rely on each other to survive? And did you know that this community could one day disappear if we don't protect it?

¿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?

No dams/No presas



YES/Si



NO!

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

APPENDIX C

2012 Brown-headed Cowbird Trapping Report

2012 BIG TUJUNGA WASH MITIGATION AREA

BROWN-HEADED COWBIRD CONTROL PROGRAM

GRIFFITH WILDLIFE BIOLOGY

2012 BIG TUJUNGA WASH MITIGATION AREA

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 8 July 2012

Preferred citation:

Griffith Wildlife Biology 2012. 2012 Big Tujunga Wash Mitigation Area Brown-headed Cowbird Control Program. Unpublished report prepared for ECORP Consulting, Santa Ana, CA, by Griffith Wildlife Biology, Calumet, MI.

EXECUTIVE SUMMARY

Four cowbird traps were operated in the vicinity of Big Tujunga Wash Mitigation Area in 2012. The traps were operated from April 2 to June 30. Each trap contained at least one male and one female decoy cowbird as of April 3, and the preferred 2-3 male and 3-5 female decoys as of April 11 and subsequently.

One hundred thirty-seven (137) cowbirds were removed, including 68 males, 68 females, and 1 juvenile, which is above the 2001-2012 average of 123.

The male: female capture ratio was 1:1. Most of the adult cowbirds were captured in weeks 1-7: 52/68 males (76%) and 60/68 females (82%). No banded cowbirds or other banded birds were captured and the traps were not vandalized.

In addition to cowbirds, 281 non-target birds of 6 species were captured, all of which were released unharmed. This total includes the multiple capture, release, and recapture of a smaller number of individuals. Three (3) yellow-headed blackbirds (*Xanthocephalus xanthocephalus*), a California Species of Special Concern (CDFG 2011), were captured and released. No other 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.

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

<u>Key words:</u> 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*).

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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 normal 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*) and southwestern willow flycatcher (*Empidonax traillii extimus*), and the federally threatened California gnatcatcher (*Polioptila californica californica*) (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 (Griffith and Griffith 2000).

The cowbird control project at Big Tujunga Wash Mitigation Area was initiated in 2001 and performed in 2001-2006 and 2009-2012. Its purpose is to enhance reproductive success among the least Bell's 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 2001-2012 (GWB 2012), and immediately upstream of Interstate 210 at Angeles National Golf Course in 2008-2012 (GWB 2012a).

STUDY AREA

Big Tujunga Wash Mitigation Area is located in the 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 and 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 Traps 3 and 4 (Gibson Ranch) were in foraging areas. Trap 2 was within the Big Tujunga Wash Mitigation Area adjacent to riparian and coastal sage habitat. The traps were placed, assembled, and activated on April 2, and operated from April 2 to June 30 2012 (90 days, 13 weeks).

Each trap is 6 feet wide, 8 feet long, and 6 feet tall, with a 1 3/8 inchwide 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 males 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 April 3, and contained the preferred 2-3 male and 3-5 female live decoys as of April 11 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 April 2 to June 30. 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 GWB Project Manager. The traps were deactivated, disassembled, and transported to off-site storage on June 30.

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 from Griffith Wildlife Biology (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 M. Birney, C. Kahler, J.T. Griffith, and T. Griffith.

RESULTS

One hundred thirty-seven (137) cowbirds were removed in 2012, including 68 males, 68 females, and 1 juveniles (Table 1, Table 2). The male: female capture ratio was 1:1. No banded cowbirds or other banded birds were captured.

The first cowbird, a male, was captured in Trap 4 on April 4. Most of the adult cowbirds were captured in weeks 1-7 (April 2 – May 19): 52/68 males (76%) and 60/68 females (82%) (Figure 5). The first (and only) juvenile was captured on June 28 in Trap 3.

In addition to cowbirds, 281 non-target birds of 6 species were captured, all of which were released unharmed. This total includes the multiple capture, release, and recapture of a smaller number of individuals. Three (3) yellow-headed blackbirds (*Xanthocephalus xanthocephalus*), a California Species of Special Concern (CDFG 2011), were captured and released. No other 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.

The traps were not vandalized in 2012. 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 Mitigation Area and from each trap site varies year to year, sometimes independently. The number of cowbirds removed in 2012 (68 males, 68 females, 1 juvenile = 137) is consistent with the 2001-2012 average (57 males, 61 females, and 5 juveniles = 123).

Female cowbirds are territorial and extremely fecund (typically 40-60 eggs per season; some studies show as high as 100 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 Mitigation Area, 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 68 females in 2012 precluded up to 2,720 parasitism events (40 per female) allowing the production of up to 10,880 songbird young (4 per otherwise parasitized nest) in the study area. Because not all parasitism events are viable and not all cowbird eggs are laid in the nests of small hosts, 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 a single juvenile cowbird was removed in 2012, suggesting that cowbird parasitism was essentially eliminated in the study area in 2012.

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 reduce the regional cowbird population (if only because so few cowbirds are trapped in so few areas). If it did, 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, 2009-2012 were the highest per-trap capture totals ever, even with a 91 day vs 122 day trapping season). 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 Mitigation Area cowbird control project, which successfully removes the local cowbirds and reduces parasitism in the study area to near 0%, will be required indefinitely to reduce or eliminate cowbird parasitism and enhance reproductive success among host species in the study area.

MANAGEMENT RECOMMENDATIONS

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

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Figure 1. 2012 Big Tujunga Wash Mitigation Area brown-headed cowbird control project study area.

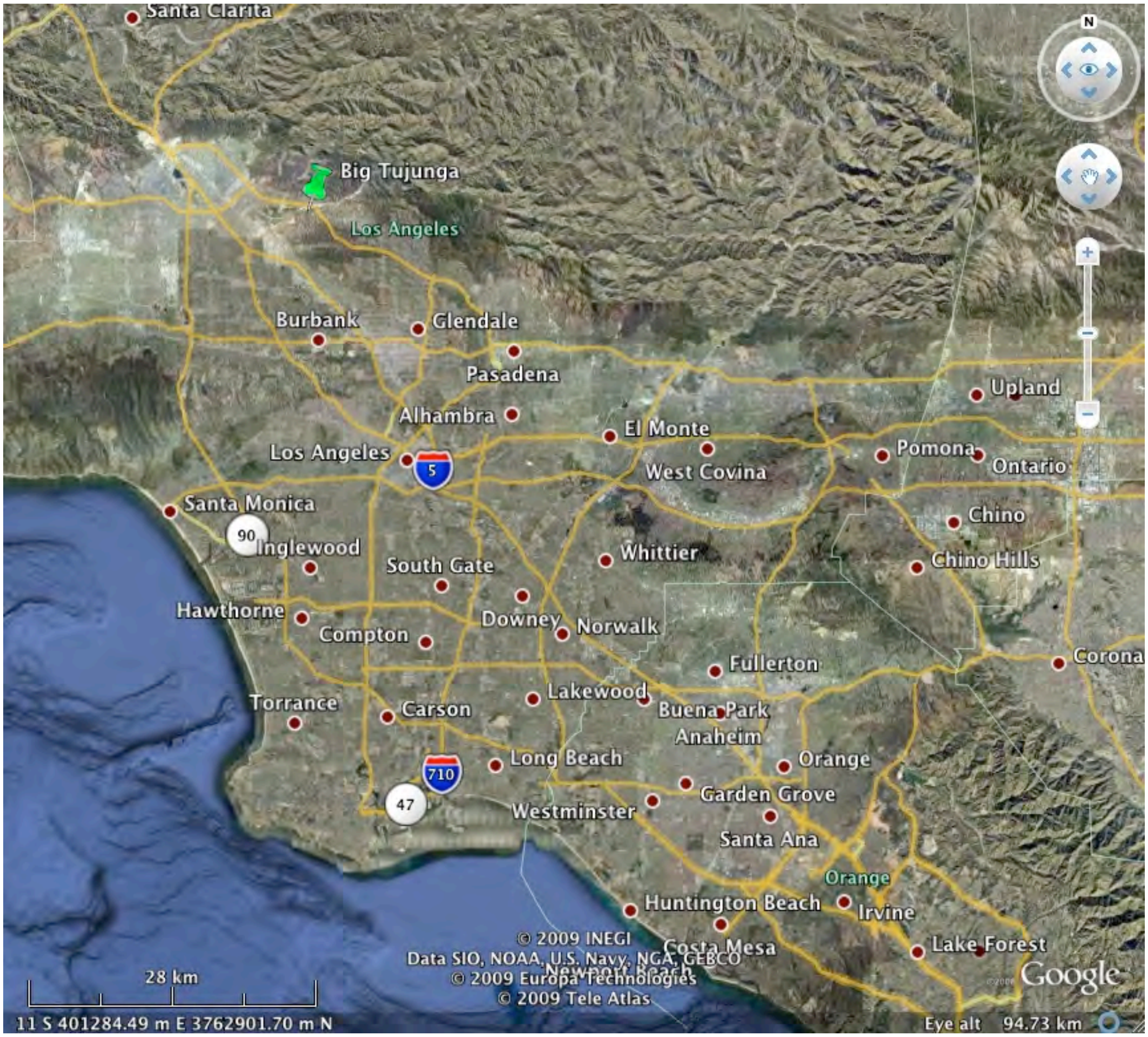

Figure 2. 2012 Big Tujunga Wash Mitigation Area brown-headed cowbird trap locations.

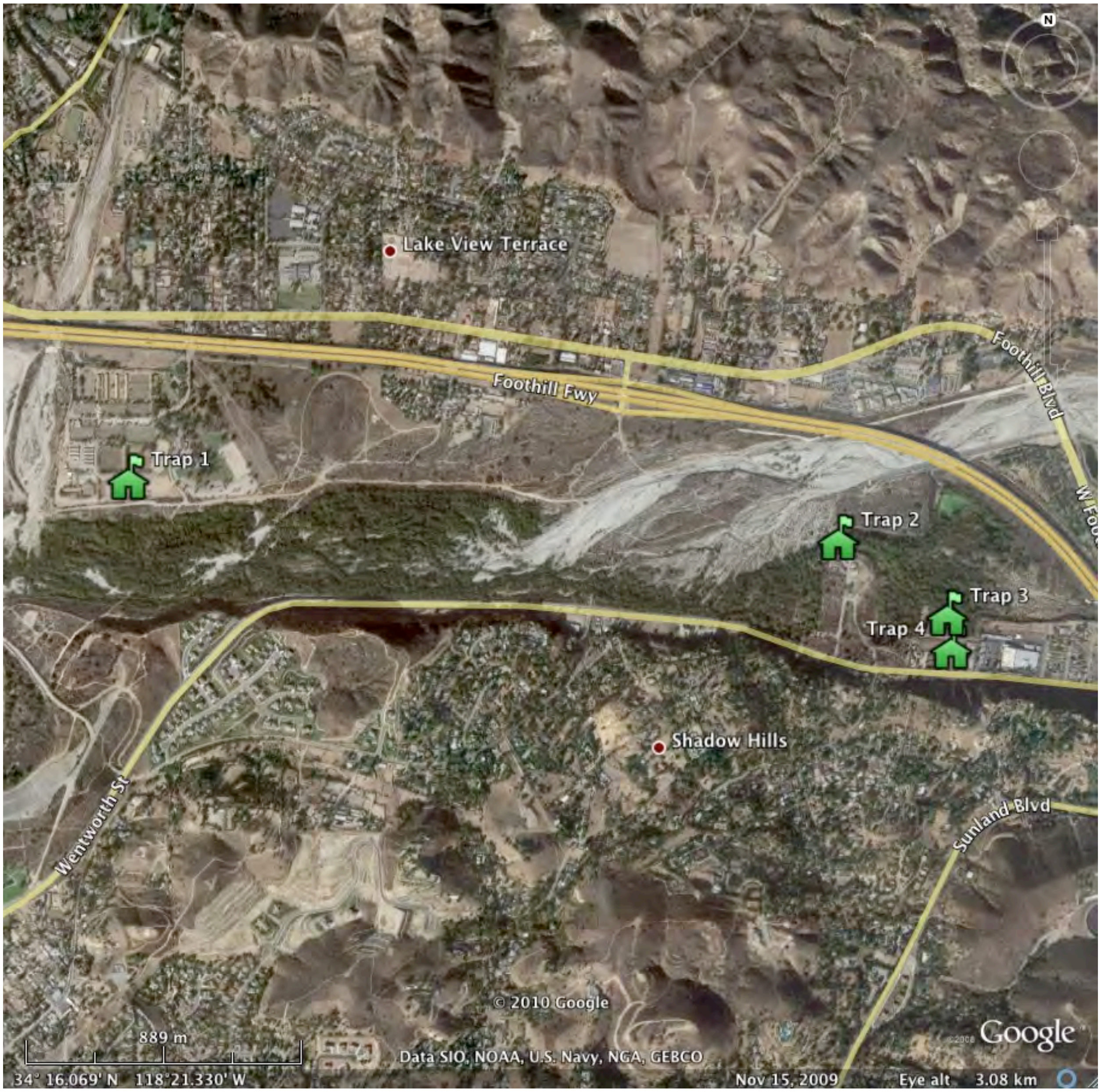

Figure 3. 2012 Big Tujunga Wash Mitigation Area brown-headed cowbird Trap 1 (top) and Trap 2 (bottom).

Figure 4. 2012 Big Tujunga Wash Mitigation Area brown-headed cowbird Trap 3 (top) and Trap 4 (bottom).

Figure 5. Number of male (M), female (F), and juvenile (J) cowbirds removed per week at and in the Vicinity of Big Tujunga Wash Mitigation Area in 2012.

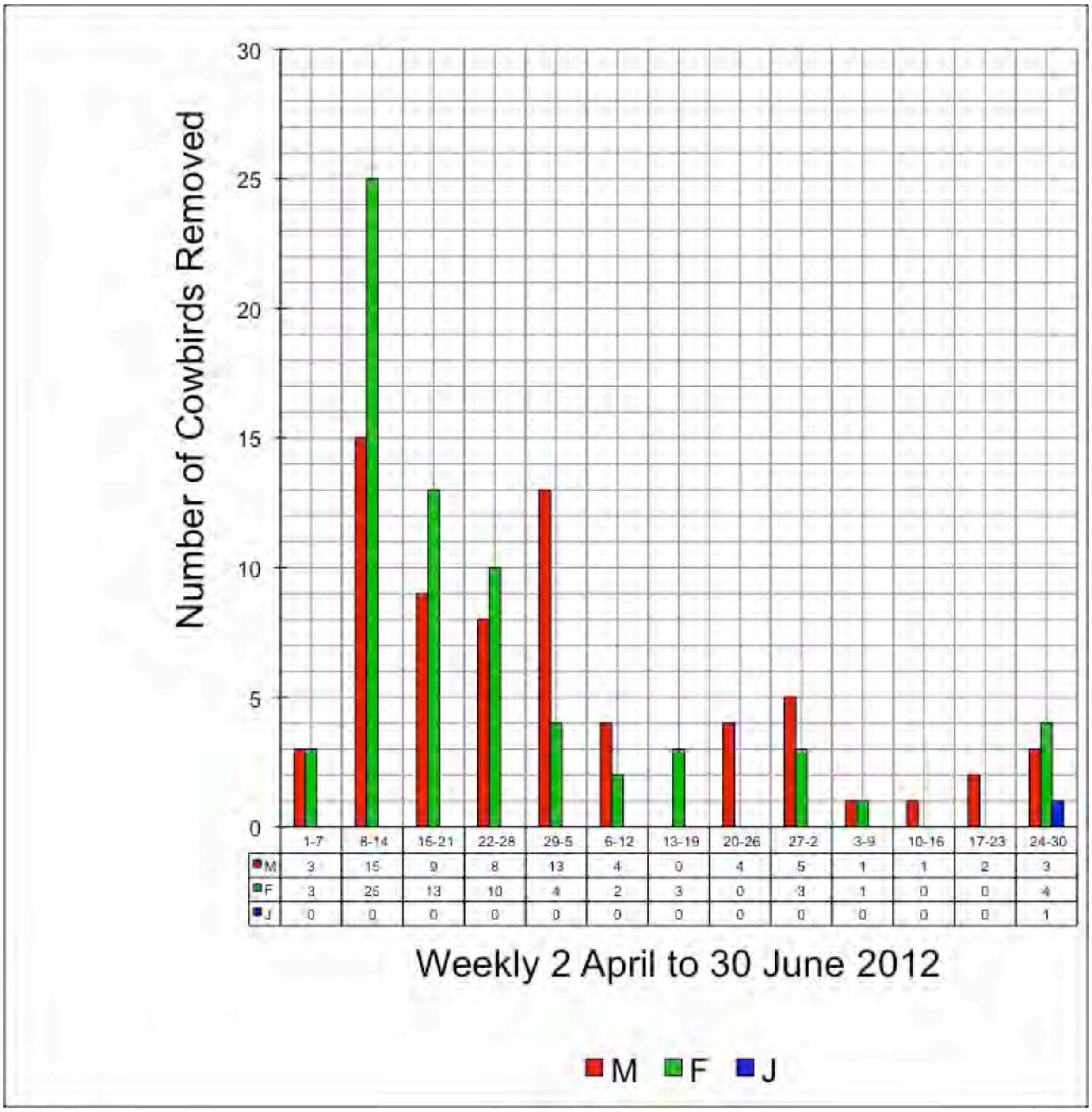

Table 1. Number of brown-headed cowbirds captured at and in the vicinity of Big Tujunga Wash Mitigation Area, 2001-2012.

Year	Number of Traps	Trapping Period	Number of Cowbirds Captured				Number Per Trap	M:F Ratio
			Male	Female	Juvenile	Total		
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
2011	4	4/1 - 6/30	103	99	9	211	52.75	1.04
2012	4	4/2 - 6/30	68	68	1	137	34.25	1.00
TOTAL	55		568	612	51	1231	22.38	0.93
AVG	5.5		56.80	61.20	5.10	123.10	22.38	0.93

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

Table 2. Number of male (M), female (F), and juvenile (J) cowbirds captured per day, per week, per trap, and total at and in the vicinity of Big Tujunga Wash Mitigation Area in 2012.

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										1			1	0	0
	6										2			2	0	0
	7										9	3		9	3	0
wk 1		0	0	0	0	0	0	0	0	0	3	3	0	3	3	0
	8							3	1					3	1	0
	9								1		3	2		3	3	0
	10							1	2		2	3		3	5	0
	11		2						1		3			3	3	0
	12								4		2	1		2	5	0
	13													0	0	0
	14								3		1	5		1	8	0
wk 2		0	2	0	0	0	0	4	12	0	11	11	0	15	25	0
	15							1						1	0	0
	16					1					1	1		1	2	0
	17							3						3	0	0
	18								4		4	1		4	5	0
	19					1			2			1		0	4	0
	20													0	0	0
	21		1						1					0	2	0
wk 3		0	1	0	0	2	0	4	7	0	5	3	0	9	13	0
	22										1			1	0	0
	23				1	2			3					1	5	0
	24													0	0	0
	25	2												2	0	0
	26	1	1											1	1	0
	27		1						1		2	2		2	4	0
	28										1			1	0	0
wk 4		3	2	0	1	2	0	0	4	0	4	2	0	8	10	0
	29										1			1	0	0
	30	1												1	0	0
May	1							2				2		2	2	0
	2										3			3	0	0
	3								2					0	2	0
	4							1			3			4	0	0
	5							1			1			2	0	0
wk 5		1	0	0	0	0	0	4	2	0	8	2	0	13	4	0
	6													0	0	0
	7							1						1	0	0
	8											1		0	1	0
	9		1											0	1	0
	10							2						2	0	0
	11													0	0	0
	12							1						1	0	0
wk 6		0	1	0	0	0	0	4	0	0	0	1	0	4	2	0
	13													0	0	0
	14		1											0	1	0
	15													0	0	0
	16											1		0	1	0
	17													0	0	0
	18													0	0	0
	19		1											0	1	0
wk 7		0	2	0	0	0	0	0	0	0	0	1	0	0	3	0

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
	20													0	0	0
	21										1			1	0	0
	22							1						1	0	0
	23													0	0	0
	24							1						1	0	0
	25													0	0	0
	26										1			1	0	0
wk 8		0	0	0	0	0	0	2	0	0	2	0	0	4	0	0
	27	1												1	0	0
	28													0	0	0
	29													0	0	0
	30				1			1						2	0	0
	31							1	1					1	1	0
Jun	1											2		0	2	0
	2							1						1	0	0
wk 9		1	0	0	1	0	0	3	1	0	0	2	0	5	3	0
	3		1											0	1	0
	4													0	0	0
	5													0	0	0
	6										1			1	0	0
	7													0	0	0
	8													0	0	0
	9													0	0	0
wk 10		0	1	0	0	0	0	0	0	0	1	0	0	1	1	0
	10													0	0	0
	11													0	0	0
	12													0	0	0
	13													0	0	0
	14													0	0	0
	15													0	0	0
	16	1												1	0	0
wk 11		1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	17													0	0	0
	18							1			1			2	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	1	0	0	1	0	0	2	0	0
	24													0	0	0
	25								3					0	3	0
	26											1		0	1	0
	27										2			2	0	0
	28							1		1				1	0	1
	29													0	0	0
	30													0	0	0
wk 13		0	0	0	0	0	0	1	3	1	2	1	0	3	4	1
TOTAL		6	9	0	2	4	0	23	29	1	37	26	0	68	68	1

Table 3. Number of non-target species captured & released (C&R) or preyed upon (PU) in cowbird traps at and in the vicinity of Big Tujunga Wash Mitigation Area in 2012.

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
SPTO					1									
CATO	15		16		16		15		20		18		15	
WCSP	3		2											
YHBL					1								2	
HOFI	7		2		4		2				3			
HOSP	4		10		2		5		3		3		3	
TOTAL	29	0	30	0	24	0	22	0	23	0	24	0	20	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**
SPTO									1		1		**3**	**0**
CATO	12		25		17		16		15		11		**211**	**0**
WCSP													**5**	**0**
YHBL													**3**	**0**
HOFI					1		1		3				**23**	**0**
HOSP	3				1		1		1				**36**	**0**
TOTAL	15	0	25	0	19	0	18	0	20	0	12	0	**281**	**0**

SPTO spotted towhee
CATO California towhee
WCSP white-crowned sparrow
YHBL yellow-headed blackbird
HOFI house finch
HOSP house sparrow

Appendix 1. Warning/informational sign placed on cowbird traps at Big Tujunga Wash Mitigation Area in 2012.

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 and CDFW Notifications

Exotic Plant Removal Memos

April 16, 2012
(2010-116.006/C/C2)

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

SUBJECT: First Phase Memorandum for the Exotic Plant Removal (April 2012) in the Riparian Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as an update to the exotic plant removal and maintenance activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) during March through April 2012.

The activities conducted during this timeframe included spraying, girdling, and removal of exotic plants within the riparian area.

A pre-removal reconnaissance site visit was conducted on March 21, 2012 by ECORP Consulting, Inc. (ECORP) biologists Kristen Mobraaten and Cara Snellen in order to identify locations of active bird nesting behavior and to identify target locations containing exotic plant species. The survey resulted in the following observations:

- Neither songbird breeding activity nor raptor nests were observed in the areas slated for treatment, therefore no buffers were established;
- Stands and patches of brome grasses (*Bromus* sp.), eupatory (*Ageratina adenophora*), mustard (*Hirschfeldia incana*), and thistle (*Carduus pycnocephalus*) were observed throughout the riparian area where low to high levels of sunlight reach the ground;
- Isolated plants of castor bean (*Ricinus communis*) (mostly immature and exhibiting new growth) were observed in the riparian area; and,
- Three groups of eucalyptus (Eucalyptus sp.) trees were observed within the eastern portion of the Mitigation Area.

The actual removal of the invasive exotic plant species was conducted by a landscape contractor (Natures Image, Inc.) on March 22, 23, 27 through 30, 2012 and monitored by biologists Krissy Day and Cara Snellen. Prior to any work, all members of the landscape contractor's crew received an onsite orientation and instruction on the Mitigation Area's regulations and concerns relating to the area's sensitive species and habitat by an ECORP 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

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 included Haines Canyon Creek, Tujunga Ponds, and any standing or ponded water. Outside of the 5-meter distance, oil-based and water-based herbicides were used. In the limited cases when the landscape contractor's crew members and ECORP biologists entered Haines Canyon Creek, crossings were made only at established creek crossings to minimize disturbance to sensitive habitat and species. All herbicide treatments were conducted by a qualified licensed applicator.

The removal effort was conducted in the riparian habitat areas and along the Big Tujunga Wash. The removal efforts were focused on removing species such as brome, eupatory, mustard, thistle, giant reed, and castor bean from the understory (Figures 1, 2, and 7). The following is a summary of the work performed in March:

- Brome grasses, mustard plants, eupatory, and umbrella plant (*Cyperus involucratus*) were treated with, Ranger-Pro ™ herbicide or, in areas near water, with Aquaneat ™, herbicide;
- Castor bean, ash (*Fraxinus udhei*), elm (*Ulmus parvifolia*), and stands of thistle were cut down with a machete then treated with the Garlon 4™ herbicide;
- Eucalyptus trees were girdled using a chainsaw to cut into the tree trunk and then Garlon 4™ was applied within the cut;
- Giant reed plants were removed using a machete (Figure 4) and cut patches were treated with Garlon 4™ herbicide; and,
- Spanish broom (Spartium junceum) was removed with a portable chainsaw and treated with the Ranger-Pro ™ herbicide.

I hereby certify that the statements furnished above present the data and information required for this report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Krista A. Day DATE: 4/16/2012

Kristina A. Day
Biologist


Figure 1. Spraying eupatorium with herbicide.


Figure 2. Cutting and spraying giant reed stands.


Figure 3. Cutting the eucalyptus with a chainsaw for girdling.


Figure 4. Garlon 4 application on eucalyptus for girdling.


Figure 5. Removal of Spanish broom.


Figure 6. Cutting Spanish broom stumps for better herbicide application.


Figure 7. Spraying brome grasses with herbicide.

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

April 16, 2012
(2010-116.006/G/G2)

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

SUBJECT: Cottonwood/Willow Restoration Area Maintenance and Monitoring (January through March 2012) for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as an update to the cottonwood/willow restoration area maintenance and monitoring activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) for January through March 2012.

Maintenance visits were conducted by ECORP Consulting, Inc. (ECORP) biologists Krissy Day and Cara Snellen on March 22-23 and 26-30, 2012. During this time the restoration areas were inspected and areas needing maintenance were identified. The maintenance was conducted by landscape contractor, Natures Image, Inc. Maintenance involved weed removal around cottonwood plantings. The plantings appeared healthy and, in most cases, required very little maintenance other than weeding.

Prior to any weed removal activities, ECORP's biologist conducted a pre-removal activity survey to determine if any active bird nests were located within the areas where maintenance was scheduled to occur. 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 furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Phang Wang ________________ DATE: April 16, 2012

for Cara Snellen
Biologist

April 13, 2012
(2010-116.006/C/C3)

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

SUBJECT: Weeding in the Oak/Sycamore Upland Area (April 2012) of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as an update to the weeding activities in the oak/sycamore upland area of the Big Tujunga Wash Mitigation Area (Mitigation Area) during March and April 2012. The area targeted during this effort includes the upland areas on the east and west sides of Cottonwood Avenue and the Mary Bell entrance to the Mitigation Area.

Prior to any weed removal activities, ECORP Consulting, Inc. (ECORP) biologist Phillip Wasz conducted a pre-removal activity survey to determine if any active bird nests were located within the areas where weed removal was scheduled to occur. In addition, all of the landscape contractor's (Natures Image, Inc.) crew members were given an onsite orientation briefing by ECORP's biologist. The briefing informed them of the Mitigation Area's regulations and the sensitive species and habitats that are present in the Mitigation Area.

Natures Image's crew conducted the weed removal on March 30 and April 2, 2012. Hand removal methods were used, which included utilizing tools such as machetes and string trimmers. Garlon 4™ herbicide was used to treat cut areas to minimize re-growth of unwanted plant species. The removal efforts were focused on non-native weeds growing around the base of native shrubs and trees. Species targeted for removal included but was not limited to; mustard plant (*Brassica* sp.), thistle (*Carduus* sp.), and red-stemmed filaree (*Erodium cicutarium*). Weeding was conducted on both the east and west sides of Cottonwood Avenue and near the Mary Bell entrance. Large stands of mustard were also treated on the slopes heading down to the riparian area from the upland area.

During the pre-removal activity survey of the upland areas, two American goldfinches were observed carrying nest material and nest building along the north extent of Cottonwood Ave. A 300-foot buffer was established in this area to prevent disturbing bird breeding activity. While weeding was restricted to the areas outside the buffer,

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's biologist instructed Natures Image crew to maintain a distance from the perimeter of the buffer. No raptor breeding or nesting was observed.

I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Phillip Wasz DATE: April 15, 2012

Phillip Wasz
Biologist

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

October 9, 2012
(2010-116.007/002/2)

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

SUBJECT: Second Phase Memorandum for the Exotic Plant Removal (August 2012) in the Riparian Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This memorandum serves as a documentation of the exotic plant removal activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) during August of 2012.

A pre-removal reconnaissance site visit and nesting bird survey was conducted on August 1, 2012 by ECORP Consulting, Inc. (ECORP) biologists Phillip Wasz and Carley Lancaster. This site visit was conducted to identify any sensitive biological resources (such as bird nests) and to identify areas with high densities of exotic plant species. No sensitive resources were recorded during the survey, but large areas of exotic plant species were flagged and recorded using a global positioning system (GPS). These areas included large stands of giant reed (*Arundo donax*), fig tree (*Ficus* sp.), and castor bean (*Ricinus communis*).

The actual removal of the invasive exotic plant species was conducted by the landscape contractor's (Natures Image, Inc.) crews August 2 through 3, 6 through 9, 13 through 15, and 20, 2012. Prior to any work, all members of the landscape contractor's crew received an onsite orientation and instruction on the Mitigation Area's regulations and concerns related to the area's sensitive species and habitat by a qualified ECORP biologist.

The removal effort began on August 2, 2012 with a three person crew from Natures Image. The crew started at the mouth of Haines Canyon Creek near the West Pond and continued down the stream removing exotic vegetation on either side of the creek. The removal efforts were focused on removing species such as eupatory (*Ageratina adenophera*), tree of heaven (*Ailanthus altissima*), giant reed, fig tree, and castor bean from the understory (Figures 1, 2, and 3). The crew used machetes to chop down large stands of vegetation and then sprayed the exposed cut stems with herbicide. The crew worked along the stream for the entire day and finished just south of the Wheatland Avenue entrance off of Wentworth Street.

The removal effort continued on August 3, 2012, with the work located in the riparian areas both east and west of the Cottonwood entrance. The main species of focus continued to be eupatory, castor bean (Figure 4), umbrella sedge (*Cyperus involucratus*) and tree of heaven. Large stands of exotic species were cut down and then sprayed with herbicide, while smaller solitary plants were either sprayed or pulled out by hand.

The removal effort extended to August 15, 2012. Natures Image began working near the Foothill Boulevard entrance of the Mitigation Area. The crew started on the east side of the Big Tujunga Wash and worked west while removing exotic plant species that included mainly giant reed, castor been, tree tobacco (*Nicotiana glauca*), and tamarisk (*Tamarix* sp.) (Figure 5). The crew worked in the wash area for the remainder of the day and ended on the far west side near the large transmission towers.

On August 20, 2012 Natures Image returned to the site to girdle and spray two mulberry trees that were identified during a site visit conducted by ECORP biologists.

ECORP biologists Phil Wasz, Cara Snellen, Krissy Day, and Tania Asef monitored exotic plant removal activities occurring between August 2 and 20, 2012.

During the removal process the following protocols were conducted to minimize disturbance to sensitive habitat and species.

- Nesting bird surveys were conducted in areas prior to the Natures Image crews beginning the removal process.
- Only water-soluble herbicide was used in areas within a 5-meter distance from all water sources. Water sources include Haines Canyon Creek, Tujunga Ponds, and any standing or ponded water. Outside of the 5-meter distance, oil-based and water-based herbicides were used.
- In the limited cases when the landscape contractor's crew members 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 are scheduled to continue in the late fall or early winter 2012.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: Phillip Wasz   DATE: October 9, 2012

Phillip Wasz
Biologist

Figure 1. Castor bean and tree of heaven removal.

Figure 2. Tree of heaven removal.

Figure 3. Giant reed stand cut and sprayed.

Figure 4. Castor bean removal.

Figure 5. Tamarisk removal within the Big Tujunga Wash.

January 4, 2013
(2010-116.007/002/2)

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

SUBJECT: Third Phase Memorandum for the Exotic Plant Removal (December 2012) in the Riparian Area of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This memorandum serves as a documentation of the exotic plant removal activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) during December of 2012.

A pre-removal reconnaissance site visit and survey was conducted on December 6, 2012 by ECORP Consulting, Inc. (ECORP) biologist Phillip Wasz. This site visit was conducted to identify any sensitive biological resources and to identify areas with high densities of exotic plant species. No sensitive resources were recorded during the survey, but large areas of exotic plant species were flagged and recorded using a global positioning system (GPS). These areas included large stands of giant reed (*Arundo donax*) and castor bean (*Ricinus communis*).

The actual removal of the invasive exotic plant species was conducted by the landscape contractor's (Natures Image, Inc.) crews December 10, 11, 17, and 26, 2012. Prior to any work, all members of the landscape contractor's crew received an onsite orientation, a bilingual informational brochure, and instruction on the Mitigation Area's regulations and concerns related to the area's sensitive species and habitat by a qualified ECORP biologist.

The removal effort began on December 10, 2012 with a six-person crew from Natures Image. The crew started at the mouth of Haines Canyon Creek near the West Tujunga Pond and continued down the stream removing exotic vegetation on either side of the Haines Canyon Creek. The removal efforts were focused on removing species such as eupatory (*Ageratina adenophera*), tree of heaven (*Ailanthus altissima*), giant reed, fig (*Ficus* sp.), eucalyptus (*Eucalyptus sideroxylon*), and castor bean (Figures 1, 2, and 3). The crew used machetes to chop down large stands of vegetation and then sprayed the exposed cut stems with herbicide. The crew worked along the stream for the entire day and finished just south of the Wheatland Avenue entrance off of Wentworth Street.

The removal effort continued on December 11, 2012 as Natures Image began working within the Big Tujunga Wash. The crew started on the southeast side of the Big Tujunga Wash and worked their way west while covering the southern half of the wash in the first pass. Once the crew reached the western boundary of the Mitigation Area they turned around and worked east removing exotic plant species in the northern half of the wash. Species removed in the wash included mainly giant reed, castor been, tree tobacco (*Nicotiana glauca*), and tamarisk (*Tamarix* sp.) (Figures 4 and 5). The crew worked in the wash area for the remainder of the day and ended on the eastern-most boundary of the Mitigation Area near the 210 freeway bridge. Additional removal activities were not conducted for the remainder of the week due to the forecast of rain.

On December 17, 2012, Natures Image returned to the site to continue the exotic plant removal activities. The crew began removing exotic plant species around the ponds and within the upland area at the Cottonwood Avenue entrance. The bulk of the activities included spraying of emergent weeds such as black mustard (*Brassica nigra*) and redstem fillaree (*Erodium circutarium*).

The crews continued applying herbicide to weeds and exotic plant species located in the upland area near the Cottonwood Avenue entrance on December 26, 2012. Afterward, the crew walked the trail system and conducted a general maintenance effort, picking up trash and debris along the trails and around the Tujunga Ponds.

ECORP biologist Phillip Wasz monitored exotic plant removal activities occurring during the month of December. During the removal process the following protocols were conducted to minimize disturbance to sensitive habitat and species:

- Site visit and survey was conducted in work areas prior to the Natures Image crews beginning the removal process.
- Only water-soluble herbicide was used in areas within a 5-meter distance from all water sources. Water sources include Haines Canyon Creek, Tujunga Ponds, and any standing or ponded water. Outside of the 5-meter distance, oil-based and water-based herbicides were used.
- In the limited cases when the landscape contractor's crew members and ECORP biologists entered Haines Canyon Creek, crossings were made only at established creek crossings to minimize disturbance to sensitive habitat and species.

This is the final exotic plant removal effort for 2012. No additional exotic plant removal activities will be conducted in 2012.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: Phillip Wasz　　　　DATE: January 4, 2013

Phillip Wasz
Biologist


Figure 1. Eucalyptus tree prior to removal.


Figure 2. Eucalyptus tree after removal.


Figure 3. Castor bean after removal.


Figure 4. Giant reed before removal.


Figure 5. Giant reed after removal.

CA Department of Fish and Game Notifications

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

March 16, 2012
(2010-116.006/C/C2)

Ms. Jamie Jackson
California Department of Fish and Game
PO Box 92890
Pasadena, CA 91109

RE: Notification No. 1600-2008-0253-R5 – Big Tujunga Wash Mitigation Area Exotic Plant Removal and Maintenance Activities (Sent via facsimile to (626) 296-3430)

Dear Ms. Jackson:

The purpose of this letter is to provide notification that exotic plant removal activities will be conducted between March 22 and March 30, 2012 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 for nesting birds and to identify the areas where weeds, non-native grasses, and invasive exotic plant species will need to be removed. This survey will take place on March 21, 2011. The locations of all active nests that are found will be identified using a Global Positioning System (GPS) and areas that will require maintenance will also be identified using a GPS. If active nests are identified, then an appropriately-sized buffer will be established as a "no work" zone. A biological monitor will be on site full-time during all maintenance and exotic plant removal 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

July 20, 2012
(2010-116.007/C/C2)

Ms. Jamie Jackson
California Department of Fish and Game
PO Box 92890
Pasadena, CA 91109

RE: Notification No. 1600-2008-0253-R5 – Big Tujunga Wash Mitigation Area Exotic Plant Removal and Maintenance Activities (Sent via email to jjackson@dfg.ca.gov)

Dear Ms. Jackson:

The purpose of this letter is to provide notification that exotic plant removal activities will be conducted beginning July 26, 2012 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 may be shortly after July 26th depending upon mobilization of the maintenance crew. The activities will begin with the biologists conducting a pre-construction survey for nesting birds and to identify the areas where weeds, non-native grasses, and invasive exotic plant species will need to be removed. This pre-construction survey will take place between July 23 and July 25, 2012. The locations of all active nests that are found will be identified using a Global Positioning System (GPS) and areas that will require maintenance will also be identified using a GPS. If active nests are identified, then an appropriately-sized buffer will be established as a "no work" zone. A biological monitor will be on site during maintenance and exotic plant removal 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

December 6, 2012
(2010-116.007/002/2)

Ms. Jamie Jackson
California Department of Fish and Game
PO Box 92890
Pasadena, CA 91109

RE: Notification No. 1600-2008-0253-R5 – Big Tujunga Wash Mitigation Area Exotic Plant Removal and Maintenance Activities (Sent via email to jjackson@dfg.ca.gov)

Dear Ms. Jackson:

The purpose of this letter is to provide notification that exotic plant removal activities will be conducted beginning December 10, 2012 at the Los Angeles County Department of Public Works' Big Tujunga Mitigation Area near the City of Sunland in Los Angeles County. The activities will begin with the biologists conducting a pre-construction survey for nesting birds and to identify the areas where weeds, non-native grasses, and invasive exotic plant species will need to be removed. This pre-construction survey will take place December 6, 2012. The locations of all sensitive biological resources that are found will be identified using a Global Positioning System (GPS) and areas that will require maintenance will also be identified using a GPS. Although not expected during this time of year, if active bird nests are identified, then an appropriately-sized buffer will be established as a "no work" zone. A biological monitor will be on site during maintenance and exotic plant removal 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

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Rocklin
San Francisco
Redlands
San Diego
Santa Ana

APPENDIX E

Water Lettuce Removal Memos

January 10, 2012
(2010-116.006/C/C4)

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

SUBJECT: Removal of Water Lettuce within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as a notice of continuation of the water lettuce (*Pistia stratiotes*) removal effort within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area (Mitigation Area) during the period of January 2-6, 2012.

Water lettuce removal continued this week using equipment that included a reach forklift, tractor with a bucket, dumpsters, and a boat with an outboard motor. Nearly all of the water lettuce was removed from the West Pond (Figure 1) and Renovate®, an aquatic herbicide approved by regulatory agencies for use within the ponds, was applied to the remaining water lettuce hidden within vegetation around the perimeter of the pond where netting would not have been efficient. Nearly all of the water lettuce was also removed from the East Pond (Figures 2 and 3) and removal effort during the week consisted of cleaning up the perimeter of the East Pond and clearing the water lettuce from the channel connecting the east and west ponds (Figure 4).

The volume of water lettuce removed was not significant and was added to the two dumpsters from the previous week.

Members of the public had again constructed an unauthorized log bridge across the outflow channel at the west end of the West Pond (Figure 5). The bridge was acting as a dam and was elevating the water level within the ponds and increasing the saturation of the trail being used by the work crew along the east side of the ponds. The bridge was removed on January 3, 2012 to allow the water level to return to normal.

Two measures were previously left in place to prevent water lettuce from escaping the ponds and spreading down Haines Canyon Creek: a fishnet stretched across the end of the west pond before the outflow channel into Haines Canyon Creek and a plastic mesh across Haines Canyon Creek a short distance downstream from the ponds. A small amount of water lettuce was found within the channel upstream from the plastic mesh and was removed. No water lettuce was found downstream from the plastic mesh, indicating that the measures are successfully preventing water lettuce from traveling downstream from the ponds.

A variety of aquatic birds were observed using the ponds, including ruddy ducks (*Oxyura jamaicensis*), ring-necked ducks (*Aythya collaris*), mallard (*Anas platyrhynchos*), American coots (*Fulica Americana*), and pied-billed grebes (*Podilymbus podiceps*) (Figure 6). Kingfishers (*Megaceryle alcyon*) and sora (*Porzana Carolina*) were also observed in the vicinity of the ponds.

I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Ben Smith DATE: 1/10/2012

Ben Smith
Biologist

Figure 1. West Pond cleared of water lettuce. Photo taken on 1/3/12.

Figure 2. East Pond with a small amount of water lettuce around the perimeter. Photo taken on 1/3/12.

Figure 3. East Pond cleared of water lettuce. Photo taken on 1/5/12.

Figure 4. Channel connecting the ponds being cleared of water lettuce. Photo taken on 1/3/12.

Figure 5. Log bridge constructed by the public across the outflow from the West Pond into Haines Canyon Creek. Photo taken on 1/3/12.

Figure 6. Ring-necked ducks enjoying open water within the West Pond. Photo taken on 1/5/12.

January 23, 2012
(2010-116.006/C/C4)

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

SUBJECT: Removal of Water Lettuce within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as a notice of continuation of the water lettuce (*Pistia stratiotes*) removal effort within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area (Mitigation Area) during the period of January 9-19, 2012.

Treatment of the two Tujunga Ponds with Renovate®, an aquatic herbicide approved by regulatory agencies for use within the ponds, was completed the week of January 9, 2012. Follow up visits revealed that both mature and seedling water lettuce plants remained within vegetation around the ponds (Figures 1 and 2). Additional monitoring is recommended to ensure the herbicide treatments are effective in eliminating these plants. It was also noted that amphipods, a type of small crustacean, were consuming the remaining water lettuce plants and may help in eliminating the plant from the ponds (Figures 3 and 4).

Restoration of the trail between the ponds on the east side as well as other areas affected by the water lettuce removal project began on January 9, 2012. The staging area on the northwest side of the west pond was ripped with a tractor to de-compact the area. The trail between the ponds on the east side was graded and leveled to remove the tractor ruts (Figure 5). Cuttings were taken from the surrounding habitat on January 12, 2012 and planted on the sides of the trails on the outer two feet, leaving approximately the middle six feet of the trail clear (Figure 6). Cuttings were also planted on January 19, 2012 within vegetation gaps that had been cleared for the project along the east side of the east pond. A total of 20 arroyo willow (*Salix lasiolepis*), 5 black willow (*Salix gooddingii*), and 145 mulefat (*Baccharis salicifolia*) cuttings were planted as part of the restoration effort. Additionally, a seed mix recommendation to restore upland areas on the east side of the east pond was sent to the County of Los Angeles Department of Public works (LACDPW) to pass on to the County of Los Angeles Department of Parks and Recreation.

The notices posted at the Mary Bell and Wheatland North and South entrances to the Mitigation Area stating trail closures around the ponds were taken down following removal of the last water lettuce dumpster from the project site on January 18, 2012. An e-mail was also sent to the LACDPW recommending notifying the public that the trails around mitigation area were now open for use.

Two measures are in place to prevent water lettuce from escaping the ponds and spreading down Haines Canyon Creek: a fishnet stretched across the end of the west pond before the outflow channel into Haines Canyon Creek and a plastic mesh across Haines Canyon Creek a short distance downstream from the ponds. Small amounts of water lettuce were periodically found and removed from within the channel upstream from the plastic mesh. The portion of Haines Canyon Creek within the Mitigation Area was surveyed on Thursday, January 12, 2012 to determine if any water lettuce had migrated downstream. No water lettuce was found downstream from the plastic mesh, indicating that the measures are successfully preventing water lettuce from traveling downstream from the ponds.

A variety of aquatic birds continue to be observed using the ponds, including ruddy ducks (*Oxyura jamaicensis*), ring-necked ducks (*Aythya collaris*), mallard (*Anas platyrhynchos*), American coots (*Fulica Americana*), and pied-billed grebes (*Podilymbus podiceps*) (Figure 6). Kingfishers (*Megaceryle alcyon*) and sora (*Porzana Carolina*) also continue to be noted in the vicinity of the ponds.

I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Ben Smith DATE: 1/23/2012

Ben Smith
Biologist

Figure 1. Seedling water lettuce inside the plastic mesh at the west end of the West Pond. Photo taken on 1/9/12.

Figure 2. Water lettuce plants under vegetation within the East Pond. Photo taken on 1/9/12.

Figure 3. Amphipods found consuming water lettuce. Photo taken on 1/18/12.

Figure 4. Water lettuce damaged by amphipods. Photo taken on 1/5/12.

Figure 5. Worker repairing the trail between the ponds on the east side. Photo taken on 1/9/12.

Figure 6. Willow and mulefat cuttings planted along the sides of the trail between the ponds on the east side. Photo taken on 1/18/12.

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

April 24, 2012
(2010-116.006/C/C4)

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

SUBJECT: Follow-up Site Visit for the February 2012 Water Lettuce Herbicide Application within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as an update on the status of the water lettuce (*Pistia stratiotes*) removal effort within the Tujunga Ponds site adjacent to the Big Tujunga Wash Mitigation Area (Mitigation Area) as of March 7, 2012.

Treatment of the two Tujunga Ponds with Renovate®, an aquatic herbicide approved by regulatory agencies for use within the ponds, was completed the on February 15, 2012. A follow up visit was conducted on March 7, 2012 to review the effectiveness of the herbicide application.

The ponds were in overall good condition with no water lettuce in the open water. However, patches of water lettuce showing new growth were observed under mulefat and other vegetation along the edges of the west pond close to the outflow channel (Figures 1 and 2). On Wednesday, March 7, 2012 the contractor was instructed to pay added attention to this area during the next herbicide treatment.

I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Ben Smith DATE: 4/24/2012

Ben Smith
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

Figure 1. Water lettuce with new growth underneath mulefat vegetation at the west end of the West Pond. Photo taken on 3/7/12.

Figure 2. Water lettuce showing new growth within vegetation along the edge of the West Pond at the west end. Photo taken on 3/7/12.

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

May 10, 2012
(2010-116.006/C/C4)

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

SUBJECT: Follow-up Site Visit for the April 2012 Water Lettuce Herbicide Application within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as an update on the status of the water lettuce (*Pistia stratiotes*) removal effort within the Tujunga Ponds site adjacent to the Big Tujunga Wash Mitigation Area (Mitigation Area) as of May 7, 2012.

Treatment of the two Tujunga Ponds with Renovate®, an aquatic herbicide approved by regulatory agencies for use within the ponds, was completed on April 17, 2012. A follow up visit was conducted on May 7, 2012 to review the effectiveness of the herbicide application.

The ponds were in overall good condition with no water lettuce in the open water (Figure 1). However, small numbers of healthy water lettuce plants were observed within cattails (*Typha latifolia*), under mulefat (*Baccharis salicifolia*), and under other vegetation along the edges of the both ponds (Figures 2 through 4). Also, it was noted that patches of algae were beginning to occupy large areas of the ponds. A boat will be needed to remove the water lettuce and care needs to be exercised if the removal is done during the bird nesting season since red-winged blackbirds (*Agelaius phoeniceus*) were observed nesting in the cattails near where water lettuce was found.

Damage caused by fishermen, including uprooted cattails, a fishing pole cut from a live willow, and tangled fishing line as well as other litter was also noted throughout the site.

I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Ben Smith DATE: 5/10/2012

Ben Smith
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

Figure 1. View of the East Pond where water lettuce was removed. Photo taken on 5/7/12.

Figure 2. Water lettuce showing new growth within vegetation along the edge of the West Pond. Photo taken on 5/7/12.

Figure 3. Water lettuce showing new growth within vegetation along the edge of the East Pond. Photo taken on 5/7/12.

Figure 4. Water lettuce showing new growth within vegetation along the edge of the East Pond. Photo taken on 5/7/12.

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

October 22, 2012
(2010-116.007/003)

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

SUBJECT: Follow-up Site Visit for the July/August 2012 Water Lettuce Herbicide Application within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu;

This memorandum serves as documentation of a follow-up site visit for the application of herbicide in the Tujunga Ponds under the Water Lettuce Control Program for the Big Tujunga Wash Mitigation Area (Mitigation Area). ECORP Consulting, Inc. biologists, Cara Snellen and Tania Asef, conducted a site visit on August 14, 2012 as follow up for water lettuce herbicide application event that occurred on July 30, 31 and August 1, 2012. The biologists walked along the perimeter of both ponds and inspected the water for presence of water lettuce. No water lettuce was observed; however, both ponds had high cover of algae at the surface (Figures 1 and 2). The algae growth is likely a result of the prolonged high summer temperatures in the area and is a naturally-occurring annual event in the ponds.

The information within this memorandum provides evidence that the water lettuce herbicide application in late July/early August was successful. Another water lettuce herbicide application event is scheduled for September 5, 6, and 7, 2012. If you have any questions regarding the contents of this memorandum, please contact me at (714) 648-0630.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: ____________________ DATE: October 22, 2012

Cara Snellen
Biologist

Figure 1. Algae growth on surface of East Pond, taken August 14, 2012.

Figure 2. Algae growth on surface of West Pond, taken August 14, 2012.

October 22, 2012
(2010-116.007/003)

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

SUBJECT: Follow-up Site Visit for the September 2012 Water Lettuce Herbicide Application within the Tujunga Ponds at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu;

This memorandum serves as documentation of a follow-up site visit for the application of herbicide in the Tujunga Ponds under the Water Lettuce Control Program for the Big Tujunga Wash Mitigation Area (Mitigation Area). ECORP Consulting, Inc. biologist Ben Smith conducted a site visit on October 15, 2012 as follow up for water lettuce herbicide application events that occurred on September 5-7 and September 26-28, 2012. The biologist walked along the perimeter of both ponds and inspected the water for presence of water lettuce. Water lettuce was not observed; however, both ponds had high cover of algae at the surface (Figures 1 and 2). The algae growth is likely a result of the prolonged high summer temperatures in the area and is a naturally-occurring annual event in the ponds.

The information within this memorandum provides continued evidence that the water lettuce herbicide applications during 2012 have been successful. Water lettuce was not observed during the previous visit for July/August applications. The next water lettuce herbicide application event is scheduled for the October 29-31, 2012. If you have any questions regarding the contents of this memorandum, please contact me at (714) 648-0630.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: Ben Smith   DATE: October 22, 2012

Ben Smith
Biologist

Figure 1. Algae growth on surface of East Pond, taken October 15, 2012.

Figure 2. Algae growth on surface of West Pond, taken October 15, 2012.

APPENDIX F

Exotic Wildlife Removal Memos and 2012 Report

Exotic Wildlife Removal Memos

June 1, 2012
(2010-116.006/D/D1)

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

SUBJECT: **First Phase of the Exotic Aquatic Species Removal Efforts (May 2012) in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. Yu,

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 their negative impacts on sensitive native species. These negative impacts on sensitive native 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 May 29, 30, and 31, 2012. The primary species targeted during the removal effort were red swamp crayfish (*Procambarus clarkii*), largemouth bass (*Micropterus salmoides*), and the American bullfrog (*Lithobates catesbeianus*). ECORP fisheries biologists Brian Zitt, Terrance Wroblewski, and Adam Schroeder conducted removal efforts in the Tujunga Ponds and Haines Canyon Creek using a suite of sampling methods.

During this removal effort, a large number of red swamp crayfish were observed in Haines Canyon Creek. In an attempt to decrease numbers of red swamp crayfish in the creek, ECORP biologists utilized a 3-meter (m) seine to target deep pools, areas of overhanging instream vegetation, and undercut banks with the highest concentrations of exotic aquatic species. ECORP biologists worked systematically in an upstream direction, sampling each unique habitat repeatedly until all exotic aquatic species were removed. In addition to the seining in Haines Canyon Creek, a total of eight baited minnow/crayfish traps were also set in suitable habitats.

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A total of three 30-m gillnets, each consisting of three 10-m panels (1-, 3- and 5-centimeter (cm) monofilament mesh), and 17 baited minnow/crayfish traps were deployed in the Tujunga Ponds. Thegillnets targeted the removal of multiple size classes of exotic fish species. Bullfrog gigging surveys were conducted at night throughout Haines Canyon Creek and around the perimeter of the Tujunga Ponds. Spear fishing surveys were not conducted within the Tujunga Ponds due to poor visibility (one to three feet).

The exotic aquatic species captured and removed during this effort included: 709 red swamp crayfish, 89 largemouth bass, 12 bluegill (*Lepomis macrochirus*), 6 green sunfish (*Lepomis cyanellus*), 4 mosquitofish (*Gambusia affinis*), 1 fathead minnow (*Pimephales promelas*), 1 black bullhead (*Ameiurus melas*), 1 goldfish (*Carassius auratus auratus*), and 14 American bullfrog adults. In addition to collecting exotic aquatic species during the removal effort, 3 arroyo chub (*Gila orcuttii*), a California Species of Special Concern, were collected in Haines Canyon Creek. These native fish were immediately enumerated and released back into the creek unharmed. There were no native fish species observed in the Tujunga Ponds. Removal of water lettuce was conducted while checking the traps and nets in Tujunga Ponds and a total of 700 plants were removed from the West Pond in and around the cattails.

In addition to the exotic aquatic species removal efforts, multiple man-made dams and barriers were broken down in Haines Canyon Creek in an attempt to restore the natural flow of water.

I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Mari Quillman DATE: June 1, 2012

For: Terrance Wroblewski
Fisheries Biologist

December 12, 2012
(2010-116.007/004/4)

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

SUBJECT: **Second Phase of the Exotic Aquatic Species Removal Efforts (September 2012) in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. Yu,

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 sensitive native 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 September 4 through 6, 2012. The primary species targeted during the removal effort were red swamp crayfish (*Procambarus clarkii*), largemouth bass (*Micropterus salmoides*), and the American bullfrog (*Lithobates catesbeianus*). ECORP fisheries biologists Brian Zitt, Terrance Wroblewski, and Adam Schroeder conducted removal efforts in the Tujunga Ponds and Haines Canyon Creek using a suite of sampling methods.

Day-time removal efforts within Haines Canyon Creek utilized a 3-meter (m) seine to target deep pools, areas of overhanging vegetation, and undercut banks with the highest concentrations of exotic aquatic species. In addition to the seining, 13 baited minnow/crayfish traps were set in suitable habitats. Nighttime surveys were also conducted in Haines Canyon Creek and focused on capturing American bullfrogs and red swamp crayfish. Biologists snorkeled in the pool habitats in the creek and removed exotic fish using spears. Dip nets were also used during nighttime surveys to capture exotic fishes and red swamp crayfish.

Three 30-m gillnets, each consisting of three 10-m panels (1-, 3- and 5-centimeter (cm) monofilament mesh), and six baited turtle traps were deployed in the Tujunga Ponds. Bullfrog surveys were conducted at night around the perimeter of the Tujunga Ponds using gigs. Spearfishing surveys were not conducted within the Tujunga Ponds due to poor visibility (less than one meter). In addition to traps set in the ponds, five baited minnow/crayfish traps and one fyke net were deployed in the Connector Channel between the ponds. All nets and traps in the ponds and the Connector Channel were removed on September 5, 2012 due to the application of herbicides targeting water lettuce (*Pistia stratoites*).

The exotic aquatic species captured and removed during this effort included: 885 red swamp crayfish, 180 largemouth bass, 2 bluegill (*Lepomis macrochirus*), 1 mosquitofish (*Gambusia affinis*), 10 common carp (*Cyprinus carpio*), 1 goldfish (*Carassius auratus auratus*), and 14 American bullfrog. In addition to collecting exotic aquatic species during the removal effort, seven Santa Ana sucker (*Catostomus santaanae*), a federally listed (threatened) species and California Department of Fish and Game Species of Special Concern (CDFG SSC), one Santa Ana speckled dace (*Rhinichthys osculus* ssp.), a CDFG SSC, and two arroyo chub (*Gila orcuttii*), a CDFG SSC, were collected in Haines Canyon Creek. These native fish were immediately enumerated and released back into the creek unharmed. There were no native fish species observed in the Tujunga Ponds. During removal efforts in Haines Canyon Creek, a single water lettuce plant was found and removed.

In addition to the exotic aquatic species removal efforts, multiple man-made dams and barriers were broken down in Haines Canyon Creek in an attempt to restore the natural flow of water. Several groups of people were observed swimming in the creek on September 4, 2012. These groups were educated about the site and advised to follow regulations of the site including no swimming.

I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Adam Schroeder DATE: December 12, 2012

Adam Schroeder
Fisheries Biologist

December 12, 2012
(2010-116.007/004/4)

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

SUBJECT: **Third Phase of the Exotic Aquatic Species Removal Efforts (December 2012) in the Big Tujunga Wash Mitigation Area, Los Angeles County, California**

Dear Ms. Yu,

This letter serves as an update to the exotic aquatic species removal activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) during December 2012. 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 sensitive native 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 4 through 6, 2012. The primary species targeted during the removal effort were red swamp crayfish (*Procambarus clarkii*), largemouth bass (*Micropterus salmoides*), and the American bullfrog (*Lithobates catesbeianus*). ECORP fisheries biologists Brian Zitt, Terrance Wroblewski, Adam Schroeder, and Phillip Wasz conducted removal efforts in the Tujunga Ponds and Haines Canyon Creek using a suite of sampling methods.

Day-time removal efforts within Haines Canyon Creek utilized a 3-meter (m) seine to target deep pools, areas of overhanging vegetation, and undercut banks with the highest concentrations of exotic aquatic species. Nighttime surveys were also conducted in Haines Canyon Creek and focused on capturing American bullfrogs and red swamp crayfish. Biologists snorkeled in the pool habitats in the creek and removed exotic fish using spears. Dip nets were also used during nighttime surveys to capture exotic fishes and red swamp crayfish.

Three 30-m gillnets, each consisting of three 10-m panels (1-, 3- and 5- centimeter (cm) monofilament mesh), two 100-m gillnets each consisting of 10-cm monofilament mesh

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and 16 baited minnow/crayfish traps were deployed in the Tujunga Ponds. Bullfrog surveys were conducted at night around the perimeter of the Tujunga Ponds using gigs. Spearfishing surveys were conducted within the Tujunga Ponds, visibility was 1.5 to 7.5-m. In addition to traps set in the ponds, five baited minnow/crayfish traps and one fyke net were deployed in the Connector Channel between the ponds.

The exotic aquatic species captured and removed during this effort included: 253 red swamp crayfish, 200 largemouth bass, 12 bluegill (*Lepomis macrochirus*), 12 green sunfish (*Lepomis cyanellus*), 11 mosquitofish (*Gambusia affinis*), 7 common carp (*Cyprinus carpio*), 6 goldfish (*Carassius auratus auratus*), 2 Mozambique tilapia (*Oreochromis mossambicus*), 1 channel catfish (*Ictalurus punctatus*), and 5 American bullfrog. In addition to collecting exotic aquatic species during the removal effort, 38 Santa Ana sucker (*Catostomus santaanae*), a federally listed (threatened) species and California Department of Fish and Game Species of Special Concern (CDFG SSC), were collected in Haines Canyon Creek. These native fish were immediately enumerated and released back into the creek unharmed. There were no native fish species observed in the Tujunga Ponds.

In addition to the exotic aquatic species removal efforts, two man-made dams and barriers were removed from Haines Canyon Creek in an attempt to restore the natural flow of water.

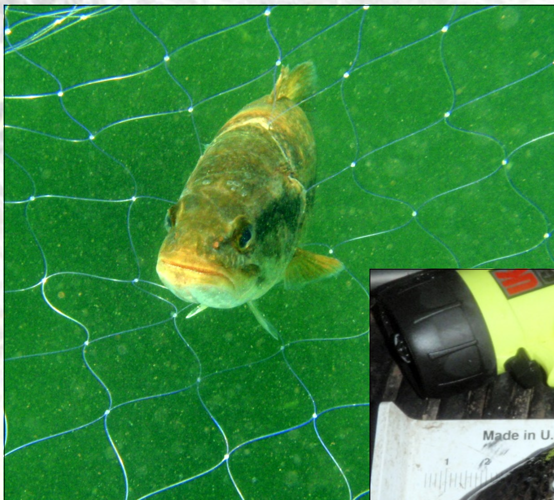
I hereby certify that the statements furnished above present the data and information required for this biological monitoring report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: ______________________ DATE: December 12, 2012

Terrance Wroblewski
Fisheries Biologist

2012 Exotic Wildlife Removal Report

2012 Exotic Aquatic Wildlife Species Removal Report for The Big Tujunga Wash Mitigation Area



Prepared for:
County of Los Angeles
Department of Public Works
900 S. Fremont Avenue
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Prepared by:
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December 2012

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1.0 INTRODUCTION

ECORP Consulting, Inc. (ECORP) was contracted by the County of Los Angeles 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 Wildlife's (CDFW's, formerly California Department of Fish and Game'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 both native wildlife and numerous local groups. It also provides direction for the capture and removal of exotic aquatic species from the various watercourses located within the Mitigation Area in order to relieve some of the negative impacts that these individuals can have on natives. Implementation of the MMP initially began in August 2000, and a Long-term Management Plan (LTMP) is currently being developed to specifically address the continuation of this program into the future.

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

The Mitigation Area currently provides suitable habitat for 2 sensitive reptile species, southwestern pond turtle (*Actinemys marmorata pallida*) and two-striped garter snake (*Thamnophis hammondii*). These species are both listed as CDFW SSC and are known to occur within the Mitigation Area. 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*). In recent years there have been no observations of either of these amphibian species in the Mitigation Area. Arroyo toads are considered to be habitat specialist, relying on specific features associated with large rivers and wash systems in southern California (USFWS 2009). Habitat alteration through changes or manipulation of the hydroperiod, generally associated with damming and/or controlling upstream water releases, likely contributed to the absence of arroyo toad within the Mitigation Area. Likewise, the absence of California red-legged frog is likely attributed to competition and predation pressures associated with the introduction of the exotic American bullfrog (*Lithobates catesbeianus* [bullfrog]) (Hayes and Jennings 1986; Kiesecker and Blaustein 1997).

The purpose of implementing this exotic aquatic species removal program in the Mitigation Area is to restore, create, and maintain suitable habitat for native aquatic species. The program focuses on the removal of exotic fishes, reptiles, amphibians, and invertebrates from all aquatic habitats using a suite of sampling techniques. This report provides the results of the exotic aquatic species removal efforts conducted at the Mitigation Area in 2012.

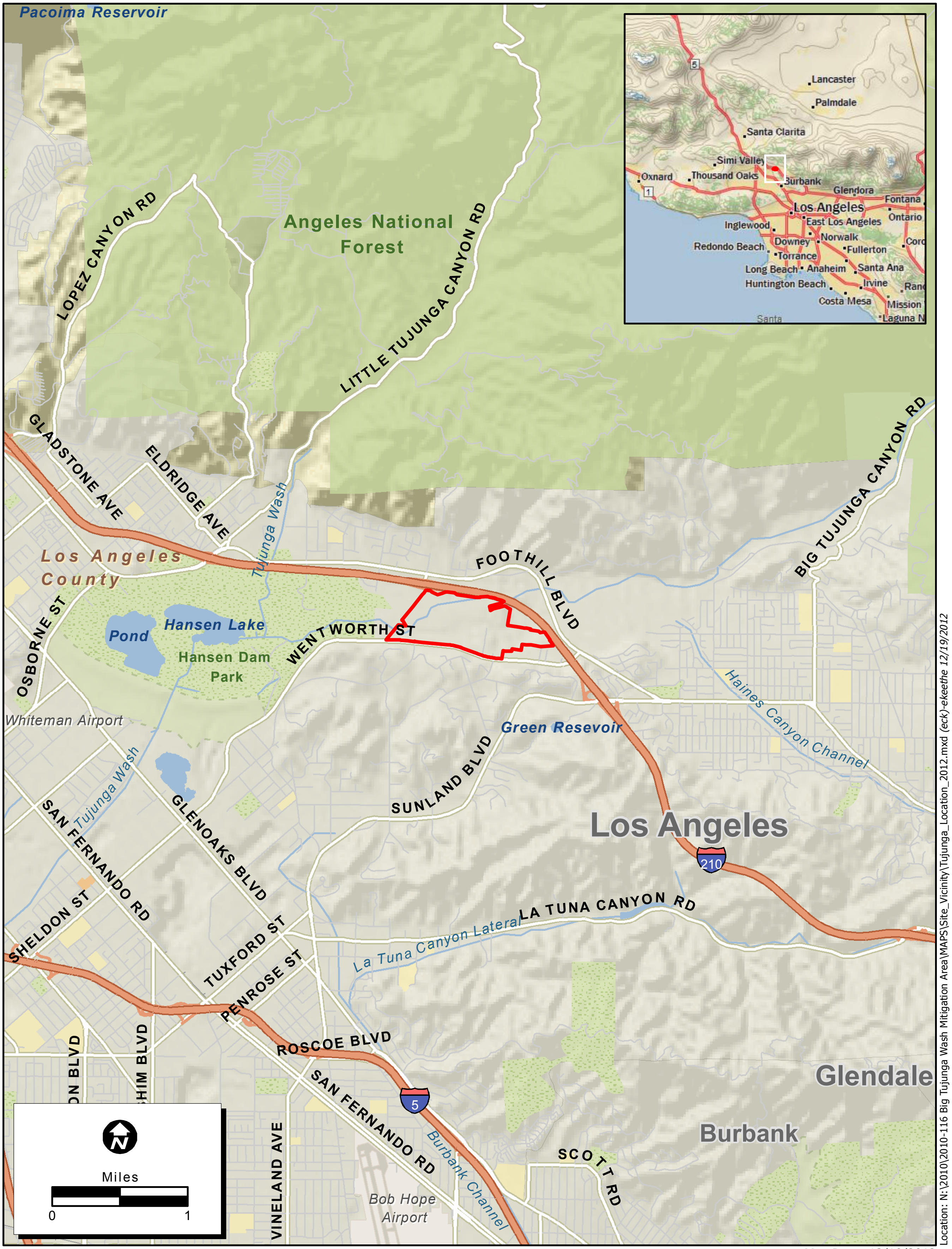
1.1 Location and Setting

The Mitigation Area is located in Big Tujunga Wash (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 (Figure 1-1). The Mitigation Area is bordered on the north by I-210, on the east by I-210 and the Tujunga Ponds, and on the south by Wentworth Street. The western boundary is contiguous with high power lines crossing the 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 (Safford and Quinn 1998; CDFG 2012).

The Mitigation Area contains two watercourses (Figure 1-2): The Wash and Haines Canyon Creek (Haines Creek). The Wash, located in the northern portion of the Mitigation Area, is a wide (greater than 30 meters [m] [98 feet {ft}]) partially-concrete lined tributary of the Los Angeles River. Water flow in the Wash originates from the Big Tujunga Dam (approximately 17.5 kilometers [km] [10.9 miles {mi}] upstream) and is dependent on controlled releases and from local rainfall. Flow is therefore intermittent, leaving it dry for large portions of the year. Haines Creek, located in the southern portion of the Mitigation Area, is a tributary that conveys water flow from Haines Canyon to the Wash. Water flow is perennial and is fed by groundwater and/or runoff from adjacent residential areas. Haines Creek and the Wash merge near the western boundary of the Mitigation Area and continue into the Hansen Dam Flood Control Basin, located approximately 0.8 km (0.5 mi) downstream of the site.

Haines Creek is a relatively narrow (less than 10 m [33 ft] width) and densely vegetated stream with flow originating from the East and West Tujunga Ponds (Ponds). The creek contains a variety of flow types ranging from slow moving glides (less than 0.3 meters/second [m/s] [1.0 foot/second {ft/s}]) and pools (greater than 0.5 m [1.6 ft]), to fast-flowing riffles and runs (greater than 0.3 m/s [1.0 ft/s]) over a mix of substrates (e.g., boulder, cobble, gravel, sand, and fine sediment). The banks along the creek provide an equally diverse set of habitats, ranging from deep (greater than 0.5 m [1.6 ft]) vegetated overhangs and undercuts, to shallow (less than 0.5 m [1.6 ft]) sandy beaches which can be suitable for juvenile life stages of native fishes and amphibians. Haines Creek maintains a dense riparian buffer which provides an intact canopy cover throughout a majority of its course in the Mitigation Area. This canopy layer helps to keep dissolved oxygen levels and water temperatures stable during the warm summer months. This riparian buffer also provides a source of large woody debris, instream vegetation, and bank stability.

Water flowing into Haines Creek originates from underground springs that first supply water directly into the Ponds. The Ponds are located in the northeast corner of the Mitigation Area and consist of two large, interconnected bodies of water each being approximately 100 m (330 ft) across at their widest point. The Ponds are divided into three distinct water features: the West Pond, the Connector Channel, and the East Pond.



Map Date: 12/19/2012
Source: ESRI

Figure 1-1. Project Location

2010-116 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Location: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2012\Tujunga_SiteOverview_2012.mxd (ekeethe 12/20/2012)

Aerial Date: USGS Dec 2010
12/20/2012

Figure 1-2. Project Area Watercourses

2010-116 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

The West Pond lies adjacent to the I-210 freeway, approximately 60 m (200 ft) to the south, and connects directly to Haines Creek. The West Pond has a surface area of approximately 3,200 square meters (m^2) (10,500 square feet [ft^2]) providing a complex, heterogeneous space for many aquatic species. The water depths range from 1.8 to 3.7 m (5.9 to 12.1 ft), and the substrate consists primarily 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 emergent and riparian vegetation that provide both submerged and overhanging habitat. Variations in algal and emergent aquatic plant growth along the banks fluctuate according to seasonal changes, contributing to the habitat complexity within the West Pond.

The Connector Channel is a 70-m (230-ft) long, narrow channel that connects the Ponds. This channel has a maximum width of 5 m (16 ft), with dense stands of emergent vegetation along both banks. Water depths range from less than 1 m to 1.5 m (3.3 ft to 4.9 ft), with the deepest point near the connection with the West Pond.

The East Pond lies adjacent to the I-210 freeway, approximately 65 m (210 ft) to the south. The East Pond has a surface area of approximately 3,300 m^2 (10,800 ft^2) and, like the West Pond, it also provides a diverse combination of aquatic habitats. Water depths in this pond range from 1.8 to 3.7 m (5.9 to 12.1 ft) with substrates consisting mainly of fine silts and sands in the middle with cobble and gravel areas along portions of the perimeter. The banks are heavily lined with emergent and riparian vegetation that provide both submerged and overhanging habitat. Unlike the West Pond, the East Pond possesses more complexity along its banks with several shallow water coves.

In addition to the aquatic habitats within the Mitigation Area a cement lined drainage ditch, located between the equestrian trail and the I-210 freeway along the northeastern portion of the Ponds, also contains habitat for exotic aquatic species. This freeway drainage is located within the California Department of Transportation (Caltrans) easement just outside the Mitigation Area boundary/fence line. The freeway drainage is densely vegetated and holds water year round. Following periods of heavy rain the water spills over from the freeway drainage flooding the adjacent equestrian trail, turning the area into a swamp. Flooding of the equestrian trail provides one continuous wetted habitat from the Ponds to the freeway drainage, and gives exotic aquatic species (i.e., red swamp crayfish [*Procambarus clarkii*] and bullfrog) an opportunity to move from the freeway drainage into the Ponds. Although a chain link fence is in place along the freeway drainage, several openings allow biologists access to survey for exotic aquatic species.

Haines Creek and the Ponds are in fact part of the same watercourse, but when taking into consideration the ecological requirements of the SCMC assemblage, these two systems are extremely different in the amount of suitable habitat they can each provide for native fishes. Historically, perennial deep-water habitats (i.e., ponds and lakes) were uncommon in southern California and thus this type of habitat is not well suited for native southern California fishes, in particular the SCMC fish assemblage. This perennial deep water habitat does, however, favor the exotic aquatic species currently present within the Mitigation Area. The substrates within both Ponds provide excellent breeding areas for exotic species such as largemouth bass (*Micropterus salmoides*) and other Centrarchid (sunfish) species. The heavily vegetated banks surrounding both Ponds provide refuge and forage areas for larval and juvenile life stages of exotic aquatic species. Due to the perennial nature of the Ponds, they will continue to act as a nursery where exotic aquatic species can produce offspring that could eventually move down into Haines Creek.

1.2 Exotic Aquatic Species Ecology in Big Tujunga Wash Mitigation Area

The extremely favorable habitat conditions in the Ponds (i.e., clear, slow moving water; abundant vegetation; availability of prey items – both native and introduced) have allowed several exotic aquatic species to become established either following deliberate introductions or natural range expansions from other locations. Furthermore, several of these species have persisted and proliferated in the absence of natural predators and competitors. Their presence in the Mitigation Area may be having both direct and indirect negative effects upon the resident native species.

One of the most notable and predictable effects of exotic species on natives is direct predation of both adults and their young (Minckley et al. 1991). Largemouth bass spawn from late spring to late fall which coincides with the spawning periods for Santa Ana sucker, Santa Ana speckled dace, and arroyo chub. Largemouth bass are known to cease feeding during their spawning period, but in the weeks leading up to the spawn they feed voraciously in shallow water areas and along vegetated banks (Moyle 2002). There is therefore a high risk of predation on gravid female and mature male native fishes during this largemouth bass pre-spawning period. Following their spawn, the threat resumes for both adult and juvenile native fishes when largemouth bass resume their normal feeding activities. Predation of Santa Ana sucker was documented in October of 2007, when a Santa Ana sucker was discovered inside the stomach of a largemouth bass captured in Haines Creek (ECORP 2009).

Santa Ana sucker, Santa Ana speckled dace, and arroyo chub feed primarily on filamentous algae, crustaceans, insects, and detritus. Their diet places them in direct competition with many of the juvenile exotic fishes found within the Mitigation Area. For example, juvenile bluegill (*Lepomis macrochirus*) feed on both algae and zooplankton, juvenile green sunfish (*Lepomis cyanellus*) eat insects and zooplankton, and western mosquitofish (*Gambusia affinis*) feed upon zooplankton. The juvenile life stages of largemouth bass also feed primarily on zooplankton and small aquatic invertebrates (red swamp crayfish), prior to their dietary transition to larger prey items, including fish. Further, in freshwater fisheries, competition for food during juvenile life stages can force what is termed a “juvenile bottleneck,” wherein competition between juveniles of different species can cause a reduction in their successful transition from juvenile to pre-adult, affecting the number of individuals that eventually 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 these individuals are deliberately introduced from different waterways or regions. One example of this threat is the largemouth bass virus (LMBV), which is currently known to only affect the largemouth bass (Grant et al. 2003). Genetic variations within LMBV have been observed from various infected 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 affects largemouth bass, novel mutations of this virus could eventually pose a threat to native fishes.

2.0 METHODS

The 2012 removal of exotic aquatic species from the Mitigation Area was conducted over three removal efforts: May 29 through 31 (effort number 1), September 4 through 6 (effort number 2), and December 4 through 6 (effort number 3). All removal efforts were conducted under the direction of ECORP biologist Brian Zitt, U.S. Fish and Wildlife Service (USFWS) 10(a)(1)(A) recovery permit holder for Santa Ana sucker (TE-27460A-0). Since the Mitigation Area is home to several special-status species, sampling methods were selected and deployed in habitats with the lowest potential for impacting native species, especially during their spawning/breeding season. In addition to the exotic aquatic species removal efforts in Haines Creek, efforts were also made to remove rock dams and foot bridges.

2.1 Water Quality

Prior to the start of each removal effort, water quality readings were collected to minimize any anomalous readings caused by the disturbance of sediments in the sampling location. A multi-probe HORIBA (Model U-52) meter was utilized to record water temperature, conductivity, salinity, dissolved oxygen (DO), total dissolved solids (TDS), pH, turbidity, and oxidation-reduction potential (ORP). The meter was calibrated according to the manufacturer's instructions prior to each removal effort, and all of the data were tabulated according to site location and date following collection.

2.2 Removal Methods

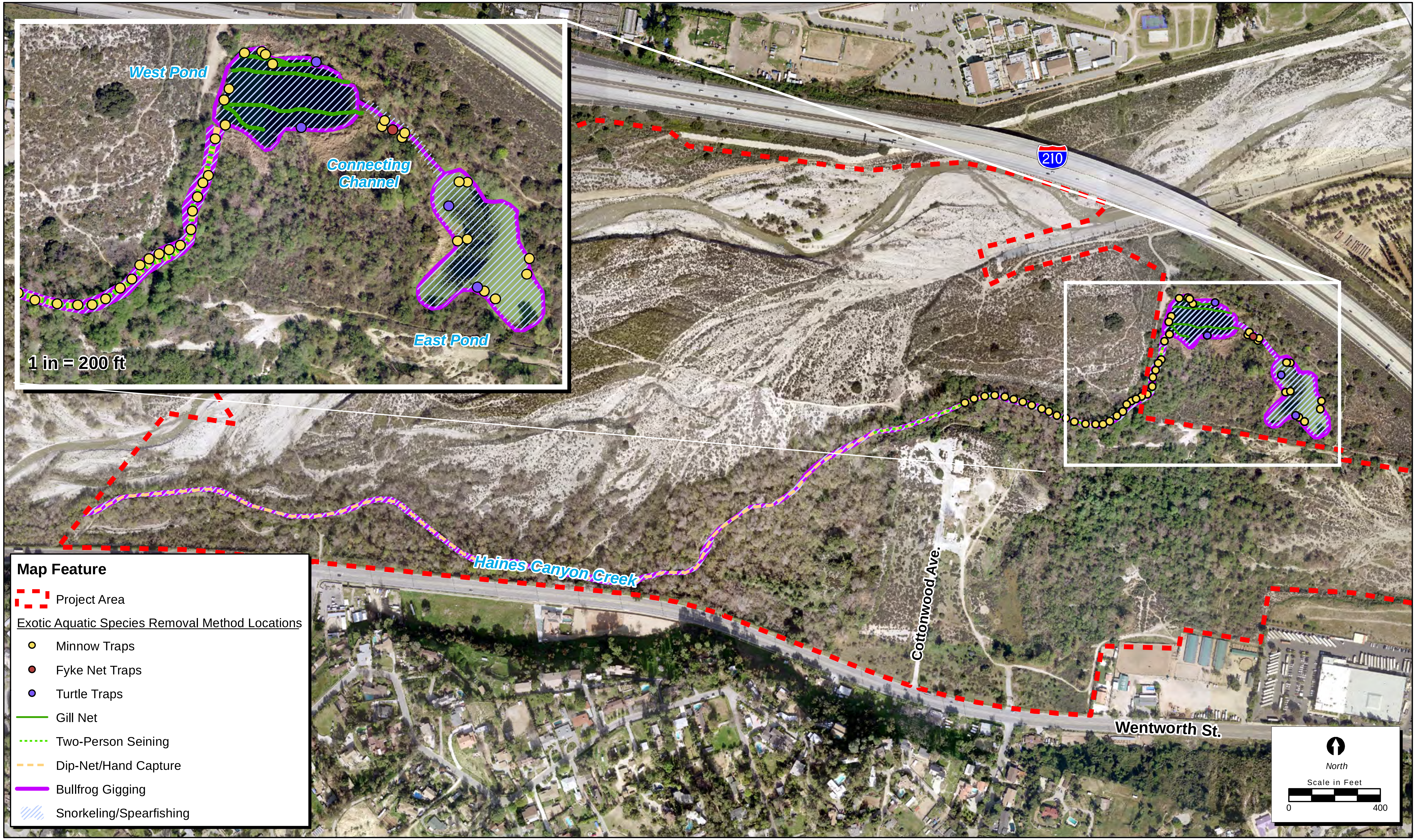
A wide range of removal methods were utilized during the 2012 exotic aquatic species removal efforts (Table 2-1). These methods included: fyke net trapping, spearfishing (day and night), dip-netting/hand capturing, bullfrog gigging, two-person seining, minnow trapping, turtle trapping, and gillnetting. Prior to each removal effort, all potential sampling methods were evaluated for efficacy based upon the current site conditions and information derived from previous removal efforts. In an attempt to reduce the potential for theft, removal, or vandalism of the sampling equipment, the trap locations were often strategically deployed into areas that were inaccessible to the public. Sampling locations and the various sampling methods utilized during 2012 are shown in Figure 2-1. Below is a description of each method used during the exotic aquatic species removal efforts.

2.2.1 Fyke Net Trapping

Fyke net traps are large hoop style nets with detachable wings attached to the throat of the net. Each trap consisted of three steel frames (1.0 m^2 [3.3 ft^2]) wrapped with 6.35-millimeter (mm) (0.25-inch [in]) delta weave mesh, 4.57-m (15.0-ft) detachable wings (1.0-m [3.3-ft] high), and funnels (fykes) on the first, second, and third square frames. The wings provide the ability to block off channels or areas on either side of the trap, funneling fish to swim into the trap. Each trap was allowed to fish for a minimum of 12 hours prior to being checked. A single fyke net trap was set in the center of the Connector Channel in water depths ranging from 0.9 to 1.0 m (3.0 to 3.3 ft) for five days during removal efforts number 2 and number 3.

Table 2-1. Removal Methods Used by Date, Big Tujunga Wash Mitigation Area, 2012

Removal Location	Removal Dates	Fyke Net Trapping	Spearfishing (Day/Night)	Dip-Netting/ Hand Capturing	Bullfrog Gigging	Two-Person Seining	Minnow Trapping	Turtle Trapping	Gillnetting
Haines Canyon Creek	May 29, 2012		X	X	X		X		
	May 30, 2012				X		X		
	May 31, 2012					X	X		
	September 4, 2012		X	X	X		X		
	September 5, 2012		X	X	X		X		
	September 6, 2012					X			
	December 5, 2012		X	X	X				
	December 6, 2012					X			
West Pond	May 29, 2012				X		X		X
	May 30, 2012			X	X		X		X
	May 31, 2012						X		X
	September 4, 2012				X		X	X	X
	September 5, 2012						X	X	X
	December 4, 2012		X		X		X		X
	December 5, 2012		X		X		X		X
	December 6, 2012		X				X		X
Connector Channel	May 29, 2012				X				
	September 4, 2012	X					X		
	September 5, 2012	X					X		
	December 4 2012	X							
	December 5, 2012	X					X		
	December 6, 2012	X					X		
East Pond	May 29, 2012				X				
	May 30, 2012				X		X		
	May 31, 2012						X		
	September 4, 2012				X			X	
	September 5, 2012						X	X	
	December 4, 2012		X						
	December 5, 2012		X		X				
	December 6, 2012		X				X		



Location: N-116 Big Tujunga Mitigation Area/MAPS/Mitigation Monitoring/Report_2010/Tujunga_Exotic_Wildlife_Removal_2010.mxd

Aerial Date: USGS Dec 2010
12/19/2012

Figure 2-1. Exotic Aquatic Wildlife Species Sampling Locations

2010-116 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2.2.2 Spearfishing Surveys

Spearfishing was conducted while snorkeling using either banded spear guns or pole spear slings equipped with barbed, five-prong trident tips. Surveys were conducted in Haines Creek and the Ponds during the day and at night and targeted exotic fishes. Any observation of sunfish nests and bullfrog egg masses were either destroyed or removed. These surveys provide biologists valuable insight into the current underwater habitat features, species specific habitat preferences, and approximate locations of exotic aquatic species aggregations. Spearfishing (day and night) was utilized as a sampling method over the course of six days during all three removal efforts.

2.2.3 Dip-netting/Hand Capturing Surveys

Long handled dip-nets (3.00-mm [0.12-in] knotless nylon mesh) were utilized in the most appropriate habitats (e.g., undercut banks and areas containing overhanging vegetation) for capturing exotic aquatic species (e.g., red swamp crayfish, juvenile fishes, bullfrog tadpoles). This method was utilized during the day in areas of Haines Creek where seining was limited due to accessibility, and at night in combination with bullfrog gigging and spearfishing surveys. Red swamp crayfish and bullfrogs are most active at night and are therefore more susceptible to being located and captured. The use of a light source (either a head and/or hand lamp) is the most effective way to locate and identify red swamp crayfish and bullfrogs, since light directed into a their eyes will reflect an eye-shine, thereby exposing their location. Fish are generally inactive at night and easier to approach, which makes them more susceptible to being captured during night surveys. Although dip-nets are capable of sampling most habitats, it was sometimes necessary to capture some animals by hand during these surveys. Dip-netting/hand capturing surveys were utilized as a sampling method for five days during all three removal efforts.

2.2.4 Bullfrog Gigging Surveys

Bullfrog gigging surveys were conducted throughout Haines Creek and around the perimeter of the Ponds. These surveys focused mainly in areas where suitable habitat for bullfrog exists (pools and slow moving side channels with aquatic vegetation). Surveys were conducted at night with the use of a light source, when adults and juvenile bullfrogs are most active and thereby more susceptible to being located and captured. Biologists searched systematically for bullfrog eye-shine by shining a light along the shoreline, the surface of the water, and any exposed banks. In open areas, biologists scanned the area ahead of them looking for any eye-shine before moving slowly through an area searching the bank habitat in a more detailed manner. Often times (during the breeding season) surveyors would listen for calls around open water areas, a technique which helped cue surveyors in on the location of breeding adults.

Adult and juvenile bullfrogs were captured either by hand or with the use of pole spear slings equipped with barbed, five-prong trident tips. Bullfrog gigging efforts were utilized as a sampling method for six nights during all three removal efforts.

2.2.5 Two-person Seining Surveys

Two-person seining was accomplished through the use of both (3.0-m [10-ft] and 5.0-m [16-ft]) un-bagged (3.00-mm [0.12-in] delta weave mesh) seines mounted on poles, within Haines Creek. Seines were generally hauled upstream or across pooled habitats and either pulled up or onto the banks. Seining was the preferred method used to sample slower moving waters, lacking woody debris or heavy vegetation, often too wide or deep for other sampling techniques to be effective. This method allows for the capture of large numbers of individuals while minimizing the potential for injury or mortality to native species. Two-person seining was utilized as a sampling method for three days during all three removal efforts.

2.2.6 Minnow Trapping

Minnow traps are two-piece cylinders (41 centimeters [cm] [16 in] in height by 25 cm [10 in] in diameter) encased in 6.35-mm (0.250-in) wire mesh with 2.52-cm (1.00-in) diameter funnel openings at either end. Minnow traps were typically set in slow moving water under overhanging riparian vegetation and along undercut banks to target the following species: red swamp crayfish, bullfrog tadpoles, and young-of-the-year (YOY) fishes. Minnow traps were baited with an attractant (e.g., Whiskas© brand tuna cat food), and secured to either the surrounding vegetation at various locations around the perimeter of both Ponds and in Haines Creek. Each trap was allowed to fish for a minimum of 12 hours prior to being checked. Minnow traps were utilized as a sampling method for a total of eight days during all three removal efforts.

2.2.7 Turtle Trapping

Turtle traps are hoop-net traps 1.2 m (3.9 ft) in total length consisting of three steel rings (51 cm [20 in] in diameter), surrounded by 38-mm (1.5-in) knotted nylon mesh, with a single fingered throat on the first ring. The traps were retrofitted with notched foam filled polyvinyl chloride (PVC) pipes to ensure full deployment, and accessory floats to provide sufficient buoyancy for the maintenance of an adequate head space to allow captured turtles room to breather. Orientation of the traps was typically directed toward the most suitable habitat within a sampling area. Typically traps were set in pool habitat areas containing little to no flow, and water depths of at least (1.0 m [3.3 ft]). These floating traps were baited with cans of sardines and secured to the bank. The turtle traps were placed in both Ponds and checked daily following a period of at least 12 hours in the water. Four turtle traps were utilized as a sampling method for two days during removal effort number two.

2.2.8 Gillnetting

Gillnets are monofilament nets that sit vertically in the water column by means of a float line and a lead line. Fish swim into the net and become entrapped, usually at their gills. The mesh sizes vary from 1 to 10 cm (0.4 to 3.9 in) which allows for the capture of multiple size classes. Two different lengths of gillnet were deployed in the West Pond (30 m [98 ft] and 100 m [328 ft]). Gillnets were checked frequently during snorkeling and spearfishing surveys, with no longer than 8 hours between checks. Due to the entanglement hazard involved with gillnetting, bilingual signs were posted around the access points to the West Pond to remind the public to stay out of the water. Five gillnets were utilized as a sampling method for eight days during all three removal efforts.

2.3 Processing Protocol

All of the animals captured were identified to species, enumerated, and examined for any observable health conditions (e.g., parasites, lesions, fin erosion) which were noted and recorded onto standardized data sheets. The first 30 individuals of each species captured by each sampling method at each of the locations were measured to the nearest mm standard length (SL). All native aquatic species captured during the removal efforts were returned unharmed to their original point of capture. All exotic aquatic species captured were humanely euthanized and buried on site. A complete listing of all aquatic species captured during the 2012 sampling efforts is included in Appendix A.

The locations of each sampling area and species encountered during the surveys were recorded using a handheld Geographic Positioning System (GPS) unit (Garmin 60CSx™) in Universal Transverse Mercator (UTM) coordinates, North American Datum of 1983 (NAD83). Photographs were taken of representative individuals from each species captured, site locations, and removal methods and these photographs are included in Appendix B. Field notes regarding weather conditions and other habitat features were also recorded.

3.0 RESULTS

The results of the exotic aquatic species removal efforts conducted in the Mitigation Area are listed below.

3.1 Water Quality

Water quality data were primarily collected in the West Pond, with two readings collected in Haines Creek (Table 3-1). Water quality data between the 2 sampling areas remained relatively constant and were in line with what is expected in these systems. In the West Pond, temperature ranged from 17.86 to 20.45 degrees Celsius (°C), DO values ranged from 4.27 to 8.67 milligrams per liter (mg/L), conductivity values ranged from 0.541 to 0.612 milliSiemens per centimeter (mS/cm), and pH values ranged from 7.03 to 7.92. In Haines Creek temperature ranged from 18.32 to 19.43 °C, DO values ranged from ranged from 7.14 to 8.92 mg/L, conductivity values ranged from 0.549 to 0.563 mS/cm, and pH values ranged from 7.09 to 7.32.

3.2 Exotic Aquatic Species Removal

A total of 2,490 individuals, consisting of 12 exotic aquatic species (10 fishes, 1 amphibian, and 1 invertebrate) and 3 native fishes were captured during the 2012 removal efforts (Table 3-2). Of the total, 98.0 percent (number of individuals [n]=2,439) of the individuals captured were exotic and removed from the site. Haines Creek accounted for 80.5 percent of the total catch (n=1,950), while the remaining 19.5 percent were captured in the remaining water features: West Pond (n=256), Connector Channel (n=123), and East Pond (n=110). All 3 native fishes (Santa Ana sucker [n=45], arroyo chub [n=5], and Santa Ana speckled dace [n=1]) were collected in Haines Creek. These individuals were in good overall health and immediately released back into the creek.

The three removal efforts resulted in the capture and removal of 1,847 red swamp crayfish, 469 largemouth bass, 33 bullfrogs (22 adults, 8 juveniles, and 3 tadpoles), 26 bluegill, 18 green sunfish, 17 common carp (*Cyprinus carpio*), 16 western mosquitofish, 8 goldfish (*Carassius auratus*), 2 Mozambique tilapia (*Oreochromis mossambicus*), 1 fathead minnow (*Pimephales promelas*), 1 black bullhead (*Ameiurus melas*), and 1 channel catfish (*Ictalurus punctatus*).

3.2.1 Exotic Aquatic Species Captured in Haines Canyon Creek

A total of 2,001 individuals, consisting of nine exotic and three native species were captured in Haines Creek during the 2012 removal efforts (Tables 3-2 and 3-3). The exotic aquatic species captured in the creek consisted of seven fishes (goldfish, common carp, fathead minnow, black bullhead, western mosquitofish, green sunfish, and largemouth bass), bullfrogs (adults, juveniles, and tadpoles) and red swamp crayfish. Red swamp crayfish was the most abundant species captured (n=1,590), accounting for 79.5 percent of the total catch at this location. Two-person seining was the most effective method for capturing exotic aquatic species (n=1,186) accounting for 60.8 percent of the exotic aquatic species captured at this location. Dip-netting and hand capture efforts accounted for 28.6 percent of the exotic aquatic species (n=557), while minnow trapping efforts accounted for 9.5 percent of the exotic aquatic species captured in Haines Creek (n=185). Santa Ana sucker, arroyo chub, and Santa Ana speckled dace accounted for 2.5 percent of the total catch at this location.

Table 3-1. Water Quality Record, Big Tujunga Wash Mitigation Area, 2012

Removal Location	Removal Dates	Time	Water Column Location	Temperature (°C)	pH	Salinity (ppt)	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	Total Dissolved Solids (g/L)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)
Haines Creek											
	May 31, 2012	7:42	Surface	18.32	7.09	0.3	7.14	0.563	0.320	0.0	113
	September 6, 2012	8:02	Surface	19.43	7.32	0.4	8.92	0.549	0.364	0.0	124
West Pond											
	May 29, 2012	14:37	Surface	18.98	7.19	0.5	8.42	0.612	0.354	12.1	167
	May 30, 2012	8:29	Surface	19.61	7.26	0.5	8.67	0.609	0.349	9.8	180
	September 4, 2012	15:02	Surface	20.31	7.03	0.4	7.93	0.587	0.359	8.9	154
	September 5, 2012	9:05	Surface	20.45	7.10	0.4	8.01	0.573	0.361	9.4	163
	December 4, 2012	13:50	Surface	18.70	7.92	0.3	5.27	0.545	0.349	0.0	176
	December 5, 2012	9:15	Surface	17.87	7.48	0.3	4.27	0.547	0.350	9.1	164
	December 6, 2012	9:34	Surface	17.86	7.62	0.3	4.58	0.541	0.346	0.0	129

Table 3-2. Summary of Aquatic Species Removal by Location and Efforts, 2012

		Exotic Species														Native Species			
Removal Location	**Removal Dates**	**Goldfish**	**Common carp**	**Fathead minnow**	**Black bullhead**	**Channel catfish**	**Mosquitofish**	**Green sunfish**	**Bluegill**	**Largemouth bass**	**Mozambique tilapia**	**Bullfrog adult**	**Bullfrog juvenile**	**Bullfrog tadpole**	**Red swamp crayfish**	**Arroyo chub**	**Santa Ana speckled dace**	**Santa Ana sucker**	**Grand Total**
Haines Canyon Creek																			
	May 29 - May 31, 2012			1	1		4	3		38		2			607	3			659
	September 4 - September 6, 2012	1	8				1			167		5	3	1	800	2	1	7	996
	December 4 - December 6, 2012	5					11	1		108					183			38	346
	Subtotal	**6**	**8**	**1**	**1**		**16**	**4**		**313**		**7**	**3**	**1**	**1,590**	**5**	**1**	**45**	**2,001**
West Pond																			
	May 29 - May 31, 2012							3	12	50		6[a]			39				110
	September 4 - September 6, 2012		2						2	11		1	3		4				23
	December 4 - December 6, 2012		7			1		10	12	80			2[b]	1	10				123
	Subtotal		**9**			**1**		**13**	**26**	**141**		**7**	**5**	**1**	**53**				**256**
Connector Channel																			
	May 29 - May 31, 2012											3							3
	September 4 - September 6, 2012									2					73				75
	December 4 - December 6, 2012							1		6				1	37				45
	Subtotal							**1**		**8**		**3**		**1**	**110**				**123**
East Pond																			
	May 29 - May 31, 2012	1								1		3			63				68
	September 4 - September 6, 2012											1			8				9
	December 4 - December 6, 2012	1								6	2	1			23				33
	Subtotal	**2**								**7**	**2**	**5**			**94**				**110**
Grand Total		**8**	**17**	**1**	**1**	**1**	**16**	**18**	**26**	**469**	**2**	**22**	**8**	**3**	**1,847**	**5**	**1**	**45**	**2,490**

[a] Two individuals captured in the freeway drainage adjacent to the West Pond

[b] Individuals captured in the freeway drainage adjacent to the West Pond

Table 3-3. Species Abundance Summary by Removal Method, Haines Canyon Creek, 2012

		Exotic Species											Native Species			
Removal Method	**Removal Dates**	**Goldfish**	**Common carp**	**Fathead minnow**	**Black bullhead**	**Mosquitofish**	**Green sunfish**	**Largemouth bass**	**Bullfrog adult**	**Bullfrog juvenile**	**Bullfrog tadpole**	**Red swamp crayfish**	**Arroyo chub**	**Santa Ana speckled dace**	**Santa Ana sucker**	**Grand Total**
Spearfishing - Night	May 29, 2012				1		1									**2**
	September 4, 2012	1	1					**1**								**3**
	December 5, 2012	5					1	2								**8**
	Subtotal	**6**	**1**		**1**		**2**	**3**								**13**
Dip-Netting/Hand Capturing	May 29, 2012											86				**86**
	September 4, 2012											79				**79**
	September 5, 2012							6				226			3	**235**
	December 5, 2012											160				**160**
	Subtotal							**6**				**551**			**3**	**560**
Bullfrog Gigging	May 29, 2012								1							**1**
	May 30, 2012								1							**1**
	September 4, 2012								2							**2**
	September 5, 2012								2	3						**5**
	Subtotal								**6**	**3**						**9**
Two-Person Seining	May 31, 2012			1		4	1	38				455				**499**
	September 6, 2012		7					159				381	2	1	4	**554**
	December 6, 2012					11		106				23			38	**178**
	Subtotal		**7**	**1**		**15**	**1**	**303**				**859**	**2**	**1**	**42**	**1,231**
Minnow Trapping	May 30, 2012						1					36				**37**
	May 31, 2012											30	3			**33**
	September 5, 2012					1		1	1		1	114				**118**
	Subtotal					**1**	**1**	**1**	**1**		**1**	**180**	**3**			**188**
Grand Total		**6**	**8**	**1**	**1**	**16**	**4**	**313**	**7**	**3**	**1**	**1,590**	**5**	**1**	**45**	**2,001**

3.2.2 Exotic Aquatic Species Captured in and around the West Pond

A total of 256 individuals, consisting of seven exotic aquatic species were captured in the West Pond during the 2012 removal efforts (Tables 3-2 and 3-4). The exotic aquatic species captured in the West Pond consisted of 5 fishes (common carp, channel catfish, green sunfish, bluegill, and largemouth bass), bullfrogs (adults, juveniles, and tadpoles), and red swamp crayfish. Largemouth bass was the most abundant species captured (n=141), accounting for 55.1 percent of the total catch at this location. Gillnetting was the most effective method for removing exotic fishes (n=108) accounting for 42.2 percent of the exotic aquatic species captured in the West Pond. Spearfishing accounted for 27.3 percent of the catch (n=70) at this location, while minnow trapping accounted for 24.6 percent of the catch (n=63). Bullfrog gigging efforts captured 8 bullfrogs (5 adults and 3 juveniles) around the perimeter of the West Pond and another two adults and two juveniles adjacent to the West Pond in wetted portions of the I-210 freeway drainage channel. Bullfrog gigging accounted for 4.7 percent of the exotic aquatic species captured at this location.

3.2.3 Exotic Aquatic Species Captured in the Connector Channel

A total of 123 individuals, consisting of four exotic aquatic species were captured in the Connector Channel during the 2012 removal efforts (Tables 3-2 and 3-5). The exotic aquatic species captured in the Connector Channel consisted of red swamp crayfish (n=110), largemouth bass (n=8), bullfrogs (3 adults and 1 tadpoles), and 1 green sunfish. Minnow trapping accounted for 67.5 percent of the total catch (n=83) at this location, and was solely comprised of red swamp crayfish. Fyke net trapping accounted for 30.1 percent of the total catch (n=37) at this location, while bullfrog gigging efforts accounted for 2.4 percent of the total catch, removing 3 adult bullfrogs.

3.2.4 Exotic Aquatic Species Captured in the East Pond

A total of 110 individuals, consisting of five exotic aquatic species were captured in the East Pond during the 2012 removal efforts (Tables 3-2 and 3-6). Minnow trapping accounted for 86.4 percent of the total catch (n=95) at this location. Red swamp crayfish was the most abundant species captured accounting for 85.5 percent of the total catch (n=94). Exotic fishes accounted for 10.0 percent of the total catch (largemouth bass [n=7], Mozambique tilapia [n=2], and goldfish [n=1]), while adult bullfrogs accounted for 4.5 percent of the total catch (n=5).

Table 3-4. Species Abundance Summary by Removal Method, West Pond, 2012

		Exotic Species									
Removal Method	**Removal Dates**	**Common carp**	**Channel catfish**	**Green sunfish**	**Bluegill**	**Largemouth bass**	**Bullfrog adult**	**Bullfrog juvinile**	**Bullfrog tadpole**	**Red swamp crayfish**	**Grand Total**
Spearfishing - Night	December 4, 2012	1	1	4	1	43					**50**
	December 5, 2012	1		5	1	13					**20**
	Subtotal	**2**	**1**	**9**	**2**	**56**					**70**
Dip-Netting/Hand Capturing	May 30, 2012									1	**1**
	Subtotal									**1**	**1**
Bullfrog Gigging	May 29, 2012						4[a]				**4**
	May 30, 2012						2				**2**
	September 4, 2012						1	3			**4**
	December 5, 2012							2[b]			**2**
	Subtotal						**7**	**5**			**12**
Minnow Trapping	May 30, 2012									21	**21**
	May 31, 2012					12				17	**29**
	September 5, 2012									2	**2**
	December 5, 2012									5	**5**
	December 6, 2012								1	5	**6**
	Subtotal					**12**			**1**	**50**	**63**
Turtle Trapping	September 5, 2012									2	**2**
	Subtotal									**2**	**2**
Gillnetting	May 30, 2012			1	8	28					**37**
	May 31, 2012			2	4	10					**16**
	September 5, 2012	2			2	11					**15**
	December 5, 2012	4		1	5	21					**31**
	December 6, 2012	1			5	3					**9**
	Subtotal	**7**		**4**	**24**	**73**					**108**
Grand Total		**9**	**1**	**13**	**26**	**141**	**7**	**5**	**1**	**53**	**256**

[a] Two individuals captured in the freeway drainage adjacent to the West Pond

[b] Individuals captured in the freeway drainage adjacent to the West Pond

Table 3-5. Species Abundance Summary by Removal Method, Connector Channel, 2012

Removal Method	Removal Dates	Exotic Species: Green sunfish	Exotic Species: Largemouth bass	Exotic Species: Bullfrog adult	Exotic Species: Bullfrog tadpole	Exotic Species: Red swamp crayfish	Grand Total
Fyke Net Trapping	September 5, 2012		2			12	**14**
	December 5, 2012		1				**1**
	December 6, 2012	1	5		1	15	**22**
	Subtotal	**1**	**8**		**1**	**27**	**37**
Bullfrog Gigging	May 29, 2012			3			**3**
	Subtotal			**3**			**3**
Minnow Trapping	September 5, 2012					61	**61**
	December 5, 2012					14	**14**
	December 6, 2012					8	**8**
	Subtotal					**83**	**83**
Grand Total		**1**	**8**	**3**	**1**	**110**	**123**

Table 3-6. Species Abundance Summary by Removal Method, East Pond,

Removal Method	Removal Dates	Exotic Species: Goldfish	Exotic Species: Largemouth bass	Exotic Species: Mozambique tilapia	Exotic Species: Bullfrog adult	Exotic Species: Red swamp crayfish	Grand Total
Spearfishing - Day	December 4, 2012	1	3				**4**
	Subtotal	**1**	**3**				**4**
Spearfishing - Night	December 5, 2012		3	2		1	**6**
	Subtotal		**3**	**2**		**1**	**6**
Bullfrog Gigging	May 29, 2012				2		**2**
	May 30, 2012				1		**1**
	September 4, 2012				1		**1**
	December 5, 2012				1		**1**
	Subtotal				**5**		**5**
Minnow Trapping	May 30, 2012	1	1			23	**25**
	May 31, 2012					40	**40**
	September 5, 2012					8	**8**
	December 6, 2012					22	**22**
	Subtotal	**1**	**1**			**93**	**95**
Grand Total		**2**	**7**	**2**	**5**	**94**	**110**

4.0 DISCUSSION

During the three exotic aquatic species removal efforts conducted in 2012 a total of 2,439 individuals consisting of 12 exotic aquatic species were removed. The majority of exotic aquatic species captured and removed came out of Haines Creek (80.5 percent). Of this total, red swamp crayfish and juvenile largemouth bass accounted for 97.6 percent of the individuals removed in 2012. Although the Ponds and Connector Channel only accounted for 19.5 percent of the total exotic aquatic species removed, the overall biomass of these individuals far exceeded that removed from the creek, as the majority of the individuals were large adults. Both of these species were observed in high densities, along with Santa Ana sucker, during the 2012 surveys in Haines Creek. During the removal efforts Santa Ana sucker, Santa Ana speckled dace, and arroyo chub were all observed in Haines Creek. Conversely, there were no native fishes, amphibians, or reptiles observed in the Ponds as the captures were exclusively comprised of exotic fishes, bullfrogs, turtles, and red swamp crayfish.

The slow moving, deep water habitat that exists in the Ponds provides an ideal location for exotic aquatic species to forage, breed, and take up shelter. Haines Creek is a swift moving, shallow water stream that contains a limited number of pools. The majority the habitat within Haines Creek would not be considered ideal for exotic aquatic species; however, in recent years (observation during the 2011 and 2012 removal efforts) exotic fish densities have become more prolific and widespread throughout the creek. In 2011, the Ponds experienced an outbreak of water lettuce (*Pistia stratiotes*), a noxious aquatic plant that completely covered the surfaces of both Ponds. Two large scale water lettuce removal efforts took place in 2011, and in 2012 these efforts were followed by several spot treatments using an approved aquatic herbicide. It is unclear what affect the water lettuce had on the aquatic species assemblages, but it appears exotic aquatic species are migrating downstream of the Ponds and becoming established in Haines Creek.

Due to the instream habitat complexity of Haines Creek (e.g., undercut banks, woody debris, overhanging vegetation, and boulder/cobble substrate) one of the most effective methods for removing exotic species has been backpack electrofishing. Although effective, this method has the greatest potential to cause stress to native fishes (i.e., Santa Ana sucker, Santa Ana speckled dace, and arroyo chub). As a condition of ECORP biologists Todd Chapman and Brian Zitt's USFWS 10(a)(1)(A) permits for Santa Ana sucker, sampling must be conducted in a manner that avoids impacts to the species during the spawning season and to any YOY. The condition specifically states that "no electrofishing shall be conducted in areas where Santa Ana suckers are known to exist between March 1 and July 31." With the anticipation of conducting the 2012 Santa Ana sucker monitoring surveys for the Mitigation Area, electrofishing was not used as a survey method during the 2012 exotic aquatic species removal efforts.

Two-person seining was used in place of electrofishing to target pools and shallow undercuts of Haines Creek. It was the most effective method used in 2012 for removing red swamp crayfish (46.5 percent of individuals captured) and juvenile exotic fishes (58.5 percent of the individuals captured). Two-person seining was used in combination with dip-netting and hand captures in the creek. Combined, these sampling methods removed nearly 80 percent of the exotic species in 2012. Minnow trapping continues to be an effective removal method for capturing red swamp crayfish, juvenile fishes, and bullfrog tadpoles.

Bullfrog gigging continues to be the most effective method for capturing adult and juvenile bullfrogs. In addition to the bullfrogs that were removed within the Mitigation Area, 4 bullfrogs

(2 adults and 2 juveniles), added to the West Pond's total, were captured in the I-210 freeway drainage. This freeway drainage retains water throughout the year and provides breeding and foraging habitat for bullfrogs. In addition to the bullfrogs captured during the removal efforts, 19 bullfrogs (13 adults, 4 juveniles, and 1 tadpole) were removed from the Wash during focused arroyo toad surveys earlier in the year. In prior years (2010 and 2011) bullfrog tadpoles were observed in large aggregations (estimates of over 1,000 individuals) in the Ponds; however, during the 2012 removal efforts there were no observations of bullfrog tadpoles in the Ponds. It was noted in the 2011 Big Tujunga Wash Mitigation Area Exotic Aquatic Species Removal Annual Report (ECORP 2012) that 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). The presence of water lettuce in the Ponds restricted snorkeling surveys for most of 2011 and early 2012, so it is difficult to ascertain what transpired of these individuals. No bullfrog egg masses were observed during the 2012 removal efforts.

Spearfishing continues to be an effective method for capturing and removing large exotic fishes. The night spearfishing surveys produce more captures than day spearfishing as fish are typically easier to approach at night. Spearfishing surveys allowed biologists insight into the current underwater habitat features, species specific habitat preferences, and approximate locations of exotic aquatic species aggregations. These surveys also provide information on species behavior and allowed biologists the opportunity to identify and capture elusive individuals (e.g., common snapping turtle [*Chelydra serpentine*]) that may avoid being captured through other conventional methods. During spearfishing surveys in 2012, two Mozambique tilapia were removed from the East Pond with one other escaping off the spear tip and avoiding capture. This is the first recording of Mozambique tilapia as it has not been documented at the Mitigation Area before. This invasive species, if left unchecked, has the potential to flourish within the Mitigation Area.

Gillnetting was an effective method of capturing and removing large exotic fishes. Conducting spearfishing surveys around the gillnets often caused fish to flush into the nets. Combined, gillnetting and spearfishing accounted for 35.8 percent of the exotic fishes captured. These individuals were primarily adult largemouth bass removed from the West Pond. In addition to those individuals removed, snorkeling surveys allowed for several sunfish nests to be destroyed, and areas around downed trees, snags, and undercut banks to be examined for the presence of exotic turtles. There were no turtles (native or exotic) observed during snorkeling surveys.

The depth and width of the Connector Channel provides an optimal setting for the deployment of a fyke net trap, as it completely blocks off the channel. The fyke net was another sampling method that proved to be effective at capturing large adult fishes. Turtle traps were set in the Ponds briefly during removal effort number 2, but needed to be removed due to the application of herbicide for water lettuce treatment. The gillnets, fyke net trap, and minnow traps that were also fishing during this period were removed in order to accommodate the water lettuce treatment. Turtle trapping was the least effective method used in 2012, only capturing two red swamp crayfish. Generally, turtle traps need to be set for a minimum of 4 days in order to get optimal results; however, exotic turtles were neither observed nor captured during the 2012 removal efforts.

Removal effort number 1 (May 2012) captured a total of 840 individuals, while removal effort number 2 (September 2012) yielded the highest catch at 1,103 individuals. Removal effort number 3 took place in December following a few winter storms and produced lower numbers compared to the first 2 removal efforts with 547 individuals. Fewer adult red swamp crayfish were observed in the creek during removal effort number 3 which is typical during cold weather patterns and following winter storms.

4.1 Problems Encountered During Removal

During each removal effort, care was taken regarding the placement of all sampling equipment in an attempt to reduce the potential for theft, removal, or vandalism. Trap locations were generally chosen based upon the ability to keep the traps concealed and inaccessible to the public. During removal effort number 1, while conducting the morning net/trap checks, a gillnet was apparently snagged by a fisherman, pulled into shore, and torn in several sections. Bilingual signs were posted around all the access points to the West Pond. These signs stated that a biological study was taking place with nets in the water - do not swim or fish in the water. Two of the signs were found broken on the ground adjacent to the net. This was the only incident involving the tampering or removal of sampling equipment during the 2012 removal efforts.

Several homemade traps were removed from the Ponds and creek during the 2012 removal efforts. These traps ranged from small plastic funnel traps to well-fabricated wire mesh traps. When observed these traps were removed from the site. Fishing tackle and bait containers were observed in open areas with access to the water. On a few occasions ECORP biologists encountered people fishing in both the creek and Ponds. When approaching these recreational users, ECORP biologists educated them about the rules of the Mitigation Area and advised them of approved fishing locations within the region.

In addition to the exotic aquatic species removal efforts conducted in the creek, several rock dams and foot bridges were also removed. These barriers can change both the stream habitat type (from riffle or glide to deep pools) and instream habitat complexity (i.e., filamentous algae, aquatic macrophytes, and overhanging vegetation). These altered habitats often create suitable foraging and breeding habitat for exotic aquatic species. The removal of these structures restored the natural flow of the creek, and removes the potential for adverse impacts to native fishes.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The current exotic aquatic species control program utilizes an approach which efficiently and effectively removes exotic aquatic species posing the greatest potential impact to the native species within the Mitigation Area. Due to the various intricacies associated with the exotic aquatic species removal program (e.g., potential for migration, habitat complexity, sensitivity on avoiding impacts to native species who share the same habitat as targeted species) within the Mitigation Area, the complete eradication of exotic aquatic species will not be possible without extensive removal efforts. In order to maintain the current levels of these exotic aquatic species, removal 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 ensure long-term success, 2) maintain a dynamic sampling approach with regard to target species, changing site conditions and seasonal variations encountered, 3) eliminate habitat for exotic aquatic species to breeding, foraging, or take up shelter, and 4) eliminate the potential for migration and/or introductions.

Continuous monitoring efforts should be conducted in order to monitor the distribution, densities, and changes in exotic species assemblages. Continuous monitoring will allow for early detection of new invasive species, range extensions, predation rates on native species, or changes in distributions or densities of already established species. In the early spring and summer months, surveys should be conducted to disrupt all fish nests and remove bullfrog egg masses. These techniques could provide an effective way to limit recruitment of these species. Night bullfrog surveys around the perimeter of the Ponds, Haines Creek, and the Wash should be conducted in the early spring and summer months when this species is most active. Due to the presence of known populations of special status fishes within Haines Creek, efforts should also continue to target and remove red swamp crayfish and exotic fishes from the creek during the fall, winter and early spring months to minimize their impacts to breeding adults and young native fishes.

Transforming the Ponds into a stream-type system to coincide with the habitat in Haines Creek, would have a substantial benefit to the native aquatic species of the Mitigation Area. It would increase the amount of suitable habitat for native fishes and remove habitat that is highly favorable for exotic aquatic species. Alternatively, a fish screen could be engineered and installed at the confluence of the West Pond and Haines Creek in an effort to reduce exotic species migration from the Ponds into the creek. The screen would likely require maintenance to ensure it functioned properly.

Rock dams, foot bridges, and other obstructions that impede the natural flow of the creek can be problematic to native fishes and often create favorable conditions for exotic aquatic species. Efforts should continue to monitor for these types of obstruction and when observed they should be removed. Public outreach regarding the biological resources of the Mitigation Area should continue in an effort to educate recreational users of the approved and prohibited recreational activities at the site and how to report infractions.

Clean out effort should be made along the I-210 freeway drainage to remove suitable habitat 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 area 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 these species from the Mitigation Area.

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APPENDIX A

Species Captured During the Exotic Aquatic Species Removal Efforts, 2012

Appendix A: Species Captured During the Exotic Aquatic Species Removal Efforts, 2012.

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*
* *fathead minnow*	*Pimephales promelas*
Santa Ana speckled dace	*Rhinichthys osculus* ssp. 3
Suckers	***Catostomidae***
Santa Ana sucker	*Catostomus santaanae*
North American Catfishes	***Ictaluridae***
* *black bullhead*	*Ameiurus melas*
* *channel catfish*	*Ictalurus punctatus*
Livebearers	***Poeciliidae***
* *mosquitofish*	*Gambusia affinis*
Sunfishes	***Centrarchidae***
* *green sunfish*	*Lepomis cyanellus*
* *bluegill*	*Lepomis macrochirus*
* *largemouth bass*	*Micropterus salmoides*
Cichlids	***Cichlidae***
* *Mozambique tilapia*	*Oreochromis mossambicus*
AMPHIBIANS	***AMPHIBIA***
True Frogs	***Ranidae***
* *American bullfrog*	*Lithobates catesbeianus*
**indicates exotic species*	

APPENDIX B

Exotic Aquatic Species Removal Photographs

B-1: Biologist removing a rock dam in Haines Canyon Creek.

B-2: A minnow trap fishing in Haines Canyon Creek.

Exotic Aquatic Species Removal Photographs

B-3: Exotic species captured in Haines Canyon Creek during two-person seining efforts.

B-4: Biologist removing a largemouth bass from a gillnet in the West Pond.

Exotic Aquatic Species Removal Photographs

B-5: During the May 2012 removal efforts a gillnet was torn and pulled from the West Pond.

B-6: Bluegill captured in the West Pond during gillnetting efforts.

Exotic Aquatic Species Removal Photographs

B-7: Common carp captured in the West Pond during gillnetting efforts.

B-8: Largemouth bass captured net in the Connecting Channel during fyke net trapping efforts.

Exotic Aquatic Species Removal Photographs

B-9: Gravid female bullfrog during gut content analysis, captured in the Connecting Channel.

B-10: Goldfish captured in the East Pond during daytime spearfishing efforts.

Exotic Aquatic Species Removal Photographs

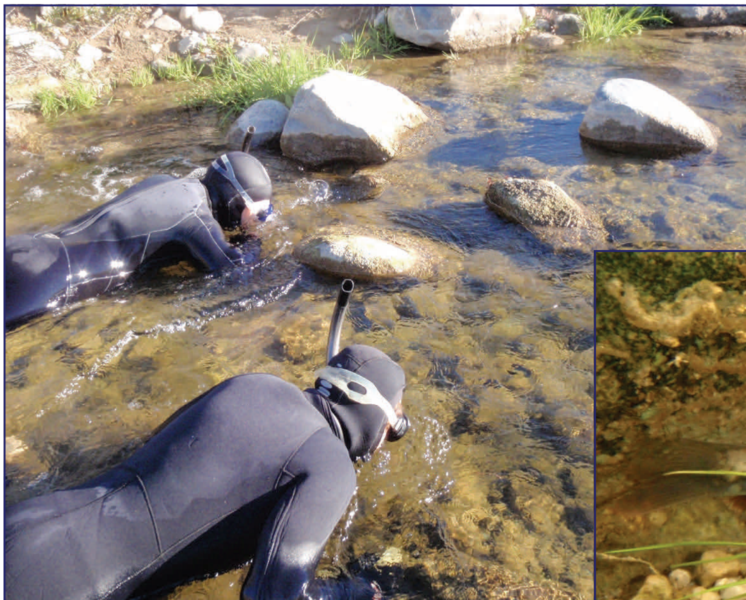
B-11: Channel catfish removed from the West Pond during night spearfishing efforts.

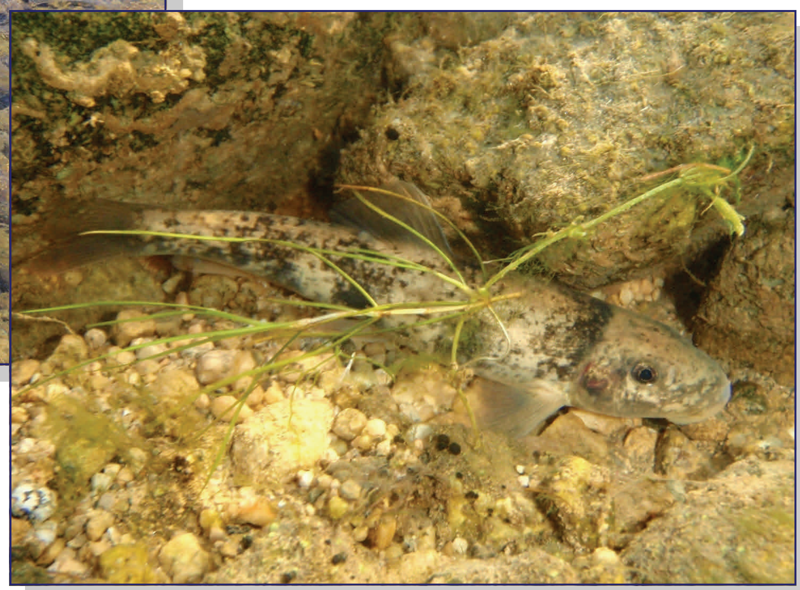
B-12: Two Mozambique tilapia captured in the East Pond during night spearfishing efforts.

APPENDIX G

Native Fish Monitoring Report

FINAL
2012 NATIVE FISHES REPORT
FOR THE
BIG TUJUNGA WASH MITIGATION AREA





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March 2013

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2012 Native Fishes Report
for the
Big Tujunga Wash Mitigation Area

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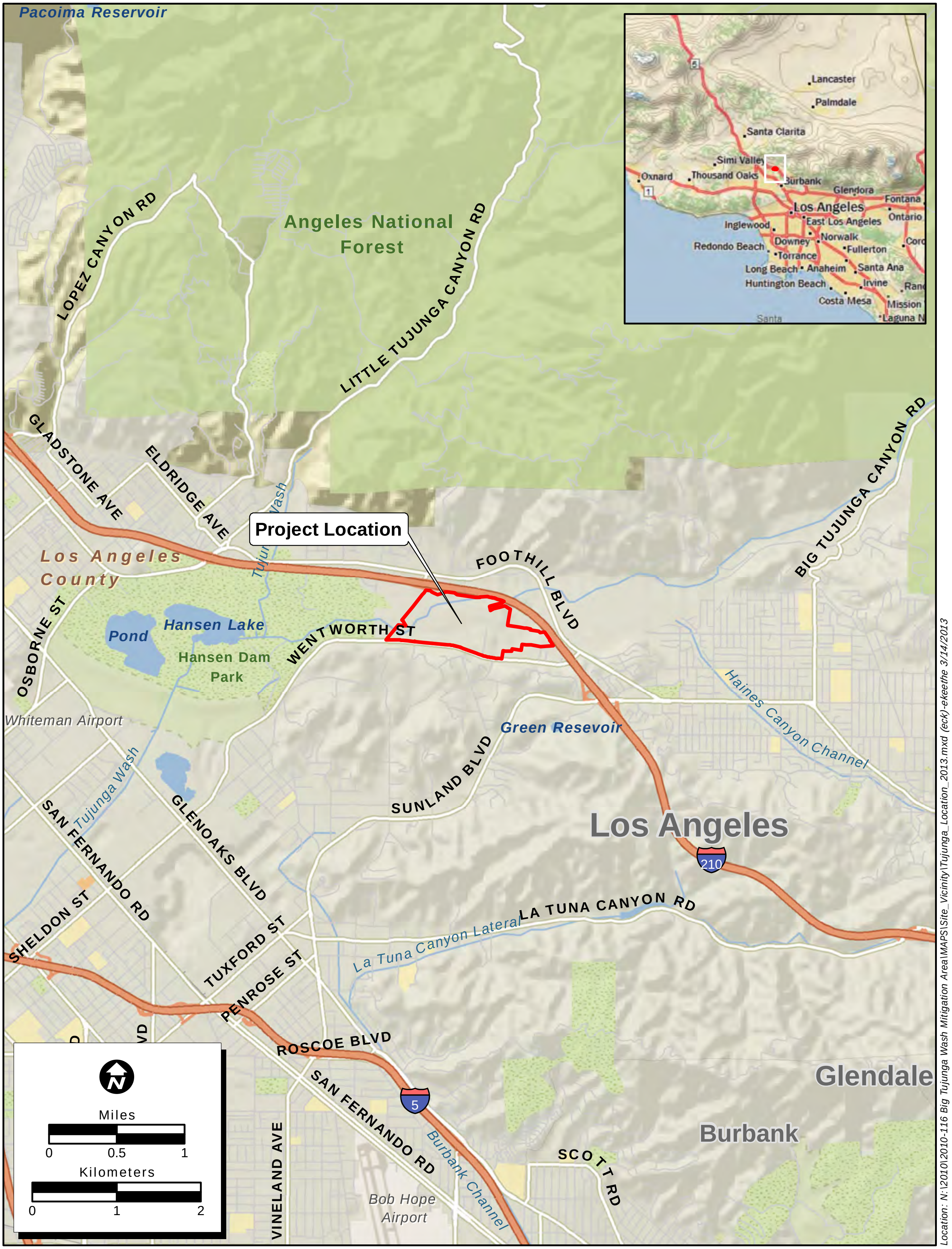
SUMMARY

ECORP Consulting, Inc. (ECORP) was contracted by the County of Los Angeles Department of Public Works (LACDPW) to conduct a native fishes survey to determine the population status of the Santa Ana sucker (*Catostomus santaanae*), a federally listed threatened species and a California Department of Fish and Wildlife (CDFW) Species of Special Concern (SSC), within the Big Tujunga Wash Mitigation Area (Mitigation Area) located in the City of Los Angeles, Los Angeles County. The native fishes survey consisted of physical habitat characterizations and visual fish counts within two watercourses of the Mitigation Area, Haines Canyon Creek (Haines Creek) and Big Tujunga Wash (Wash), in December 2012. The assessment of overall Santa Ana sucker habitat ranked as good for both sampling locations. Overall, densities of Santa Ana sucker in Haines Creek appear stable with 592 individuals (502 adults and 90 juveniles) observed; however, only four adults were observed within the Wash at the time of the survey. Santa Ana speckled dace (*Rhinichthys osculus* spp.3), a CDFW SSC, were observed in both sampling locations; however, arroyo chub (*Gila orcuttii*), a CDFW SSC, were only observed in the Wash despite being observed in Haines Creek during exotics removal efforts earlier in the year, and during previous years efforts. Several exotic species were observed during these surveys, these included: red swamp crayfish (*Procambarus clarkii*), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), brown bullhead (*Ameiurus nebulosus*), western mosquitofish (*Gambusia affinis*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), and American bullfrog (*Lithobates catesbeianus*).

1.0 INTRODUCTION

The Big Tujunga Wash Mitigation Area (Mitigation Area) is approximately a 210-acre parcel of land located in the City of Los Angeles Sunland area (Figure 1-1). The Mitigation Area was purchased in 1998 by the County of Los Angeles Department of Public Works (LACDPW) for the purpose of compensating for habitat loss from other LACDPW projects. In 2000, a Master Mitigation Plan (MMP) was created for the Mitigation Area to serve as a five-year guide for implementation of various enhancement programs and to fulfill the California Department of Fish and Wildlife's (CDFW's, formerly California Department of Fish and Game's) requirement for the preparation of a management plan for the site (Chambers Group 2000). The MMP encompassed strategies to enhance and protect the existing habitat for fish and wildlife and to create additional natural areas that could be utilized by native wildlife and numerous user (recreational) groups. The ultimate goal of establishing the Mitigation Area was to provide for the long-term preservation, management, and enhancement of biological resources. Implementation of the MMP initially began in August 2000, and a Long-term Management Plan (LTMP) is currently being developed. This document provided a summary of the restoration actions and planning that had taken place since 2000, and sketched the outline for actions and planning efforts that will take the management of the Mitigation Area into the long-term maintenance phase, in association with the goals of the site. Surveys to monitor the population of Santa Ana sucker (*Catostomus santaanae*) within the Mitigation Area are required every three years in accordance with the site's MMP (Chamber Group 2000). In response to this management requirement, ECORP Consulting, Inc. (ECORP) was contracted by LACDPW to conduct surveys in 2012 to assess the population of Santa Ana sucker within the Mitigation Area.



Map Date: 1/23/2013
Source: ESRI

Figure 1-1. Project Location

2010-116.007/005/5 Big Tujunga Wash Mitigation Area

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1.1 Location and Setting

The Mitigation Area is located in the Big Tujunga Wash (Wash), just downstream of the Interstate 210 (I-210) freeway overcrossing, near the City of Los Angeles' Sunland community in San Fernando Valley, Los Angeles County. The Mitigation Area is bordered on the north by I-210, on the east by I-210 and the Tujunga Ponds, and on the south by Wentworth Street. The western boundary is contiguous with high power lines crossing the Wash just upstream (approximately 2 kilometers [km] [1.2 miles {mi}]) 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 (Safford and Quinn 1998; CDFG 2012).

The Mitigation Area contains two watercourses, the Wash and Haines Canyon Creek (Haines Creek), both of which are designated as critical habitat for Santa Ana sucker in the Los Angeles River basin (USFWS 2010) (Figure 1-2). The Wash, located in the northern portion of the Mitigation Area, is a wide (greater than 30 meters [m] [98 feet {ft}]) partially concrete lined tributary of the Los Angeles River. Water flow in the Wash originates from the Big Tujunga Dam (approximately 17.5 km [10.9 mi] upstream) and is dependent on controlled releases and local rainfall. Flow is therefore intermittent, leaving it dry for large portions of the year. Haines Creek, located in the southern portion of the Mitigation Area, is a relatively narrow (less than 10 m [33 ft] wide) and densely vegetated fourth order stream that conveys water flow from Haines Canyon to the Wash. Water flow is perennial and is fed by groundwater and/or runoff from adjacent residential areas. Haines Creek and the Wash merge near the western boundary of the Mitigation Area and continue into the Hansen Dam Flood Control Basin, located approximately 0.8 km (0.5 mi) downstream of the Mitigation Area.

The Tujunga Ponds are located northeast of the Mitigation Area and consist of two large, interconnected bodies of water each being approximately 100 m (330 ft) across at their widest point. Haines Creek and the Tujunga Ponds are in fact part of the same watercourse, but when taking into consideration the ecological requirements of the native fish assemblage these two systems are extremely different in the amount of suitable habitat they can each provide for native fishes. Historically, perennial deep-water habitats (i.e., ponds and lakes) were uncommon in southern California and thus this type of habitat is not well suited for native southern California fishes (Moyle 2002). This perennial deep water habitat does, however, favor the exotic aquatic species (exotic species) currently present within the Mitigation Area. The substrates within both ponds provide excellent breeding areas, and the heavily vegetated surrounding banks provide refuge and forage areas for larval and juvenile life stages of exotic species. Due to the perennial nature of the Tujunga Ponds, they will continue to act as a nursery where exotic species can produce offspring that could eventually move downstream into Haines Creek.

1.2 South Coast Minnow-Sucker Fish Community

Historically, all southern California coastal freshwater fishes have experienced population and environmental impacts as a result of habitat destruction, alteration, and dewatering, and thus are greatly reduced in both their overall distribution and abundances (Moyle 2002; Swift et al. 1993).

Aerial Date: USGS Dec 2010
1/23/2013

Figure 1-2. Project Area Watercourses

2010-116.007/005/5 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
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These impacts are further compounded by the effects exotic species can have on native fish assemblages. One such native freshwater fish assemblage located in southern California is the South Coast Minnow-Sucker fish community (SCMC) (Ellison 1984), which is known to occur in the Mitigation Area. This assemblage consists of the following native fishes: Santa Ana sucker, Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3), arroyo chub (*Gila orcuttii*). Compared to historical records, the current distribution for each of these species has been severely reduced. The Mitigation Area provides an important refuge for the native fish populations from the impacts of habitat alteration and dewatering. The Mitigation Area 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).

Threats to the SCMC within the Mitigation Area include habitat modifications and stream flow changes due to the creation of rock dams, foot bridges, or other in-stream barriers which could impede the natural water flow, restrict the movements of native fishes, and potentially dewater stream sections downstream. Recreational use of the Mitigation Area in the form of swimming, bathing, fishing, and hunting could also pose a threat to the SCMC. Fire and prolonged periods of drought, chemical contamination of the creek (e.g., detergents, pesticides, paints), exotic species introductions, and homeless encampments continue to pose a threat to the SCMC population within the Mitigation Area. Predation and competition with exotic species has been a major concern in managing the Mitigation Area and the SCMC. In an effort to counteract these ongoing threats, LACDPW has continued to monitor the Mitigation Area for any unsanctioned activities. Bilingual public outreach efforts continue to be a proactive component for educating the various recreational groups that use the Mitigation Area of its sensitive biological resources.

Over the years, exotic species removal efforts have been conducted under the MMP for the Mitigation Area in an effort to control exotic species populations and reduce their negative impact on the SCMC. Although these efforts remove a large number of individuals exotic species persist due to source populations upstream and downstream. The spawning period for the SCMC occurs from late spring to late fall, coinciding with that of largemouth bass (*Micropterus salmoides*). Largemouth bass are known to cease feeding during their spawning period, but in the weeks just prior to reproduction, largemouth bass feed voraciously in both shallow waters and along vegetated banks (Moyle 2002). There is, therefore, a high risk of predation to gravid female and mature male native fishes during this largemouth bass pre-spawning period, as there is for newly hatched fish larvae during the post-spawning period, when largemouth bass resume their normal feeding activity.

Members of the SCMC are primarily omnivorous feeders; their diet often includes filamentous algae, crustaceans, insects, and detritus. Their diet places them in direct trophic competition with several exotic species currently known to occur in the Mitigation Area. Juvenile bluegill (*Lepomis macrochirus*) feed on algae and zooplankton; green sunfish (*Lepomis cyanellus*) feed on insects and zooplankton; western mosquitofish (*Gambusia affinis*) feed upon zooplankton, and juvenile largemouth bass feed on zooplankton and small aquatic invertebrates, such as red swamp crayfish (*Procambarus clarkii*). Competition for food resources during the juvenile life stage can force what is termed a “juvenile bottleneck,” where interspecific competition between juveniles of various species can cause a reduction in overall recruitment that can adversely affect year-class strength (Traxler and Murphy 1995).

1.2.1 Santa Ana Sucker

The Santa Ana sucker is a native member of the Catostomidae (Sucker) Family. Originally described as *Pantosteus santa-anae* (Snyder 1908) from the Santa Ana River in Riverside County, this species is native to southern California and was historically found throughout the Los Angeles, San Gabriel, and Santa Ana River systems. Populations have been extirpated from several portions of these rivers and they are now primarily restricted to larger stream sections which still exist in the headwater areas of these systems (Swift et al. 1993).

This species of sucker is small, usually less than 16 centimeters (cm) (7 inches [in]) standard length (SL; measured from snout tip to the anterior portion of the caudal fin) and has deep notches at the junctions of the upper and lower lips, with a shallow median notch in the lower lip and three to four rows of papillae extending in a convex arc across each lobe (Moyle 2002). Their caudal peduncle is thick (8 to 11 percent of SL); they are silvery white below with dark grayish brown on their sides and back, with irregular dorsal blotches and faint pigmentation patterns arranged in lateral stripes along their sides (Moyle 2002; Smith 1966). The membrane between the rays of the caudal fin is pigmented, whereas the anal and pelvic fins lack pigment, during periods of active spawning Santa Ana sucker develop tubercles on their fins and bodies (Moyle 2002). They are typically found in pools and runs of small to medium-sized (less than 7 m [23 ft] wide) shallow streams, creeks, and rivers with cool (less than 22 degrees Celsius [° C] [71.6 degrees Fahrenheit {° F}]) unpolluted water; they have a strong affinity for coarse substrates such as boulders, cobbles, and gravels, although they can sometimes be found in areas with sandy/mud bottoms. They do not form schools, although they often form loose aggregations during breeding or periods of limited water resources. They feed primarily on algae (especially diatoms) and detritus, which they scrape from rocks and other wetted surfaces. Larger individuals tend to feed more predominantly on aquatic insects than do smaller individuals (Greenfield et al. 1970). The sucker's natal streams are subject to severe flooding, though these fish are well adapted to re-colonize through early maturity, high fecundity, and extended spawning periods. Santa Ana sucker rarely live more than four years, but they reach sexual maturity in their second summer. Spawning typically occurs from mid-March until early June in riffle habitats possessing gravel substrates. Recent studies indicate that the spawning season may be more protracted in the San Gabriel River system, beginning as early as November (Saiki 2000). Females deposit their eggs in the substrates, where they stick to the gravel and incubate for approximately 36 hours (Greenfield et al. 1970). Larvae remain in the gravel until they reach their post-gravel emergent stage, when they move into low flow shallow areas with silty bottoms often containing emergent aquatic vegetation (Swift 2001). This is a microhabitat exploited by young stream fishes, where they are less vulnerable to predators and possibly where elevated water temperatures accelerate development (Haglund et al. 2003).

The Santa Ana sucker was petitioned for listing under the Endangered Species Act in 1997, and although final judgment found that listing was warranted, it was precluded by other listing actions. The species was eventually federally listed as threatened by the United States Fish and Wildlife Service (USFWS) in 2000 (USFWS 2000), and it is currently designated as a Species of Special Concern (SSC) by the CDFW (CDFG 2011). The Wash and Haines Creek are designated as critical habitat for Santa Ana sucker and both are currently occupied.

1.2.2 Santa Ana Speckled Dace

The Santa Ana speckled dace is a native member of the Cyprinidae (Minnow) Family and is thought to represent a unique subspecies or form in the widespread speckled dace species complex. Recent genetic studies support this status and have shown that Santa Ana speckled dace represent a distinct Evolutionarily Significant Unit (ESU; Smith and Dowling 2008). Speckled dace (the entire species complex) are the most widespread native fish west of the Rocky Mountains (McGinnis 1984) and are the only fish native to occupy all major western drainages from Canada south to Sonora, Mexico (Moyle 2002). The Santa Ana speckled dace is restricted to the headwaters of the Los Angeles River, San Gabriel River, and Santa Ana River drainages (Feeney and Swift 2008).

Santa Ana speckled dace are small minnows rarely exceeding 7 cm (3 in) SL, with a slightly inferior (more ventrally oriented) mouth. Coloration on their back and sides is typically dusky yellow to olive with variable dark speckles and blotches. These small minnows usually possess single barbels at the end of each jaw, a defined frenum (flap of skin attaching snout to upper lip), and a thick caudal peduncle at the base of the tail. Both juvenile and adult Santa Ana speckled dace occur in riffles and closely associated pools in low-gradient stream habitats (0.5 to 2.5 percent slope) with sand, gravel, cobble, rock, and boulder substrates or within higher-gradient streams (up to 5 percent slope) along the margins or near obstructions (Feeney and Swift 2008). Speckled dace are generally bottom browsers, feeding on a variety of small invertebrates, and are known to forage both day and night. Populations that forage at night are thought to do so as a means of avoiding avian predation; populations that occur in streams with few avian predators tend to be more active during the day (Moyle 2002). Speckled dace typically do not form large schools (except during spawning); however, they do form small loose groups when foraging close to the bottom. This behavior coupled with their coloration and pigmentation patterns can effectively blend into the surrounding habitats. Spawning can occur throughout the summer months, and adhesive eggs are attached to rocks or gravel in shallow flowing water (Feeney and Swift 2008).

The Santa Ana speckled dace was petitioned for listing as a federally endangered species in 1994, but the petition was denied because the species had not been formally described (Moyle 2002). This unique subspecies is currently designated as a SSC by CDFW (CDFG 2011).

1.2.3 Arroyo Chub

The arroyo chub is another native member of the Cyprinidae (Minnow) Family. This small minnow is native to the streams and rivers of the Los Angeles Plain in southern California, including the Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita Rivers, and Malibu and San Juan Creeks.

Most adult arroyo chubs are 8 to 10 cm (3 to 4 in) long, with large individuals occasionally reaching 12 cm (5 in) SL. Coloration in this species ranges from silver-gray to olive green above, shading to white below, usually with a dull gray band along each side. Arroyo chub have relatively large eyes for a Cyprinid and small mouths, with a deep body and peduncle. Arroyo chub are adapted to survive in cool to warm (10 to 25° C [50 to 75° F]) streams that fluctuate between large winter storm flows, and low summer flows, with the low dissolved oxygen and wide temperature fluctuations associated with this hydrologic regime. They are most common in slow moving backwater and side-pool areas with sand or mud substrates. They can also inhabit areas with water velocities in excess of 0.8 m (2.6 ft) per second over coarse substrates. Arroyo chub are omnivorous, feeding on plants such as water fern (*Azolla* sp.) and algae, and on invertebrates such as tiny mollusks, crustaceans, and insect larvae. Studies of this species within warm water streams show that algae dominates the diet (60 to 80 percent), and in cooler streams caddis fly larvae and mollusks are the dominant food items (Moyle 2002). Female arroyo chub reach reproductive age by year one, and spawning takes place in pools and edge habitat from February through August, reaching a peak in June and July. Fertilized eggs are deposited on plants or bottom substrates until they hatch in about four days (UC ANR 2011).

The arroyo chub is designated as a SSC by CDFW (CDFG 2011).

1.3 Previous Studies Conducted within the Mitigation Area

Over the years previous surveys have been conducted within the Mitigation Area to assess the population of native fishes, in particular the Santa Ana sucker. In the fall of 2009, ECORP conducted a native fishes population study at five equally-distributed (25-m) sites within Haines Creek. The study utilized backpack electrofishers and three pass depletion methods to obtain estimates on the population size of each captured fish species. In addition to the fish sampling, physical habitat (PHAB) data was collected at each site. The study collected a total of 41 Santa Ana sucker at four of the five sites and estimated the population to be 42 individuals following data analysis. Nearly 82 percent of the individuals captured were exotic species with the majority of the catch represented by red swamp crayfish and largemouth bass (accounting for over 76 percent of the total).

Following the Station Fire of 2009, ECORP fisheries biologists Manna Warburton and Brian Zitt conducted a visual survey of Haines Creek within the boundaries of the Mitigation Area. This survey was conducted in June 2010, at the request of CDFW, in order to obtain estimates on the abundance, age structure, and distribution of Santa Ana sucker and assess their response to the post-fire conditions within the system. No Santa Ana sucker larvae were observed during the surveys; however, small juveniles (less than 70 millimeters [mm] total length [TL]) were observed throughout the survey area in relatively high numbers (n=250). Approximately 400 adult Santa Ana sucker were also observed during this survey. Exotic species were present in high densities throughout the survey area; they included: goldfish (*Carassius auratus*), green sunfish, largemouth bass, and red swamp crayfish.

In an effort to remove these exotic species from Haines Creek, sampling efforts were conducted in October 2010 under the direction of ECORP fisheries biologist Todd Chapman, USFWS 10(a)(1)(A) recovery permit holder for Santa Ana sucker (TE-110094-2). Beginning at the downstream boundary of the Mitigation Area and working upstream in short segments of approximately 50 m in length, exotic species were targeted and removed using a backpack electrofisher. Using the information obtained from the visual surveys, areas suspected to contain high densities of native fishes were avoided. Although these precautions were taken, 150 Santa Ana sucker (106 adult, 44 juvenile), 14 Santa Ana speckled dace, and 13 arroyo chub were captured during these surveys. All native species appeared in good overall health and were returned to their area of collection unharmed. A total of 1,356 individuals represented by six exotic species were captured and removed from Haines Creek. Red swamp crayfish and largemouth bass were the most abundant species captured represented 83.2 percent of the total catch.

Efforts have been made to remove exotic species in an effort to reduce some of the negative impacts to these sensitive native species. Due to the invasive nature of electrofishing, it has been used sparingly, and only when permission has been granted by CDFW. In December 2012, ECORP coordinated with USFWS and CDFW to explore alternative methods to the use of electrofishing for the purpose of providing data on the population of Santa Ana sucker. For this reason, the survey methods for the current study were modified to utilize less invasive survey techniques (snorkel and seine). In addition to modifying the survey methods, CDFW and USFWS asked that the focus of the study be redirected to better ascertain the health of the native fish populations in relation to the ongoing habitat enhancement activities taking place within the Mitigation Area. One goal of the Mitigation Area is to improve habitat quality for imperiled native species. Some of these actions could include the removal of exotic plant and wildlife species, removal of rock dams, and closure of recreational trails. Because the focus of the Mitigation Area is improving habitat quality, the native fish surveys were conducted in a manner so that correlations/relationships and any trends within these populations could be related back to the PHAB conditions or any habitat changes created within the sites.

PHAB data were used to assign a rank to each of the sample sites based on their inherent quality in relation to the known habitat requirements of both juvenile and adult Santa Ana sucker. A similar approach is currently being utilized for a field study being conducted upstream in Big Tujunga Creek (SMEA 2009). This report will provide the results of the native fishes surveys conducted in the Mitigation Area during December 2012.

2.0 METHODS

For the purposes of sampling the native fish community within the Mitigation Area, contiguous 25-m sites were sampled along Haines Creek and the Wash. Sites were labeled in numeric order starting at the downstream boundary (Site 1) and continuing upstream. Surveys within Haines Creek were conducted on December 10 through 12, 2012, and surveys within the Wash were conducted on December 19 and 20, 2012. All work was conducted under the direction of ECORP biologist Brian Zitt, USFWS 10(a)(1)(A) recovery permit holder for Santa Ana sucker (TE-27460A-0). At each of the sites, PHAB characterization and visual fish surveys were conducted as detailed below.

2.1 Physical Habitat Characterization

In an effort to minimize any anomalous readings, water quality readings were collected prior to any instream surveys. A multi-probe water quality meter (HORIBA Model U-52) was utilized to record water temperature, conductivity, salinity, dissolved oxygen (DO), total dissolved solids (TDS), pH, turbidity, and oxidation-reduction potential. The water quality meter was calibrated according to the manufacturer's instructions prior to the survey, and the data were tabulated according to site location and date following collection. Water discharge velocity data were collected at the upstream and downstream extent of the survey area along Haines Creek and in the Wash. Water discharge was measured using a Marsh-McBirney Flo-Mate 2000 electromagnetic flowmeter. The flowmeter was calibrated according to the manufacturer's instructions prior to the survey, and the data were tabulated according to site location and date following collection. PHAB measurements were recorded using a modified version of California's State Water Resources Control Board (SWRCB) Surface Waters Ambient Monitoring Program (SWAMP) procedures (Fetscher et al. 2009). Standard SWAMP methods call for multiple transects across either a 150- or 250-m stream reach depending on wetted stream width; however, in an effort to collect a more comprehensive dataset across the entire survey area, each site was 25-m in length. The following PHAB data were collected for each 25-m site and were used to calculate habitat ranking scores: average water depth, maximum water depth, wetted stream width at the center of each site, and visual estimations of instream habitat complexity including: filamentous algae, aquatic macrophytes/emergent vegetation, boulders, woody debris (greater than 0.3 m), woody debris (less than 0.3 m), undercut banks, overhanging vegetation, live tree roots, and artificial structures. The evaluation of instream habitat complexity was provided using the SWAMP Stream Habitat Characterization form's rating scale from 4 to 0. The rating scale is arranged as follows:

4 = Very Heavy	(greater than 75 percent of the wetted stream channel),
3 = Heavy	(greater than 40 to 75 percent of the wetted stream channel),
2 = Moderate	(10 to 40 percent of the wetted stream channel),
1 = Sparse	(less than 10 percent of the wetted stream channel), and
0 = Absent	(0 percent of the wetted stream channel)

Visual estimates were made on the amount of still edgewater habitat, flow habitat, and substrate types. Flow habitats were categorized based on the following criteria: cascade/falls (high gradient drop in stream bed elevation), rapids (swiftly flowing water with considerable surface turbulence, larger substrate than riffles), riffles (less than 0.5 m deep, greater than 0.3 meters per second [m/s]), runs (greater than 0.5 m deep, greater than 0.3 m/s), glides (less than 0.5 m deep, less than 0.3 m/s), pools (greater than 0.5 m deep, less than 0.3 m/s), and dry. Substrate types were categorized based on the following criteria: bedrock (greater than 4 m), large boulder (1 to 4 m), small boulder (25 cm to 1 m), cobble (64 to 250 mm), coarse gravel (16 to 64 mm), fine gravel (2 to 16 mm), sand (0.06 to 2 mm), fine sediment/silt (less than 0.06 mm), and wood/other. Canopy cover of overhanging riparian vegetation was recorded at the center of each site in four directions (left bank, right bank, upstream, and downstream) using a densiometer. At each upstream and downstream boundary, photographs and coordinate data were taken. Any human disturbances present including exotic species, rock dams, trail crossings, trash, evidence of off-highway vehicle (OHV) usage, evidence of fishing, and evidence of swimming/wading were also recorded.

2.1.1 Evaluating the Physical Habitat Requirements for Santa Ana Sucker

Because the focus of this study is primarily based on the population of Santa Ana sucker in the Mitigation Area, the habitat scores were weighted based on this species individual habitat requirements. Four habitat types were evaluated as defined below in Sections 2.1.1.1 through 2.1.2.4 by San Marino Environmental Associate's (SMEA) during their habitat suitability study of Big Tujunga Creek (SMEA 2009). Habitat ranking score criteria are presented in Table 2-1.

2.1.1.1 Canopy Cover

The percent canopy cover scoring criteria is identical for adult, juvenile, and fry. A score of 0 is given if the percent canopy cover present comprised 100 percent. A score of 1 was given if the percent canopy cover comprised greater than or equal to 75 percent and less than 100 percent, a score of 2 if greater than or equal to 50 percent and less than 75 percent, a score of 3 if greater than or equal to 25 percent and less than 50 percent, and a score of 4 if less than 25 percent.

2.1.1.2 Maximum Water Depth

The maximum water depth scoring criteria differs for adults and juveniles based on their habitat preference. Adult Santa Ana sucker prefer water depths greater than 50 cm while juvenile Santa Ana sucker prefer water depths greater than 35 cm. Maximum water depth is not used as a predictor of the quality of fry habitat because fry are typically confined to edgewater habitats along shallow margins of a stream.

Juvenile: A score of 0 is given if the maximum water depth is less than 5 cm. A score of 1 was given if the maximum water depth was greater than 5 to 15 cm, a score of 2 if greater than 15 to 25 cm, a score of 3 if greater than 25 to 35 cm, and a score of 4 if greater than 35 cm.

Adult: A score of 0 is given if the maximum water depth is less than 20 cm. A score of 1 was given if the maximum water depth was greater than 20 to 30 cm, a score of 2 if greater than 30 to 40 cm, a score of 3 if greater than 40 to 50 cm, and a score of 4 if greater than 50 cm.

2.1.1.3 Substrate Type

Adult sucker have a preference for gravel/cobble substrate, juvenile sucker prefer sand/gravel substrate, and fry prefer silt/sand substrate. A score of 0 is given if the percent of preferred substrate type present comprised 0 percent of the site. A score of 1 was given if the percent of preferred substrate type comprised less than or equal to 25 percent, a score of 2 if greater than 25 to 50 percent, a score of 3 if greater than 50 to 75 percent, and a score of 4 if greater than 75 percent.

Table 2-1. Santa Ana Sucker Habitat Evaluation Criteria (SMEA 2009)

Life Stage	Habitat Attribute (Ranking Weight)	Habitat Value Score				
		0	1	2	3	4
Fry	Percent Canopy Cover (20%)	100% Cover	≥75% <100% Cover	≥50% <75% Cover	≥25% <50% Cover	<25% Cover
	Silt/Sand Substrate (10%)	0% Silt/Sand	≤25% Silt/Sand	>25-50% Silt/Sand	>50-75% Silt/Sand	>75% Silt/Sand
	Edgewater Habitat (70%)	0-10% Edgewater	>10-20% Edgewater	>20-30% Edgewater	>30-40% Edgewater	>40% Edgewater
Juvenile	Percent Canopy Cover (10%)	100% Cover	≥75% <100% Cover	≥50% <75% Cover	≥25% <50% Cover	<25% Cover
	Depth (15%)	≤5 cm Deep	>5-15 cm Deep	>15-25 cm Deep	>25-35 cm Deep	>35 cm Deep
	Sand/Gravel Substrate (50%)	0% Sand/Gravel	≤25% Sand/Gravel	>25-50% Sand/Gravel	>50-75% Sand/Gravel	>75% Sand/Gravel
	Riffle Habitat (25%)	0-10% Riffle	>10-20% Riffle	>20-30% Riffle	>30-40% Riffle	>40% Riffle
Adult	Percent Canopy Cover (10%)	100% Cover	≥75% <100% Cover	≥50% <75% Cover	≥25% <50% Cover	<25% Cover
	Depth (15%)	≤20 cm Deep	>20-30 cm Deep	>30-40 cm Deep	>40-50 cm Deep	>50 cm Deep
	Gravel/Cobble Substrate (50%)	0% Gravel/Cobble	≤25% Gravel/Cobble	>25-50% Gravel/Cobble	>50-75% Gravel/Cobble	>75% Gravel/Cobble
	Run/Pool Habitat (25%)	0-10% Runs/Pools	>10-20% Runs/Pools	>20-30% Runs/Pools	>30-40% Runs/Pools	>40% Runs/Pools

2.1.1.4 Flow Type

Adult sucker have a preference for run/pool habitat, juvenile sucker prefer riffle habitat, and fry prefer still edgewater habitat. A score of 0 is given if the percent of preferred habitat type present comprised 0 to 10 percent of the site. A score of 1 was given if the percent of preferred habitat type comprised greater than 10 to 20 percent, a score of 2 if greater than 20 to 30 percent, a score of 3 if greater than 30 to 40 percent, and a score of 4 if greater than 50 percent.

2.1.2 Calculating the Habitat Scores for Santa Ana Sucker

Habitat scores can range from 0 to 4, and correlate to the overall quality of the habitat required by each life stage in each site. A score from 0 to 1 indicates poor habitat, a score from greater than 1 to 2 indicates fair habitat, a score from greater than 2 to 3 indicates good habitat, and a score from greater than 3 to 4 indicates excellent habitat. Each life stage of Santa Ana sucker has unique habitat requirements which necessitates that the habitat scores be calculated separately. The individual habitat scores can then be used to calculate an overall habitat score for the species.

2.1.2.1 Fry Habitat Score

Habitat scores for fry Santa Ana sucker are based on three criteria: percent cover, percent silt/sand substrate, and percent edgewater present. Percent cover is weighted at 20 percent of the total score, percent silt/sand substrate at 10 percent, and percent edgewater at 70 percent. The equation used to calculate the fry habitat score for each site is as follows:

Fry habitat score = [(percent cover X 0.20) + (percent silt/sand substrate X 0.10) + (percent edgewater habitat X 0.70)]

2.1.2.2 Juvenile Habitat Score

Habitat scores for juvenile Santa Ana sucker are based on four criteria: percent cover, maximum depth, percent sand/gravel substrate, and percent riffle habitat present. Percent cover is weighted at 10 percent of the total score, maximum depth at 15 percent, percent sand/gravel substrate at 50 percent, and percent riffle habitat at 25 percent. The equation used to calculate the juvenile habitat score for each site is as follows:

Juvenile habitat score = [(percent cover X 0.10) + (maximum depth X 0.15) + (percent sand/gravel substrate X 0.50) + (percent riffle habitat X 0.25)]

2.1.2.3 Adult Habitat Score

Habitat scores for adult Santa Ana sucker are based on four criteria: percent cover, maximum depth, percent gravel/cobble substrate, and percent run/pool habitat present. Percent cover is weighted at 10 percent of the total score, maximum depth at 15 percent, percent gravel/cobble substrate at 50 percent, and percent run/pool habitat at 25 percent. The equation used to calculate the adult habitat score for each site is as follows:

Adult habitat score = [(percent cover X 0.10) + (maximum depth X 0.15) + (percent gravel/cobble substrate X 0.50) + (percent run/pool habitat X 0.25)]

2.1.2.4 Overall Habitat Score

Overall habitat scores are calculated based on the individual scores for fry, juvenile, and adult Santa Ana sucker life stages. Fry habitat is weighted at 15 percent, juvenile habitat at 30 percent, and adult habitat at 55 percent. The equation used to calculate the overall habitat score for each site is as follows:

Overall habitat score = [(fry habitat X 0.15) + (juvenile habitat X 0.30) + (adult habitat X 0.55)]

2.2 Native Fish Surveys

Native fishes surveys were conducted by ECORP fisheries biologists Brian Zitt, Adam Schroeder, and Terrance Wroblewski. All biologists have identification skills for the various species in all life stages, and experience counting and estimating fish lengths underwater. Surveys were conducted throughout the entire portion of the survey area during daylight hours when water visibility was ideal. Surveys were conducted by a team of one to two divers, using a mask and snorkel, and one data recorder. Divers entered the water downstream of each site and proceeded slowly upstream, identifying fish species and providing size class and count data throughout the site. The two divers moved upstream working parallel to one another, covering the entire wetted width of the stream channel in a systematic fashion. The data recorder followed closely behind the divers and recorded their observations onto standardized data sheets.

Dive lights were used to inspect shaded areas containing woody debris piles or undercut banks. Long-handled dipnets were also used to sample shallow, isolated areas (less than 50 mm in depth) usually near the banks over fine sediment or algal mats. Occasionally, these long-handled dipnets were used to capture fish and compare actual lengths to underwater estimates. Divers wore underwater writing slates to assist them in obtaining counts, especially in areas where multiple individuals, species, or size classes were present. Habitat information (e.g., water depth, flow and substrate type, presence of exotic species) was collected in locations were Santa Ana sucker were observed. Estimates of total length were categorized into the following mm size groups: less than 50, 51 to 75, 76 to 100, 101 to 125, 126 to 150, greater than 150. Calibration of fish length estimates was achieved by divers carrying foldable meter sticks during the surveys, and also through a comparison of their visual estimates to length measurements collected from fish captured in the dipnets. Aquatic invertebrates and amphibians encountered during the surveys were also counted within each site.

3.0 RESULTS

The results of the native fishes surveys conducted in the Mitigation Area are listed below.

3.1 Physical Habitat Characterization

3.1.1 Haines Creek

PHAB data were collected from a total of 69 sites in Haines Creek from December 10 to 12, 2012. The maximum depth ranged from 23 cm to 140 cm, and the wetted width ranged from 1.4 m to 10.0 m. The predominant flow types within Haines Creek were glides (51.9 percent), riffles (32.9 percent), and pools (10.9 percent) (Table 3-1). The predominant substrate types were sand (30.0 percent), gravel (25.7 percent), cobble (21.2 percent), and fines/silt (13.6 percent) (Table 3-2). Artificial structures and woody debris (greater than 0.3 m) ranged from not present to sparse, filamentous algae and boulders ranged from not present to moderate, and overhanging vegetation, live tree roots, undercut banks, and aquatic macrophytes/emergent vegetation ranged from not present to heavy throughout the 69 sites (Table 3-3). The entire creek possessed a well-developed canopy of riparian vegetation averaging 86.7 percent total cover. Human influence was ubiquitous and widespread throughout Haines Creek, found mainly in the form of trash and unsanctioned trail building activities, but also included modifications to the stream channel in the form of rock dams. There was also evidence of fishing and swimming/wading in some areas within the creek, while exotic plants (primarily eupatory [*Ageratina adenophora*]) were present along most of the stream channel.

Table 3-1. Flow Types within Haines Creek and Big Tujunga Wash, 2012.

Flow Type	Flow Type Present (%)	
	Haines Creek	Big Tujunga Wash
Cascade/Falls	0.07	0.08
Rapid	0.07	0.82
Riffle	32.90	58.53
Run	3.63	0.00
Glide	51.88	38.20
Pool	10.94	0.98
Dry	0.51	1.39

Table 3-2. Substrate Types within Haines Creek and Big Tujunga Wash, 2012.

Substrate Type	Substrate Type Present (%)	
	Haines Creek	Big Tujunga Wash
Bedrock	0.00	0.00
Boulder	5.73	18.53
Cobble	21.23	36.15
Gravel	25.65	22.54
Sand	30.00	11.31
Fines	13.62	11.23
Wood/Other	3.77	0.25

Table 3-3. Instream Habitat Complexity within Haines Creek and Big Tujunga Wash, 2012.

Instream Habitat Types	Instream Habitat Complexity Present (%)	
	Haines Creek	Big Tujunga Wash
Filamentous Algae	3.84	8.52
Aquatic Macrophytes/Emergent Vegetation	7.51	17.89
Boulders	4.06	18.69
Woody Debris	7.54	2.79
Undercut Banks	7.80	0.00
Overhanging Vegetation	7.84	3.54
Live Tree Roots	8.96	3.52
Artificial Structures	0.72	0.33

The habitat scores for fry Santa Ana sucker ranged from 0.2 to 3.5 in Haines Creek with an average score of 1.8. Of the 69 sites, 36.2 percent were considered poor, 20.3 percent were considered fair, 11.6 percent were considered good, and 31.9 percent were considered excellent habitat for fry Santa Ana sucker. Habitat scores for juvenile Santa Ana sucker ranged from 1.2 to 3.8 with an average score of 2.5. Of the 69 sites, 17.4 percent were considered fair, 58.0 percent were considered good, and 24.6 percent were considered excellent habitat for juvenile Santa Ana sucker. Habitat scores for adult Santa Ana sucker ranged from 0.8 to 3.2 with an average score of 1.9. Of the 69 sites, 7.2 percent were considered poor, 49.3 percent were considered fair, 40.6 percent were considered good, and 2.9 percent were considered excellent habitat for adult Santa Ana sucker. Overall habitat scores in Haines Creek ranged from 1.0 to 2.8 with an average score of 2.1 (Figure 3-1). Of the 69 sites, 1.4 percent were considered poor, 40.6 percent were considered fair, and 58.0 percent were considered good habitat for Santa Ana sucker.

Water discharge data were collected at the upstream and downstream boundaries of the Mitigation Area within Haines Creek. The discharge at the upstream end of Haines Creek was 2.74 cubic feet per second (cfs) and the discharge at the downstream end was 4.11 cfs. Water quality data were collected in five locations during surveys in Haines Creek (Table 3-4). Water quality data remained relatively constant and were in line with what is expected in this system.

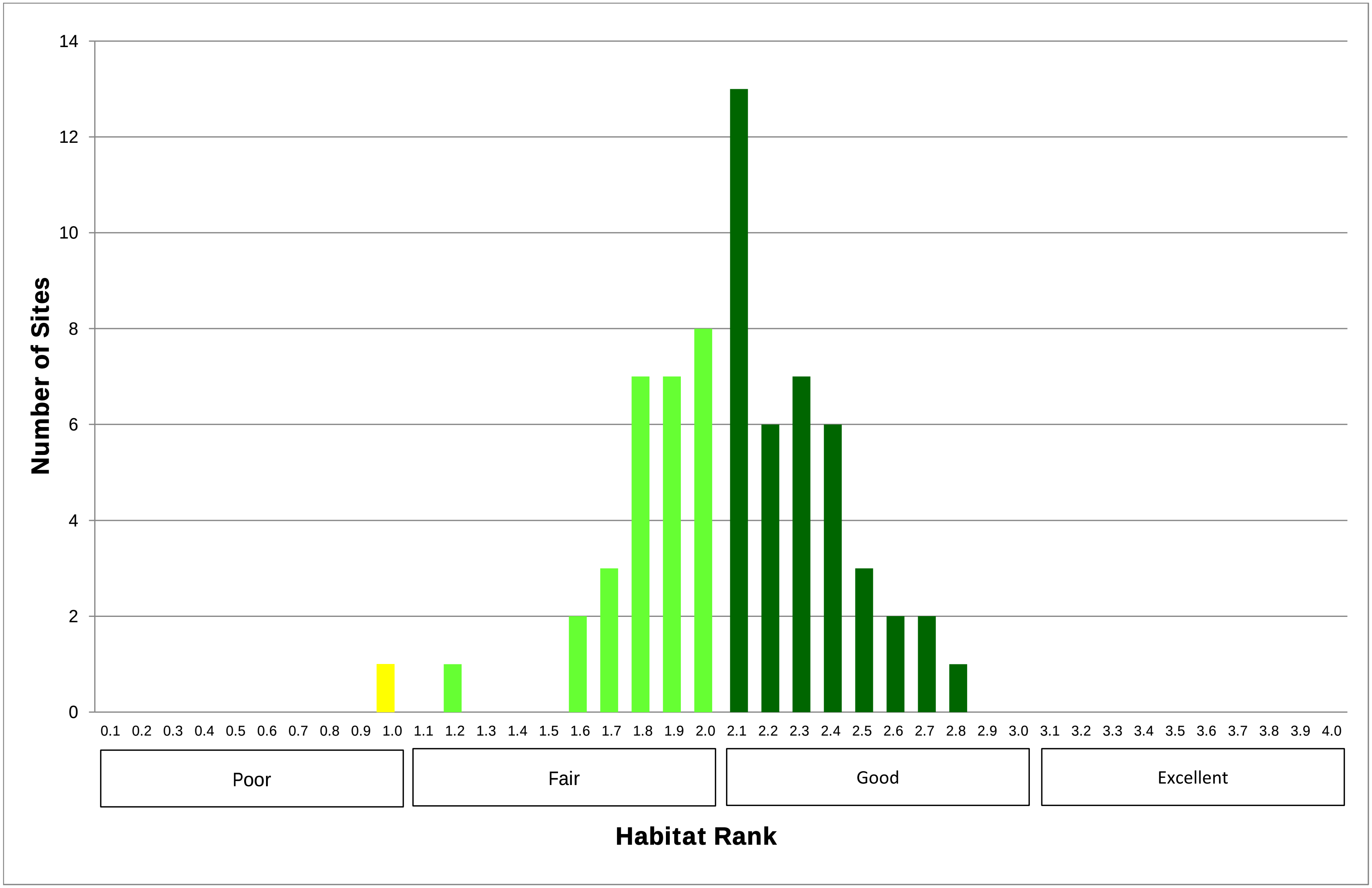

Figure 3-1. Number of sites within Haines Creek represented by habitat rank based on the overall Santa Ana sucker habitat scoring criteria, 2012.

Table 3-4. Water Quality Data within Haines Creek and Big Tujunga Wash, 2012.

Survey Location	Survey Dates	Time	Temperature (°C)	pH	Conductivity (mS/cm)	Salinity (ppt)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Total Dissolved Solids (g/L)	Oxidation-Reduction Potential (mV)
Haines Creek	December 10, 2012	7:55	14.83	7.98	0.547	0.3	7.89	0	0.350	156
	December 10, 2012	13:50	17.34	7.41	0.554	0.3	8.50	0	0.354	208
	December 11, 2012	8:30	15.34	7.36	0.551	0.3	7.98	0	0.353	226
	December 12, 2012	7:50	16.74	7.04	0.552	0.3	5.62	5.2	0.353	190
	December 12, 2012	13:57	16.98	6.96	0.547	0.3	4.81	0.7	0.350	245
Big Tujunga Wash	December 19, 2012	12:08	11.62	7.38	0.747	0.2	12.37	2.1	0.308	159
	December 20, 2012	7:50	6.05	7.62	0.505	0.2	13.65	2.1	0.323	106
	December 20, 2012	13:29	14.08	7.78	0.460	0.2	12.19	5.5	0.299	127

Temperature ranged from 14.83 to 17.34° C, DO values ranged from 4.81 to 8.50 milligrams per liter (mg/L), conductivity values ranged from 0.547 to 0.554 milliSiemens per cm (mS/cm), and pH values ranged from 6.96 to 7.98. Water clarity was ideal for conducting snorkeling surveys with turbidity readings ranging from 0.0 to 5.2 nephelometric turbidity units (NTU).

3.1.2 Big Tujunga Wash

PHAB data were collected in the Wash on December 19 and 20, 2012. The average depth in 61 sites within the Wash ranged from 10 cm to 39 cm, the maximum depth ranged from 20 cm to 72 cm, and the wetted width ranged from 2.3 m to 14.3 m. The predominant flow types throughout the Wash were riffles (58.5 percent) and glides (38.2 percent) (Table 3-1). The predominant substrate types were cobble (36.2 percent), gravel (22.5 percent), boulders (18.5 percent), sand (11.3 percent) and fines/silt (11.2 percent) (Table 3-2). Artificial structures, live tree roots and woody debris (greater than 0.3 m and less than 0.3 m) ranged from not present to sparse, filamentous algae ranged from not present to moderate, boulders and overhanging vegetation ranged from not present to heavy, and aquatic macrophytes/emergent vegetation ranged from sparse to very heavy throughout the 61 sites. Undercut banks were not present in the Wash (Table 3-3). The Wash contains very little canopy cover of riparian vegetation averaging only 5.8 percent total cover. Human influence was ubiquitous and widespread throughout the Wash, found mainly in the form of trash, but also included modifications to the stream channel in the form of rock dams. There was evidence of swimming/wading in some areas within the Wash, and exotic plants were present in and adjacent to the water in many areas.

The habitat scores for fry Santa Ana sucker ranged from 0.7 to 3.9 in the Wash with an average score of 1.8. Of the 61 sites, 50.8 percent were considered poor, 14.8 percent were considered fair, 9.8 percent were considered good, and 24.6 percent were considered excellent habitat for fry Santa Ana sucker. Habitat scores for juvenile Santa Ana sucker ranged from 1.2 to 3.2 with an average score of 2.6. Of the 61 sites, 11.5 percent were considered fair, 85.2 percent were considered good, and 3.3 percent were considered excellent habitat for juvenile Santa Ana sucker. Habitat scores for adult Santa Ana sucker ranged from 1.1 to 3.0 with an average score of 2.1. Of the 61 sites, 31.1 percent were considered fair, and 68.9 percent were considered good habitat for adult Santa Ana sucker. Overall habitat scores in the Wash ranged from 1.6 to 2.9 with an average score of 2.2 (Figure 3-2). Of the 61 sites, 24.6 percent were considered fair, and 75.4 percent were considered good habitat for Santa Ana sucker.

Water discharge data were collected at the upstream and downstream boundaries of the Mitigation Area within the Wash. The discharge at the upstream end of the Wash was 3.91 cfs and the discharge at the downstream end was 3.43 cfs. Water quality data were collected in two locations during surveys in the Wash (Table 3-4). Water quality data, with the exception of temperature, remained relatively constant and were in line with what is expected in this system. Temperature ranged from 6.05 to 14.08 °C, DO values ranged from 12.19 to 13.65 mg/L, conductivity values ranged from 0.460 to 0.747 mS/cm, and pH values ranged from 7.38 to 7.78. Water clarity was ideal for conducting snorkeling surveys with turbidity readings ranging from 2.1 to 5.5 NTU.

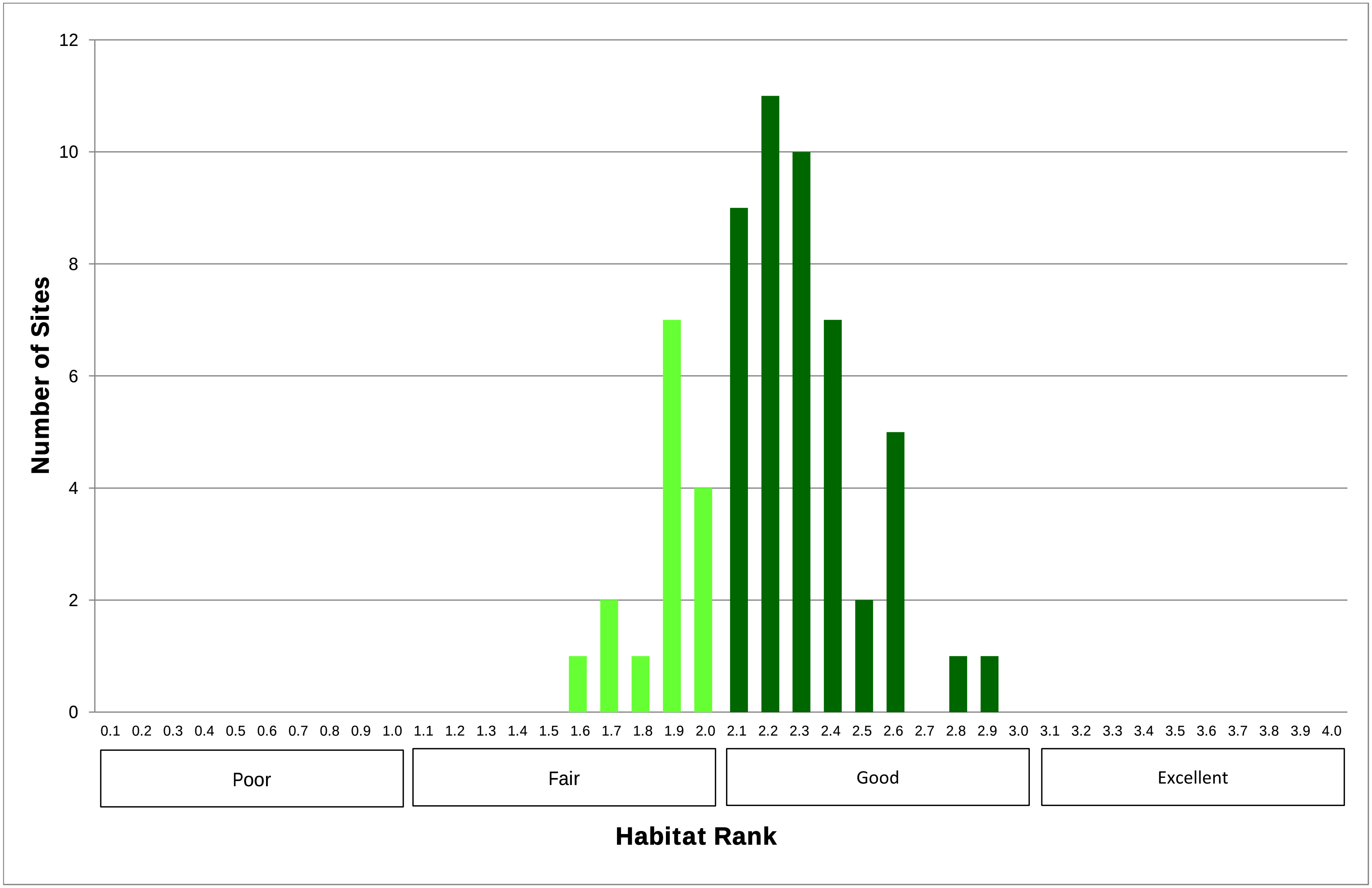

Figure 3-2. **Number of sites within Big Tujunga Wash represented by habitat rank based on the overall Santa Ana sucker habitat scoring criteria, 2012.**

Table 3-5. Total Number of Species Observed within Haines Creek and Big Tujunga Wash, 2012.

		Native Species			Exotic Species									
Survey Location	**Survey Dates**	**Arroyo chub**	**Santa Ana speckled dace**	**Santa Ana sucker**	**Red swamp crayfish**	**Goldfish**	**Common carp**	**Brown bullhead**	**Western mosquitofish**	**Green sunfish**	**Bluegill**	**Largemouth bass**	**American bullfrog**	**Total**
Haines Creek	December 10 - December 12, 2012	0	74	592	1,159	3	1	1	0	5	24	833	0	**2,692**
Big Tujunga Wash	December 19 - December 20, 2012	145	14	4	0	0	0	0	80	0	0	3	1	**247**
	Total	**145**	**88**	**596**	**1,159**	**3**	**1**	**1**	**80**	**5**	**24**	**836**	**1**	**2,939**

3.2 Native Fish Surveys

A total of 2,939 individuals representing 12 species were observed during the native fishes surveys in December 2012 (Table 3-5). Of the total, 829 were native fishes consisting of Santa Ana sucker (*n*=596), Santa Ana speckled dace (*n*=88), and arroyo chub (*n*=145). All three species appeared to be in good health with no observable abnormalities. The remaining 2,110 individuals were exotic species consisting of primarily largemouth bass (*n*=836) and red swamp crayfish (*n*=1,159). A complete list of all the species detected during the surveys is presented in Appendix A. Representative site and species photographs are included in Appendix B.

3.2.1 Haines Creek

A total of 1,533 fishes were observed during the survey of Haines Creek, of which 666 were native fishes consisting of Santa Ana sucker (*n*=592) and Santa Ana speckled dace (*n*=74). The remaining 867 individuals were represented by six species of exotic fish: goldfish (*n*=3), common carp (*Cyprinus carpio*) (*n*=1), brown bullhead (*Ameiurus nebulosus*) (*n*=1), green sunfish (*n*=5), bluegill (*n*=24), and largemouth bass (*n*=833). Additionally, red swamp crayfish (*n*=1,159) were observed during the surveys. Length-frequency distributions are provided for all fish species observed in Haines Creek in Figure 3-3.

Of the 592 Santa Ana sucker observed in Haines Creek, 90 individuals were considered juvenile (75 mm or less TL), and the remaining 502 individuals were considered adults. Based on the habitat scores for juvenile Santa Ana sucker, 17 individuals were observed in sites containing fair habitat, 61 individuals were observed in sites containing good habitat, and 12 individuals were observed in sites containing excellent habitat (Figure 3-4). Based on the habitat scores for adult Santa Ana sucker, 16 individuals were observed in sites containing poor habitat, 231 individuals were observed in sites containing fair habitat, 220 individuals were observed in sites containing good habitat, and 35 individuals were observed in sites containing excellent habitat (Figure 3-5). Based on the overall habitat scores 225 Santa Ana sucker were observed in sites containing fair habitat and the remaining 367 individuals were observed in sites containing good habitat. (Figure 3-6).

3.2.2 Big Tujunga Wash

A total of 246 fishes were observed during the surveys in the Wash, of which 163 were native fishes consisting of Santa Ana sucker (*n*=4), Santa Ana speckled dace (*n*=14), and arroyo chub (*n*=145) (Table 3-3). The remaining 83 individuals were represented by two species of exotic fish, western mosquitofish (*n*=80) and largemouth bass (*n*=3). Additionally, a juvenile American bullfrog (*Lithobates catesbeianus* [bullfrog]) (*n*=1) was observed during the surveys. This individual was captured and removed from the site. Length-frequency distributions are provided for all fish species observed in the Wash in Figure 3-7.

Four adult Santa Ana sucker were observed in the Wash. All four individuals were found within sites containing good habitat based on the adult and overall habitat ranking scores for Santa Ana sucker (Figure 3-8 and 3-9).

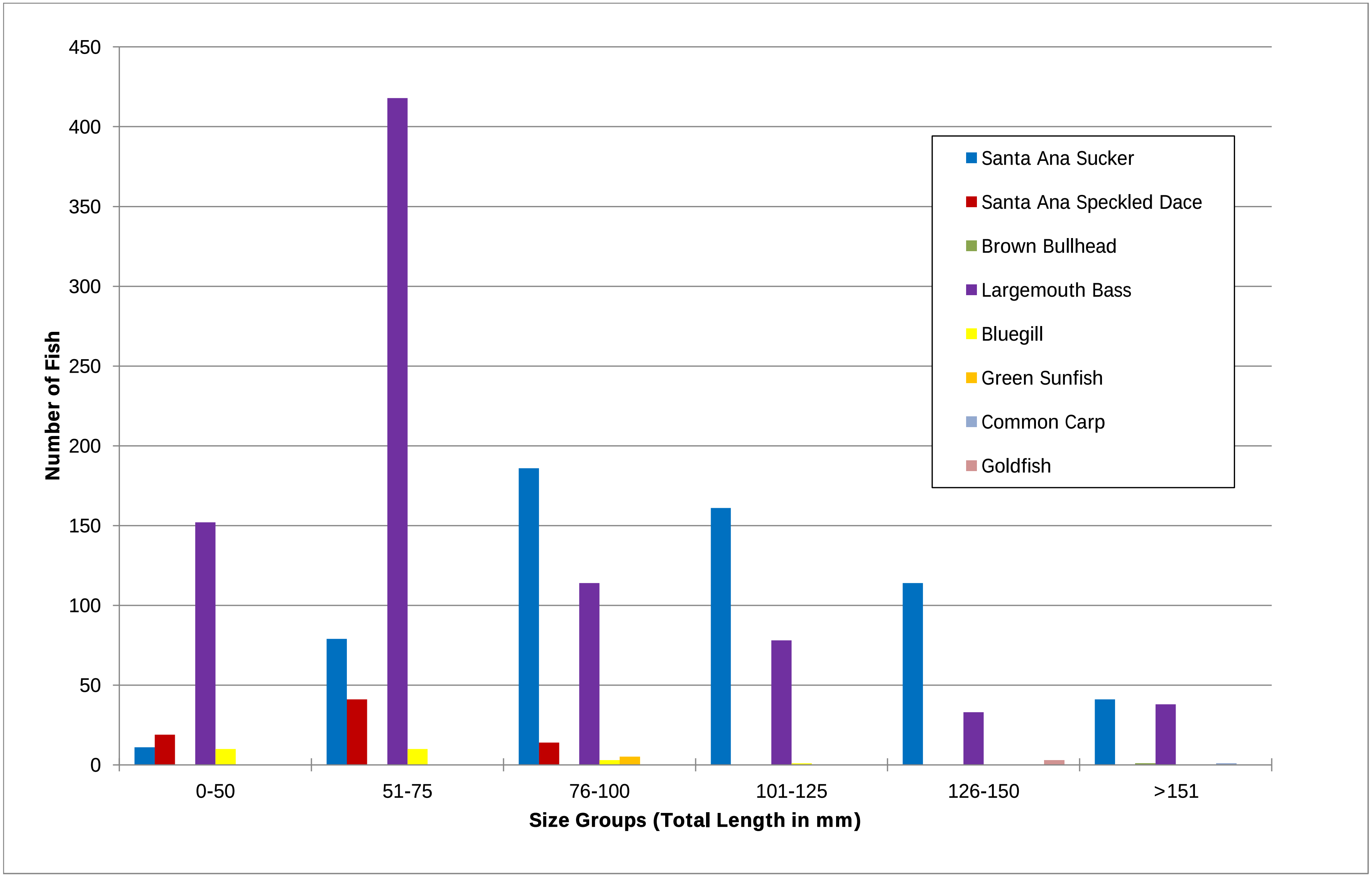

Figure 3-3. Length-frequency distribution of all fish species observed within Haines Creek, 2012.

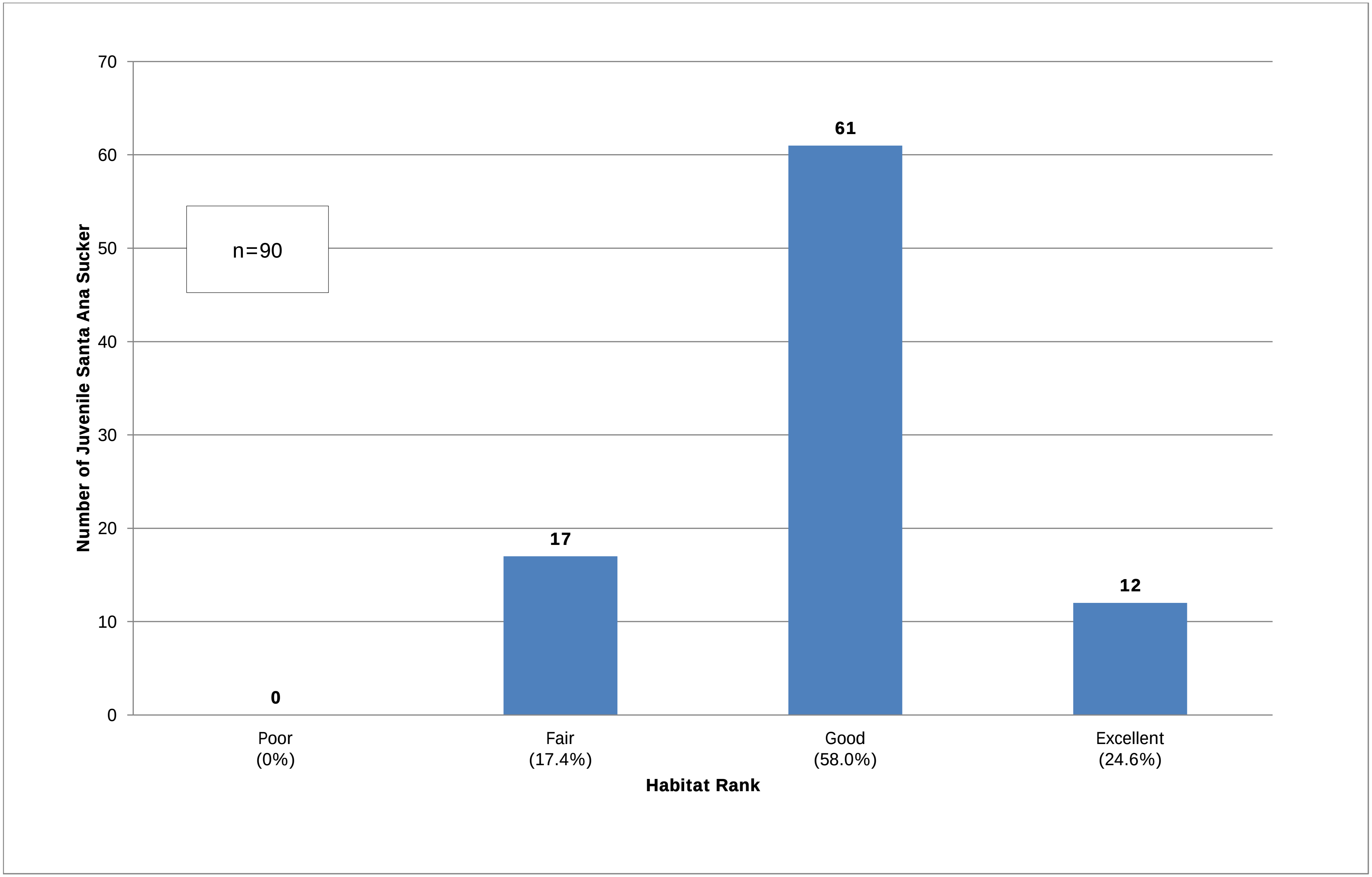

Figure 3-4. Distribution of juvenile Santa Ana sucker based on juvenile Santa Ana sucker habitat scores of 69 (25-m) sites within Haines Creek, 2012. Parenthesis represents the percent of sites assigned to each habitat rank.

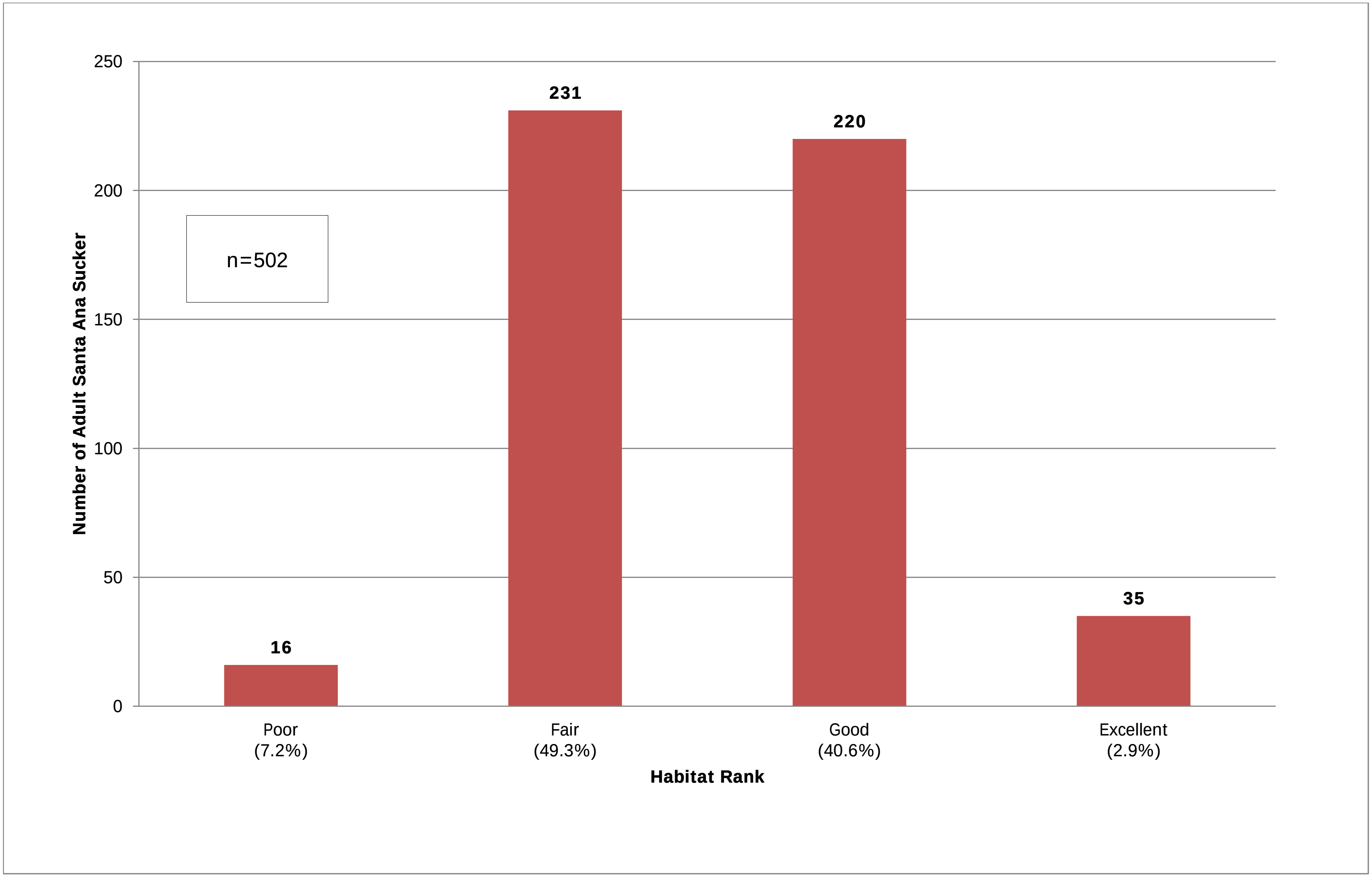

Figure 3-5. **Distribution of adult Santa Ana sucker based on adult Santa Ana sucker habitat scores of 69 (25-m) sites within Haines Creek, 2012. Parenthesis represents the percent of sites assigned to each habitat rank.**

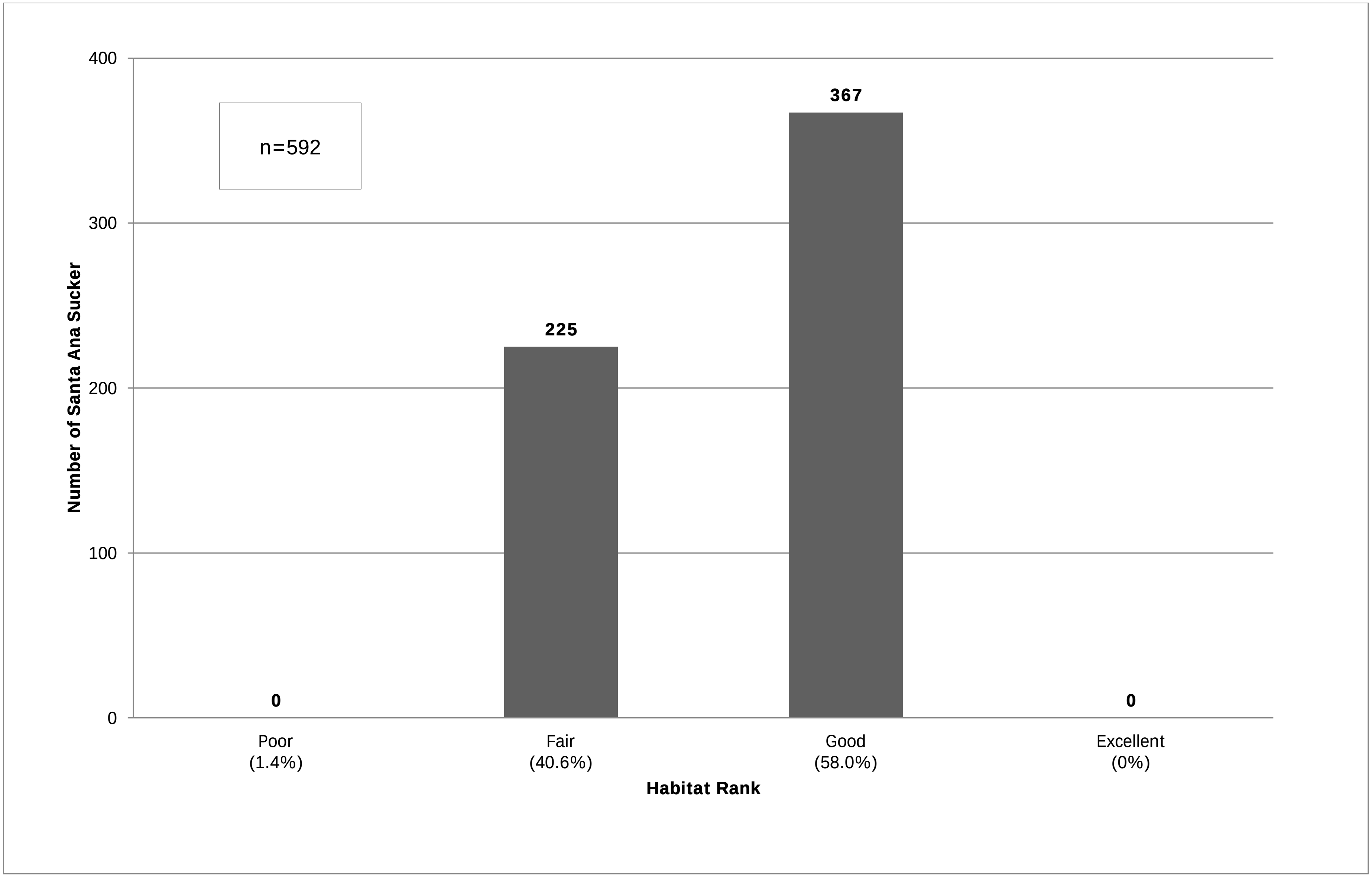

Figure 3-6. **Distribution of Santa Ana sucker based on the overall habitat scores of 69 (25-m) sites within Haines Creek, 2012. Parenthesis represents the percent of sites assigned to each habitat rank.**

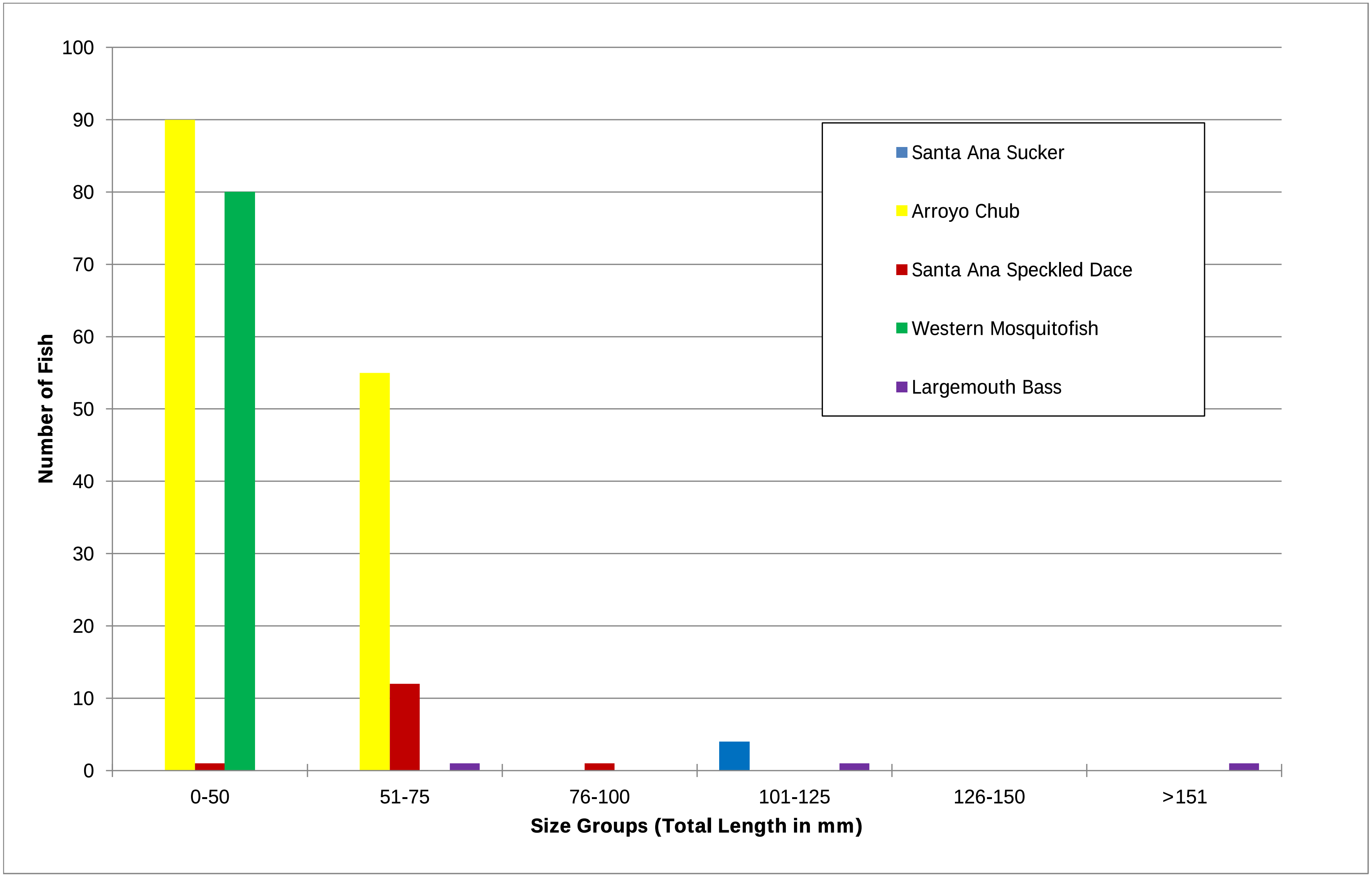

Figure 3-7. Length-frequency distribution of all fish species observed within Big Tujunga Wash, 2012.

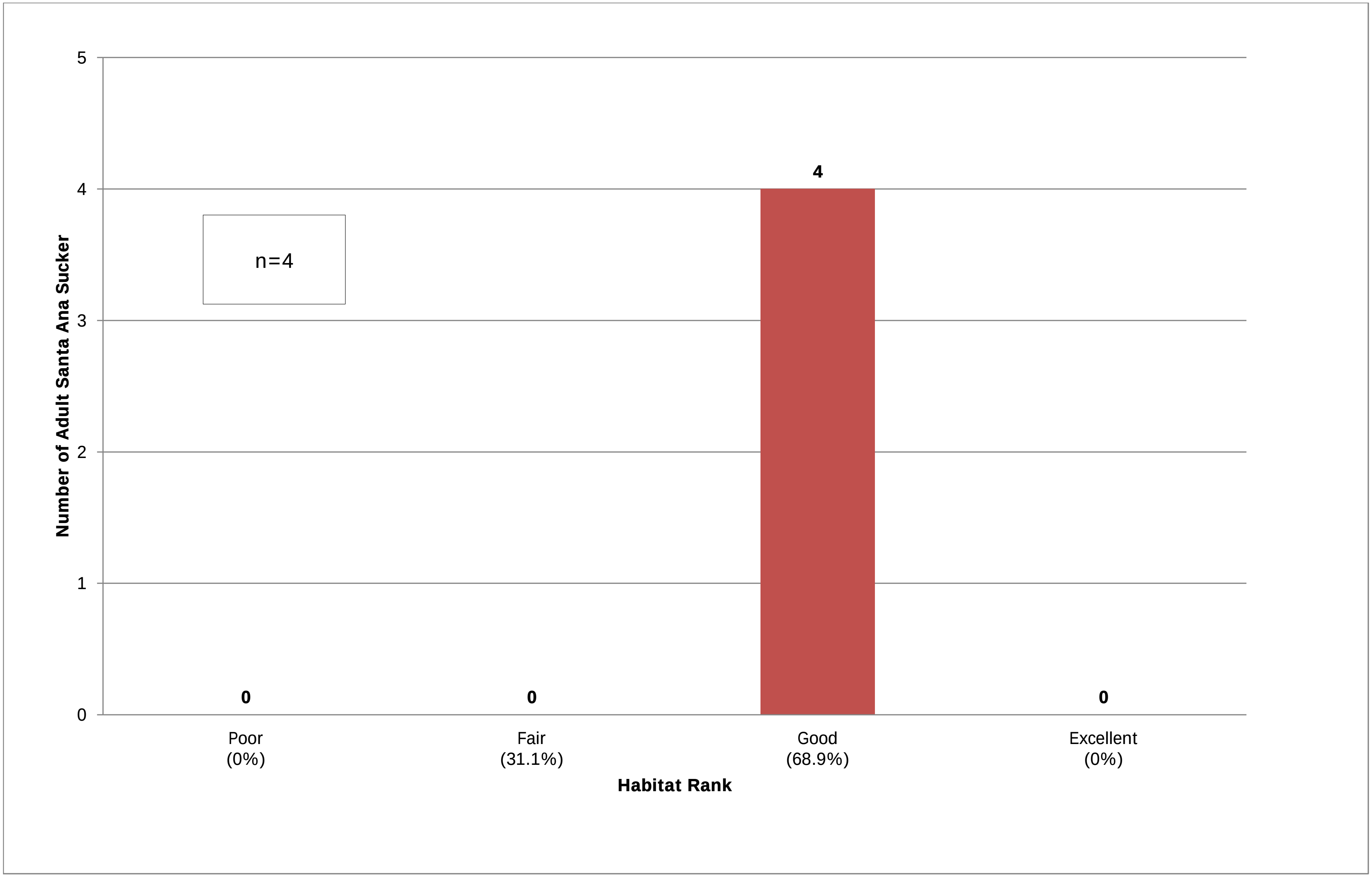

Figure 3-8. Distribution of adult Santa Ana sucker based on adult Santa Ana sucker habitat scores of 61 (25-m) sites within Big Tujunga Wash, 2012. Parenthesis represents the percent of sites assigned to each habitat rank.

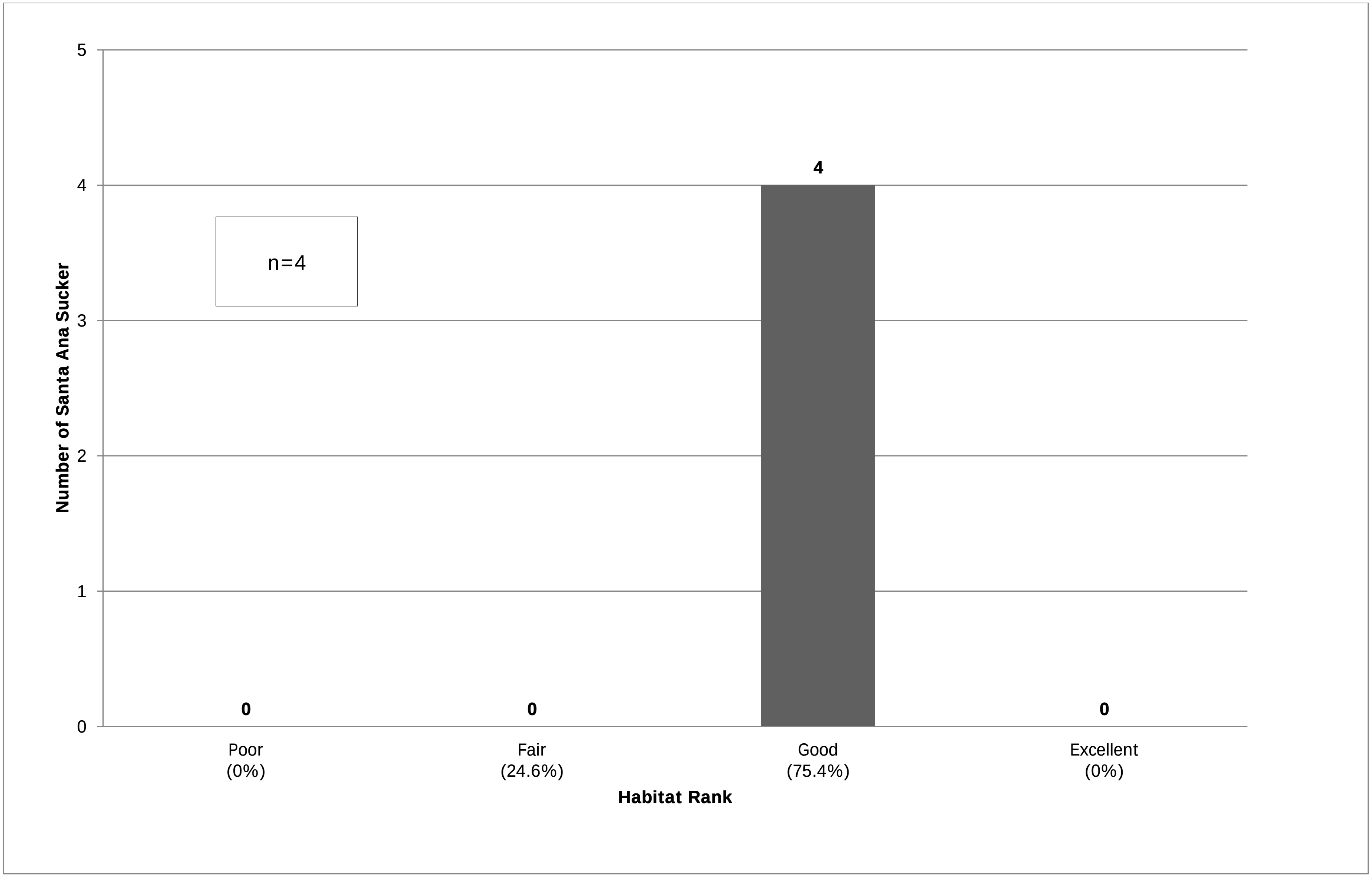

Figure 3-9. Distribution of Santa Ana sucker based on the overall habitat scores of 61 (25-m) sites within Big Tujunga Wash, 2012. Parenthesis represents the percent of sites assigned to each habitat rank.

4.0 DISCUSSION

4.1 Haines Creek

Native fishes surveys in Haines Creek resulted in the observation of two out of the three native fish species in the SCMC. Santa Ana sucker was the most abundant native fish observed, accounting for 88.9 percent of the native fish community, while Santa Ana speckled dace accounted for the remaining 11.1 percent. Although arroyo chub were observed (n=5) in Haines Creek earlier in 2012 during exotic species removal efforts (ECORP 2012a), there were no observations of this species during this current study. Prior surveys conducted in Haines Creek between 2010 and 2012 have only detected adult arroyo chub above the Cottonwood Avenue area equestrian crossing (approximately 450 m downstream of the Tujunga Ponds). For Santa Ana sucker, adults represented the majority of the individuals observed in this study (84.8 percent), while juveniles represented the remaining 15.2 percent. No Santa Ana sucker fry were observed, but this would be expected as the surveys were conducted late in the season and these fry would have grown to a juvenile size by the time the surveys were conducted.

Based on the data collected by ECORP during visual and electrofishing surveys conducted in June and October of 2010, juvenile Santa Ana sucker were found to represent 38.5 percent and 29.3 percent, of the species totals in Haines Creek, respectively. Given the large number of adult Santa Ana sucker observed in Haines Creek during the current study, a larger recruitment of juvenile Santa Ana sucker were expected. The low proportion of juvenile to adult Santa Ana sucker observed during these surveys may be a cause for concern. Factors, such as predation and competition by exotic species could be affecting juvenile recruitment.

The PHAB characterization analysis ranked the habitat based on the individual requirements of each life stages of Santa Ana sucker (i.e., fry, juvenile, and adults) and provided an overall score for all Santa Ana sucker. The percentage of excellent habitat present in Haines Creek based on the individual habitat scores for fry, juvenile, and adult Santa Ana sucker was 31.9, 24.6, and 2.9 percent, respectively. After calculating the overall habitat scores for Haines Creek there were zero sites with habitat ranked as excellent. In order to receive an excellent habitat ranking, a particular site would need to contain a minimum amount of favorable habitat for each life stage. While many sites contained habitat that was considered excellent for one of the life stages, none of the sites contained a mix of habitats that were favorable to all of the life stages. The majority of the overall habitat within Haines Creek was ranked as fair to good (40.6 percent to 58.0 percent of the available habitat, respectively), with a small proportion ranked as poor (1.4 percent). Santa Ana sucker were only observed in good and fair habitats, with observations of 367 to 225 individuals, respectively (Appendix C).

Independent of the overall habitat scores, adult Santa Ana sucker were observed more frequently in sites with good to fair scores (89.8 percent of the adults observed), which combined represented the majority of sites (89.9 percent) (Figure 4-1). The majority of sites with good habitat for juvenile Santa Ana sucker (58 percent of the sites) coincided with the highest proportion of individuals utilizing this habitat (67.8 percent of the juveniles observed). The remainder of sites ranked juvenile habitat as excellent (24.6 percent of the sites) with 13.3 percent of the individuals observed, and fair (17.4 percent of the sites) with 18.9 percent of the individuals observed.

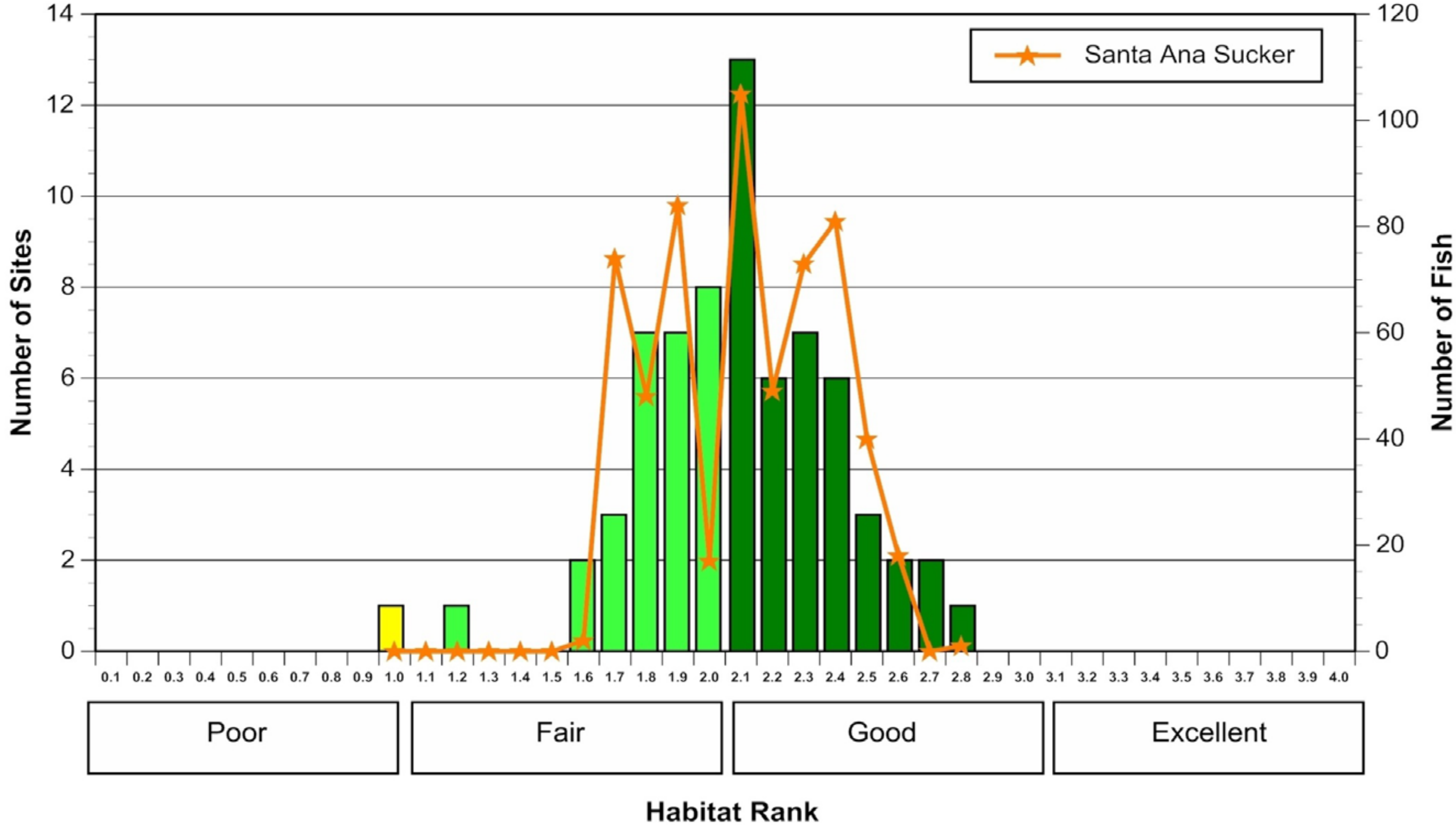

Figure 4-1. Distribution of Santa Ana sucker based on the overall habitat scores of 69 (25-m) sites within Haines Creek, 2012.

Overall, Santa Ana sucker in Haines Creek were often found in large congregations in or near woody debris piles or along undercut banks in depths greater than 40 cm. Most of these observations found Santa Ana sucker over sand and gravel substrates immediately downstream of swift moving riffles. Largemouth bass and red swamp crayfish, both known predators of Santa Ana sucker, were also observed in high densities throughout Haines Creek. They were often seen occupying the same habitat areas preferred by the Santa Ana sucker (Appendix D). Exotics species densities outnumbered native species in Haines Creek by a factor of 3 to 1. This is likely due to the presence of source populations of exotic species in the Tujunga Ponds which flow directly into Haines Creek. Although exotic species were observed throughout Haines Creek, their overall densities were greatest in the sites closest in proximity to the Tujunga Ponds, with their numbers steadily decreasing with an increase in distance downstream. The opposite was observed with Santa Ana sucker and Santa Ana speckled dace, which appeared to have greater densities with increasing distance from the Tujunga Ponds (Figure 4-2).

4.2 Big Tujunga Wash

Native fishes surveys in the Wash resulted in the observation of all three species of the SCMC. Arroyo chub was the most abundant native fish observed in the Wash, followed by Santa Ana speckled dace and Santa Ana sucker. Although recruitment in all three species was observed earlier in the year during focused surveys for arroyo toad in the Wash (ECORP 2012b), no juvenile Santa Ana sucker were observed. Only four adult Santa Ana sucker were observed during these surveys, which is far fewer than what was observed between April and July 2012. Santa Ana sucker in the Wash were only found in good habitat, which was represented by over 75 percent of the available habitat. Three of the four individuals were found together over cobble substrate in 20-cm-deep riffle habitat. The other individual was observed immediately below a riffle over cobble and gravel substrate in 18-cm-deep water.

Densities of Santa Ana sucker and Santa Ana speckled dace were low in the Wash. Generally in the late summer months the Wash dries out or goes to ground; however, this year the Wash remained wetted year round. The unpredictable nature of surface water availability in the Wash is attributed to its dependence on local rainfall totals and releases from the Tujunga Dam. Releases from the dam not only affect the availability of surface flows, but they could also alter water quality conditions. Irregular fluctuation or changes in the hydrocycle make it difficult for native species to the complete their life cycle and persist in a system. Overall, far fewer exotic species were observed in the Wash as compared to Haines Creek, which is likely attributed to the seasonal drying out of the Wash and the connectivity of the Tujunga Ponds with Haines Creek.

Although the abundance of Santa Ana sucker were much lower in the Wash in comparison to Haines Creek, the amount of fair to good habitat was found to be higher. The Wash contained a greater proportion of riffles and cobble substrates, and was lacking pools, an established riparian canopy, and a well-balanced mix of instream habitat complexity that was present in Haines Creek. An established riparian bank could help maintain bank stability, limit fluctuations in water temperature throughout the year, as well as provide woody debris, live tree roots, and other sources of instream habitat complexity. This canopy cover helps to keep dissolved oxygen levels and water temperatures stable during the warm summer months, but could restrict primary production and the abundance of periphyton (a complex mixture of algae,

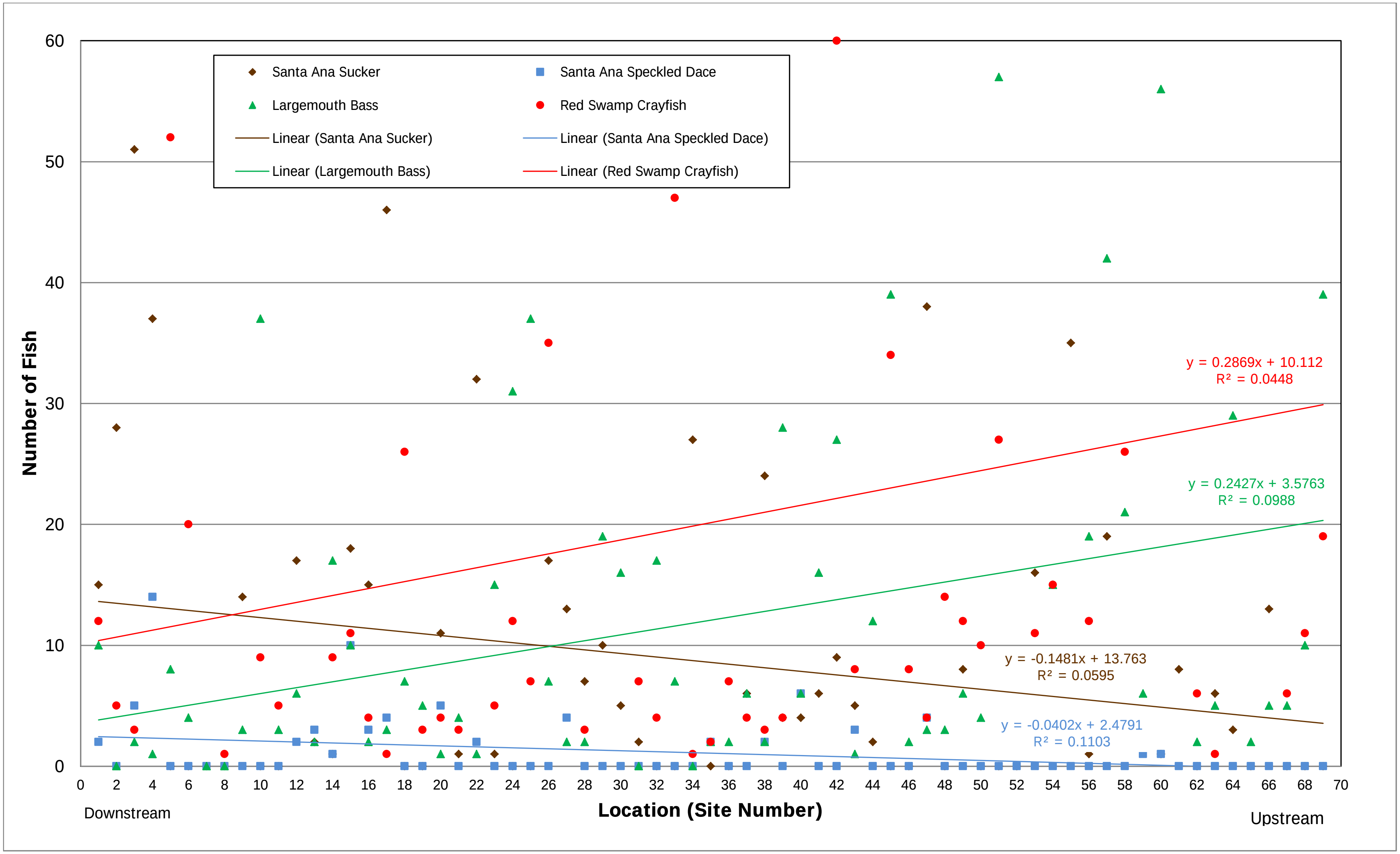

Figure 4-2. Distribution of the most abundant species observed within Haines Creek based on site number, 2012. Site 1 represents the downstream extent of the creek and site 69 represents the upstream extent. Trend lines and their equations are included for each species.

cyanobacteria, microbes, and detritus) that are key components in the life stages of many native fishes and amphibians.

Five adult Santa Ana speckled dace were found dead in the Wash during the current study. These mortalities were in no way associated with the survey effort and the cause of death appeared to be natural, as these fish are believed to live only 3 years. With the exception of one of the dace, these mortalities appeared to have occurred within a few days before being found.

4.3 Comparison between 2009 and 2012

In 2009, the native fishes survey conducted in Haines Creek identified five sites that were sampled using two backpack electrofishing units with a three-pass depletion sampling technique (ECORP 2010). In this current study the same five sites, shown in Appendix C and D, were resampled using visual mask and snorkel survey techniques to obtain fish counts and length data. Both sampling efforts were conducted during similar times of the year, under suitable sampling conditions for capturing/observing fish. Water quality parameters were comparable between the two sampling periods; however, recent rains prior to the 2012 surveys may have caused an increase in water discharge measurements from 1.27 cfs in 2009 to 2.59 cfs in 2012.

Comparing the two survey methods, both have their advantages and disadvantages. Advantages of visual surveys are the ability to observe behavioral patterns (i.e., foraging behavior and interactions between individuals) that are not possible when electrofishing. Visual surveys are much less invasive than electrofishing as there is no handling involved and the likelihood of injury and mortality is greatly reduced. Visual surveys are highly dependent upon good water clarity, while electrofishing is not as dependent. PHAB (e.g., water depth, woody debris, and overhanging vegetation) and water quality parameters (e.g., conductivity and clarity) are the two primary factors that affect the efficacy of both these methods. A comparison study between visual and electrofishing surveys conducted in the North Fork Kern River found that visual surveys consistently underestimated smaller size classes of fish, because these smaller size classes were primarily located under ledges or in shallow edgewaters (ECORP 2006). Electrofishing surveys consistently underestimated the larger size classes of fish, because larger fish typically occupy deeper pools which cannot be effectively sampled with electrofishing.

When conducting visual surveys there is often a potential for bias. Several factors can bias results, including the behavior of target fish species and attributes of the physical habitat (e.g., stream size, water clarity, temperature, and cover) (Thurow 1994). Thurow notes that smaller fish and bottom-dwelling fish that use camouflage are more difficult to count in a visual survey. Differences in fish behavior and the amount of cover available may also affect the accuracy of counts (Rodgers et al. 1992; Thurow 1994). Surveyors may misidentify fish, double-count fish, or fail to see all fish. Minimum criteria for depth, temperature, and visibility need to be met for visual surveys to be optimal. Surveyors need to be able to submerge a mask to see fish. Visual counts of small juvenile and fry size fish are often underestimated because these fish tend to occupy shallower water that cannot be easily surveyed (Bozek and Rahel 1991). A minimum recommended water depth for successful surveys is generally 20 cm.

Water temperature influences fish behavior and may also bias counts. As temperature falls below a certain threshold, fish will seek cover (Edmundson et al. 1968; Bjornn 1971; Hillman et al. 1992). At water temperatures below 9°C, most juvenile salmonids hide during the day and night surveys are likely to be more effective. Hillman et al. (1992) found that above 14°C snorkelers counted about 70 percent of the juvenile salmonids present; below 14°C they observed less than half of the juvenile fish present. Below 9°C, daytime snorkelers observed less than 20 percent of the juvenile fish present (Dolloff et al. 1993). High water velocities can also make it difficult for the surveyor to move and count fish when snorkeling (Dolloff et al. 1996). Visual surveys lack quantitative data as surveyors are unable to collect precise lengths, weights, and health information. Electrofishing surveys do allow surveyors to collect this quantitative data by capturing and handling each individual. A study in 1996 found electrofishing to be more accurate than visual surveys in determining the population structure of bull trout in second order streams in Idaho (Thurow and Schill 1996). Depending on the sampling habitats and the goals and objectives of a particular study, publications have shown support for both of these methods.

When comparing the five sampling sites between the two studies, only one site (Site 3 in 2012 [referenced as Site 1 in 2009]) was noticeably different as it had shifted locations. In 2009 this site had meandered into a portion of an equestrian trail; however, in 2012 the site had been redirected back into the main channel of the stream course. This shift increased the habitat score from fair (2009) to good (2012) and the number of Santa Ana sucker greatly increased in this site of Haines Creek (from one individual in 2009 to 51 in 2012) (Figure 4-3). In 2012, Site 55 (referenced as Site 4 in 2009) was the only site that remained unchanged in nearly every PHAB parameter collected between the two studies. This site received identical habitat scores in 2009 and 2012 (Figure 4-4). Although the habitat at this site remained unchanged, the abundance of Santa Ana sucker has appeared to more than double during the three year period. In 2012, Site 68 [located furthest upstream, nearest the Tujunga Ponds (referenced as Site 5 in 2009)] decreased from good (2009) to fair (2012) in its habitat score based on an increase in sand and fine substrates and the flow habitat shifting from riffle/pool to riffle/glide complex. No Santa Ana sucker were observed at this site during either sampling effort. The other two sites (referenced as 2 and 3 in 2009 and 19 and 38 in 2012, respectively) contained slight shifts in their habitat scores and totals of Santa Ana sucker.

Arroyo chub and Santa Ana speckled dace numbers were low in 2009, with only two arroyo chub detected at a single site and 13 Santa Ana speckled dace detected at the three downstream sites. In 2012, these numbers decreased with only seven Santa Ana speckled dace being observed at two of the three sites where it was previously detected. Although arroyo chub were observed (n=5) during the 2012 exotic species removal efforts, no arroyo chub were observed in Haines Creek during the 2012 native fishes surveys (Table 4-1). Past surveys in Haines Creek have only identified arroyo chub in the adult life stage with the majority of these occurrences taken place upstream of the Cottonwood Avenue crossing. Conversely, past surveys in Haines Creek have identified Santa Ana speckled dace in all life stages with their distribution limited to the downstream portions of Haines Creek, below the Cottonwood Avenue crossing. The limited distributions and relative abundances of these species, coupled with the pressures associated by the presence of exotic species may influence the status of both of these species in the Mitigation Area. Although exotic species totals decreased in the comparison sites from 2009 to 2012 (Figure 4-5), the total number of these individuals throughout Haines Creek were more than three times that of native fish species totals (2,026 to

666). With so many unknowns for these species within the Mitigation Area (e.g., responses to exotic species and changes to their habitat, the success of spawning and recruitment, site fidelity, and migration) it is difficult to make predictions on the future recovery of native fish species in the Mitigation Area. Further studies are needed in order to understand the population dynamics of these native fish species in this system.

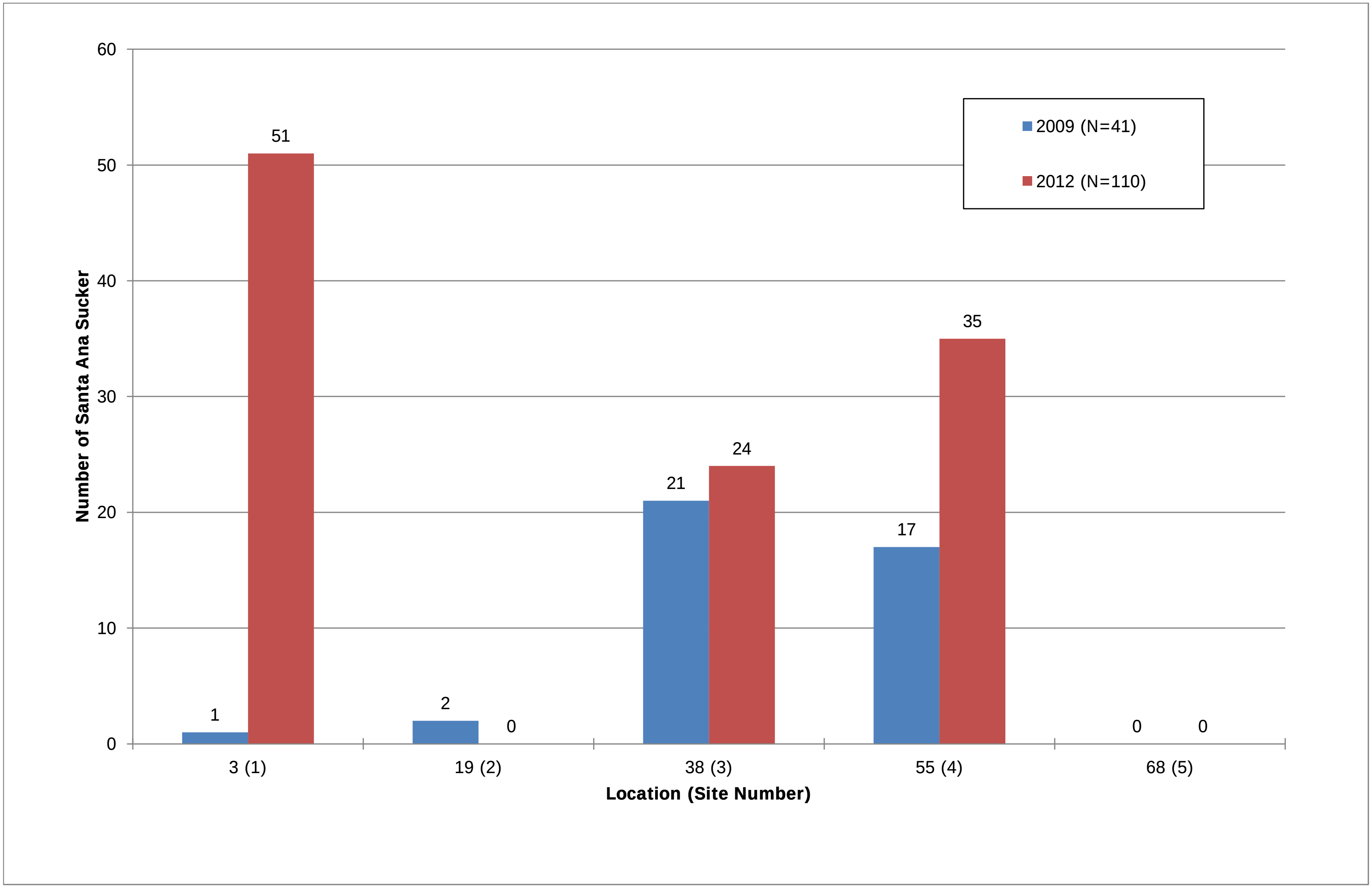

Figure 4-3. Comparison between Santa Ana sucker abundances at five sites sampled in 2009 and 2012 within Haines Creek. 2012 site numbers are presented, while 2009 site numbers are in parenthesis.

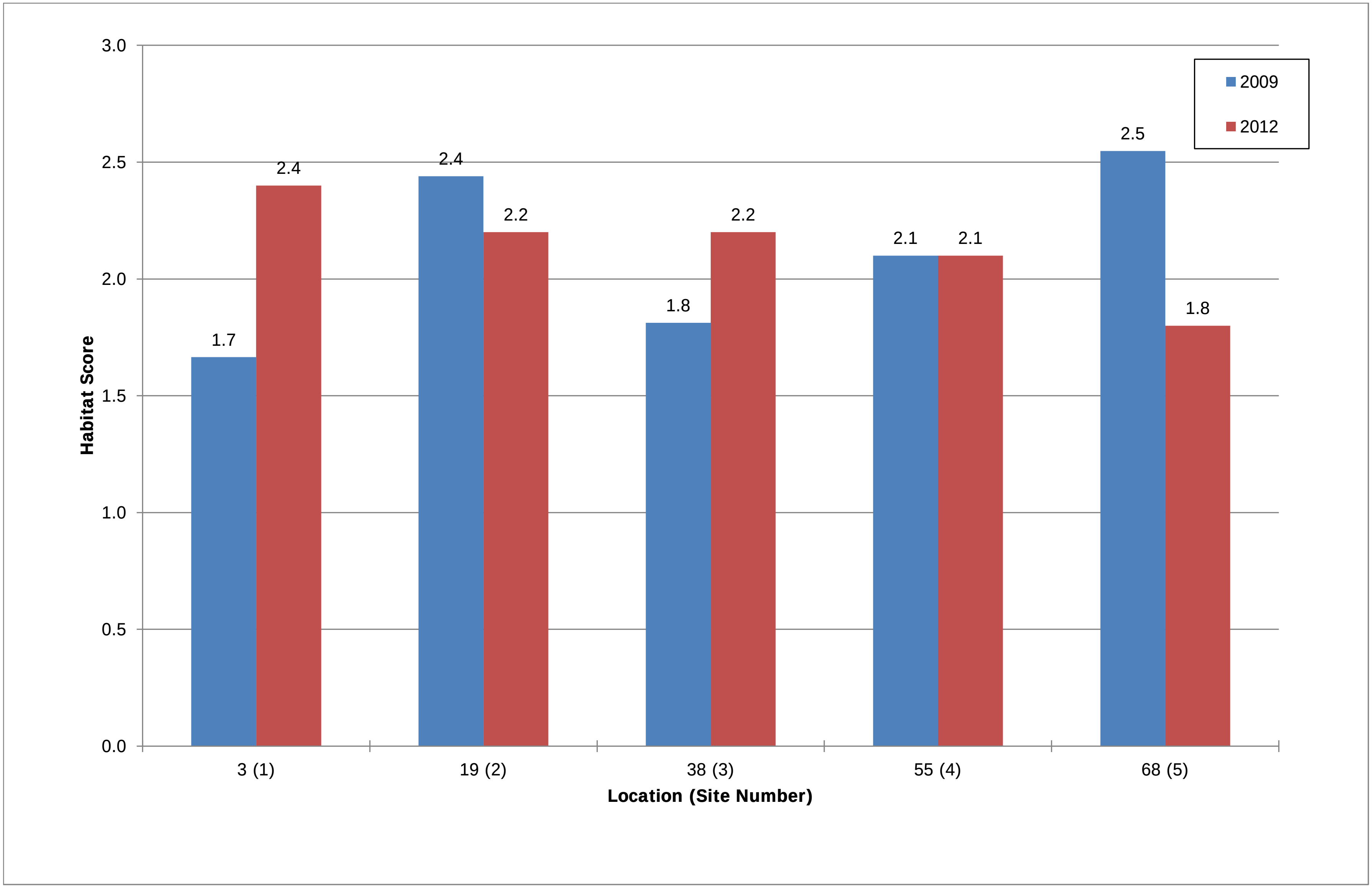

Figure 4-4. Comparison between overall habitat scores at five sites sampled in 2009 and 2012 within Haines Creek. 2012 site numbers are presented, while 2009 site numbers are in parenthesis.

Table 4-1. Abundance of Native and Exotic Species between Comparison Sites in 2009 and 2012, Haines Creek

2012 (2009) Survey Location	Native Fish Species						Exotic Species									
	Arroyo chub		Santa Ana speckled dace		Santa Ana sucker		Western mosquitofish		Green sunfish		Bluegill		Largemouth bass		Red swamp crayfish	
	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012	2009	2012
Site 3 (1)	2	0	1	5	1	51	0	0	1	0	0	1	36	2	30	3
Site 19 (2)	0	0	4	0	2	0	0	0	1	0	0	0	12	5	30	3
Site 38 (3)	0	0	8	2	21	24	0	0	0	0	0	0	3	2	12	3
Site 55 (4)	0	0	0	0	17	35	0	0	10	0	0	0	12	2	23	0
Site 68 (5)	0	0	0	0	0	0	3	0	2	0	0	0	34	10	39	11
Totals	**2**	**0**	**13**	**7**	**41**	**110**	**3**	**0**	**14**	**0**	**0**	**1**	**97**	**21**	**134**	**20**

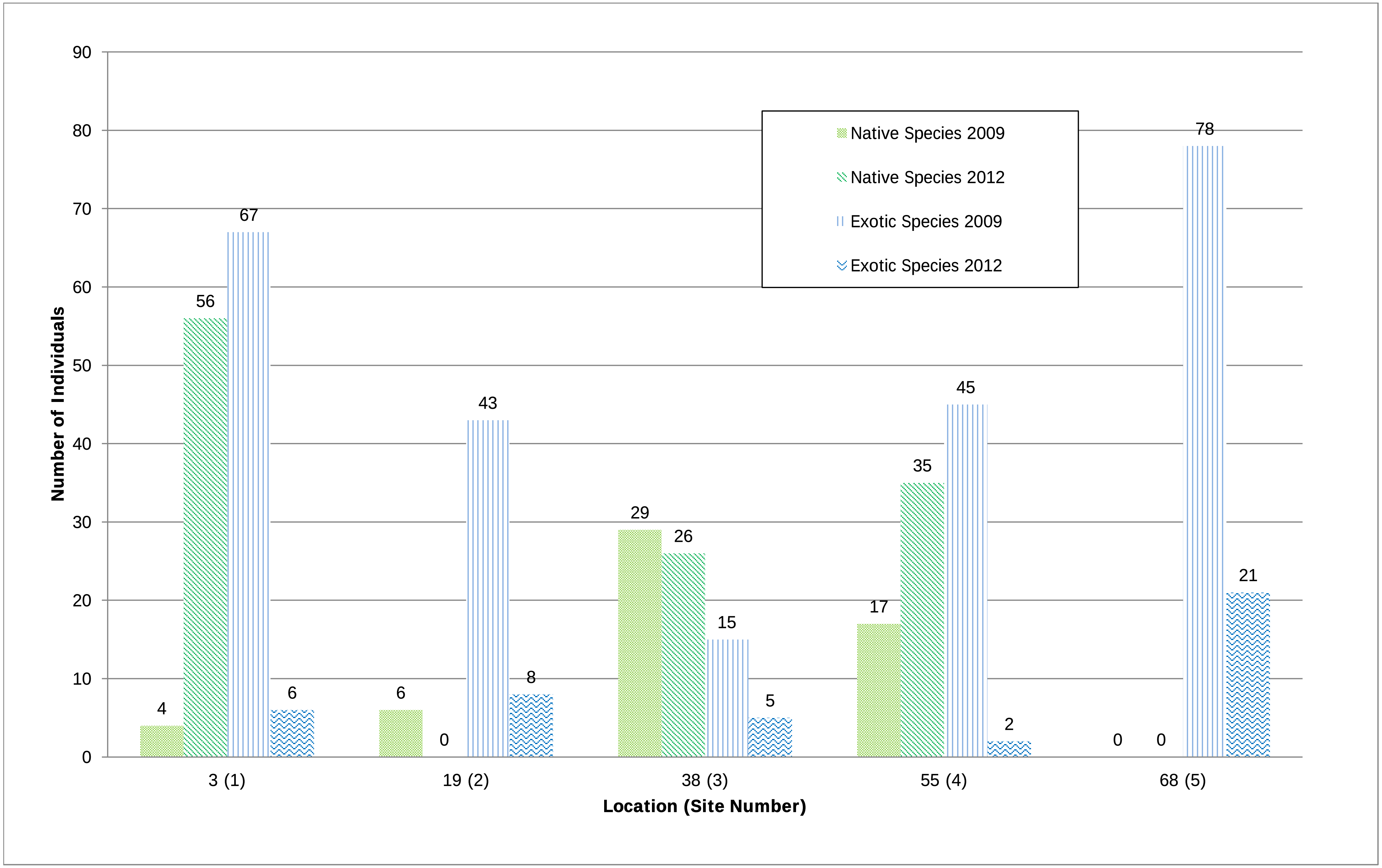

Figure 4-5. Comparison between native and exotics species abundances at five sites sampled in 2009 and 2012 within Haines Creek. 2012 site numbers are presented, while 2009 site numbers are in parenthesis.

5.0 CONCLUSIONS AND RECOMMENDATIONS

In general, the quality of habitat for Santa Ana sucker within the Mitigation Area is good with distinct habitat characteristics that favor each individual life stage. The distribution of Santa Ana sucker in Haines Creek was patchy with absent reaches occupied by exotic species. Comparing the study sites in 2009 and 2012, the total number of Santa Ana sucker has appeared to more than double with far fewer exotic species present. When comparing the 2010 visual surveys in Haines Creek with the current study, fewer juvenile Santa Ana sucker were observed; however, their overall densities appeared similar and are likely stable. Conversely, the current status of Santa Ana sucker within the Wash is unclear. Several questions still remain regarding their status as fewer individuals were observed during this study than what was incidentally observed during focused arroyo toad surveys conducted earlier in the year.

One of the major differences between the two sampling locations (Haines Creek and the Wash), is the drastic change in habitat with the connectivity of Haines Creek to the Tujunga Ponds. The slow, deep water habitat features associated with the Tujunga Ponds provides ideal habitat for exotic species. The Wash lacks these slow, deep water habitat features and contains relatively similar habitats both upstream and downstream of the Mitigation Area. Although exotic species are less abundant and likely less of a threat to native fishes in the Wash compared to those in Haines Creek, the native fishes in the Wash are subject to changes in wide fluctuations in river flow. These changes in the hydrocycle alter the availability of surface waters which can inhibit their reproductive success, restrict their movement patterns, and alter the PHAB and water quality parameters needed for them to persist. Disturbances in habitat continuity through the construction of rock dams and other channel alterations, changes in water quality through the introduction of toxins/chemicals, the danger associated with drought and wildfire, and the presence of exotic species remain threats for the native fishes in the Mitigation Area.

Due to the presence of these native fishes in the Mitigation Area, further studies should continue in an effort to assess and monitor their habitats, distributions, movement patterns, and densities within the Mitigation Area. Continuous monitoring will allow managers to make informed decisions regarding future activities, and could also serve as a means for the early detection monitoring of new invasive species, range extensions, predation rates on native species, and/or changes in distributions or densities of already established exotic species populations. Channel alterations that impede the natural water flow can isolate or restrict the movement of native fishes, potentially drying out sections downstream of the obstruction, and can create favorable conditions for exotic species to persist. Efforts should continue to monitor for these obstructions and when observed, these obstructions should be carefully removed. Public outreach regarding the biological resources of the Mitigation Area should continue so as to educate recreational users of both the approved and prohibited recreational activities and how to report any observed infractions.

Locations exist within and immediately adjacent to the Mitigation Area (e.g., Tujunga Ponds, Hansen Lake, and various ponds within the Angeles National Golf Club) that provide suitable habitat for exotic species. Although Haines Creek and the Wash would not be considered ideal habitat for most exotic species, their close proximity with these more suitable habitats allow for the potential migration and establishment within these native fishes habitats. This threat is further compounded by deliberate introductions of exotic species. Future efforts should be made to remove these exotic species, restrict their migration, and eliminate their habitat.

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APPENDIX A

Aquatic Species Observed During the Native Fishes Survey, 2012

Aquatic Species Observed During the Native Fishes Survey, 2012.

COMMON NAME	SCIENTIFIC NAME
MALOCOSTRACANS	**MALOCOSTRACA**
Freshwater Crayfishes	**Cambaridae**
Red swamp crayfish[3]	*Procambarus clarkii*
RAY-FINNED FISHES	**ACTINOPTERYGII**
Carps and Minnows	**Cyprinidae**
Goldfish[3]	*Carassius auratus*
Common carp[3]	*Cyprinus carpio*
Arroyo chub[2]	*Gila orcuttii*
Santa Ana speckled dace[2]	*Rhinichthys osculus* ssp. 3
Suckers	**Catostomidae**
Santa Ana sucker[1,2]	*Catostomus santaanae*
North American Catfishes	**Ictaluridae**
Brown bullhead[3]	*Ameiurus nebulosus*
Livebearers	**Poeciliidae**
Mosquitofish[3]	*Gambusia affinis*
Sunfishes	**Centrarchidae**
Green sunfish[3]	*Lepomis cyanellus*
Bluegill[3]	*Lepomis macrochirus*
Largemouth bass[3]	*Micropterus salmoides*
AMPHIBIANS	**AMPHIBIA**
True Frogs	**Ranidae**
American bullfrog[3]	*Lithobates catesbeianus*

[1] Federally Listed Threatened Species
[2] CDFW SSC
[3] Exotic Species

APPENDIX B

Native Fishes Survey Photographs

Figure B-1. Riffle/glide complex observed in Haines Creek.

Figure B-2. Pool/glide complex observed in Haines Creek.

Figure B-3. Shallow glide observed in Haines Creek.

Figure B-4. A diver surveying downstream of an equestrian trail crossing in Haines Creek.

Figure B-5. Site 1 in Haines Creek during the 2009 native fishes survey running through an equestrian trail.

Figure B-6. In 2012, the location of site 1 during the 2009 native fishes survey was dry and had shifted back to the main channel of the Creek.

Figure B-7. A rock dam observed in Haines Creek during visual surveys.

Figure B-8. A group of Santa Ana sucker observed in Haines Creek during visual surveys.

Figure B-9. A Santa Ana speckled dace observed in Haines Creek during visual surveys.

Figure B-10. A baited trap found in Haines Creek during visual surveys.
The trap was removed and disposed of off-site.

Figure B-11. A red swamp crayfish observed in Haines Creek during visual surveys.

Figure B-12. Trash and evidence of fishing observed in Haines Creek during visual surveys.

Figure B-13. ECORP biologist taking flow discharge readings in Haines Creek.

Figure B-14. Riffle/glide complex observed in Big Tujunga Wash.

Figure B-15. Shallow glide observed near the I-210 overpass in Big Tujunga Wash.

Figure B-16. Divers surveying in a glide in Big Tujunga Wash.

Figure B-17. Trash observed on the bank of Big Tujunga Wash during visual surveys.

Figure B-18. A dead Santa Ana speckled dace found in Big Tujunga Wash during visual surveys. The mortality was not a result of the visual surveys.

Figure B-19. A Santa Ana sucker observed in Big Tujunga Wash during visual surveys.

Figure B-20. A Santa Ana speckled dace observed in Big Tujunga Wash during visual surveys.

Figure B-21. A group of arroyo chub observed in Big Tujunga Wash during visual surveys.

Figure B-22. A juvenile bullfrog that was captured and removed from Big Tujunga Wash during visual surveys.

Figure B-23. A largemouth bass that was captured and removed from Big Tujunga Wash during visual surveys.

Figure B-24. Trash observed in the stream channel in Big Tujunga Wash during visual surveys.

APPENDIX C

Santa Ana Sucker Results

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Appendix C. Distribution of Santa Ana Sucker within Big Tujunga Wash Mitigation Area

2010-116.007/005/5 Big Tujunga Wash Mitigation Area

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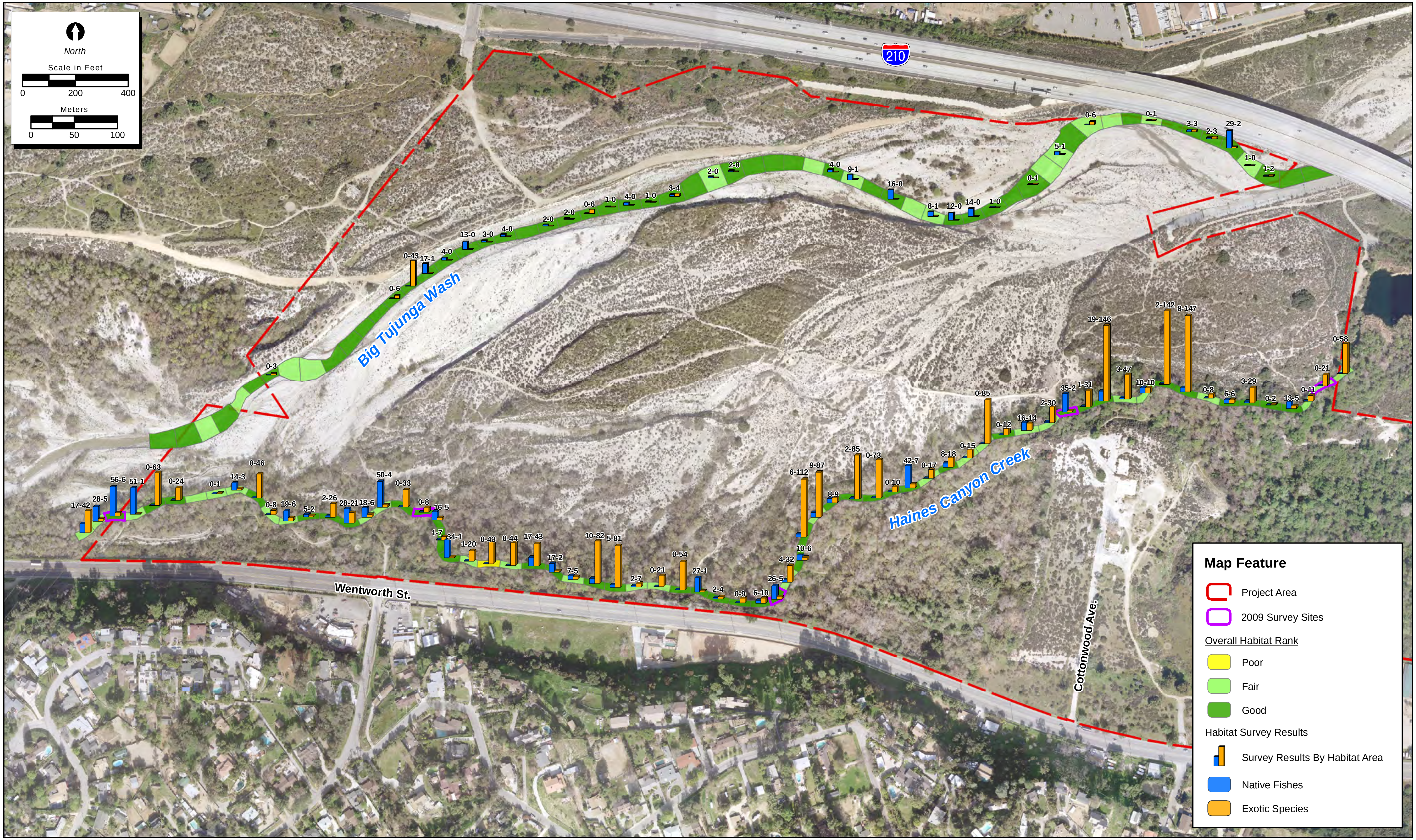
APPENDIX D

Native versus Exotic Species



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Attachment D. Distribution of Native and Exotic Species within the Big Tujunga Wash Mitigation Area

2010-116.007/005/5 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
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APPENDIX H

2012 Focused Surveys for Least Bell's Vireo

2012 Focused Surveys for Least Bell's Vireo

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

November 2012

2012 Focused Surveys for Least Bell's Vireo
for the Big Tujunga Wash Mitigation Area

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1.0 SUMMARY

As part of implementation of the endangered native wildlife monitoring program for the Master Mitigation Plan (MMP; Chambers Group, Inc. 2000) and Long-term Monitoring and Maintenance Plan (LTMMP; Chambers Group, Inc. 2006) associated with Big Tujunga Wash Mitigation Area (Mitigation Area), ECORP Consulting Inc. (ECORP) was contracted by the Los Angeles County Department of Public Works (LACDPW) in July 2007 to conduct surveys for endangered native wildlife species including the least Bell's vireo (*Vireo bellii pusillus*) every three years. Eight protocol surveys for the least Bell's vireo, following the U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 2001), were conducted in spring and early summer of 2012 in the Mitigation Area. Least Bell's vireos were not detected on the site during these surveys, despite the presence of suitable riparian habitat in the Mitigation Area.

Three additional sensitive species, yellow warbler (*Dendroica petechia*), olive-sided flycatcher (*Contopus cooperi*), and willow flycatcher (*Empidonax traillii*) were observed during the focused least Bell's vireo surveys. Two migrant willow flycatchers were observed during one survey; this species is state-listed as endangered if nesting, but not as a migrant (CDFG 2011a). Yellow warbler and olive-sided flycatcher are California Department of Fish and Game (CDFG) Species of Special Concern (SSC) and are not listed under the federal or state Endangered Species Acts (CDFG 2011a). Suitable nesting habitat for bird species protected by the Federal Migratory Bird Treaty Act of 1918 (USFWS 1918) and California Fish and Game Code (CDFG 2012a) is present throughout the Mitigation Area.

The results of the least Bell's vireo surveys are summarized below and are considered to be valid for one year, at the discretion of the USFWS.

2.0 INTRODUCTION

The Master Mitigation Plan (MMP) was created to serve as a five-year guide for the implementation of various enhancement programs and to fulfill the requirement of CDFG for the preparation of a management plan for the site (Chambers Group, Inc. 2000). The Long-term Monitoring and Maintenance Plan (LTMMP) was created to ensure the continued success of the MMP in perpetuity (Chambers Group, Inc. 2006). While the MMP 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, it also provides direction for the monitoring of existing endangered species populations. Least Bell's vireos have historically been known to occur in the riparian areas and surrounding drainages within the Mitigation Area; therefore protocol-level surveys for this species were conducted as part of the execution of the LTMMP (Chambers Group, Inc. 2006).

2.1 Project and Project Area Description

The Mitigation Area is located in Big Tujunga Wash, just downstream of the Interstate 210 (I-210) freeway overcrossing, in the Sunland area within the San Fernando Valley, Los Angeles County, California (Figure 1). 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 bordered by high-tension power lines crossing the Big Tujunga Wash just upstream of Hansen Dam Park and Recreation Area and is contiguous with undeveloped riparian habitat (Figure 2). 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, state, and federal significance (Safford and Quinn 1998). Other waterways present in and adjacent to the Mitigation Area include Haines Canyon Creek and two ponds, the Tujunga Ponds.

2.2 Least Bell's Vireo Natural History

Least Bell's vireos are neotropical migrants that breed in California and winter primarily in Mexico. Not much information is known about their wintering grounds. Usually the earliest migrants arrive on breeding grounds in late March and adults and juvenile recruits depart by September. The breeding grounds for this small, gray migratory songbird once extended from interior northern California (near Red Bluff) to northwestern Baja California (Grinnell and Miller 1944). Currently, it is largely restricted as a breeder to Southern California from Santa Barbara and San Bernardino Counties southward and in northwestern Baja California. One breeding pair was documented at the San Joaquin River National Wildlife Refuge in 2005 and 2006 (USFWS 2006), which may be indicative of a return of this species to the Central Valley. The closest recorded observations of least Bell's vireos to the project area are on the adjacent property west of the power lines (CDFG 2012b) and in Hansen Dam basin (Griffith Wildlife Biology 2009).

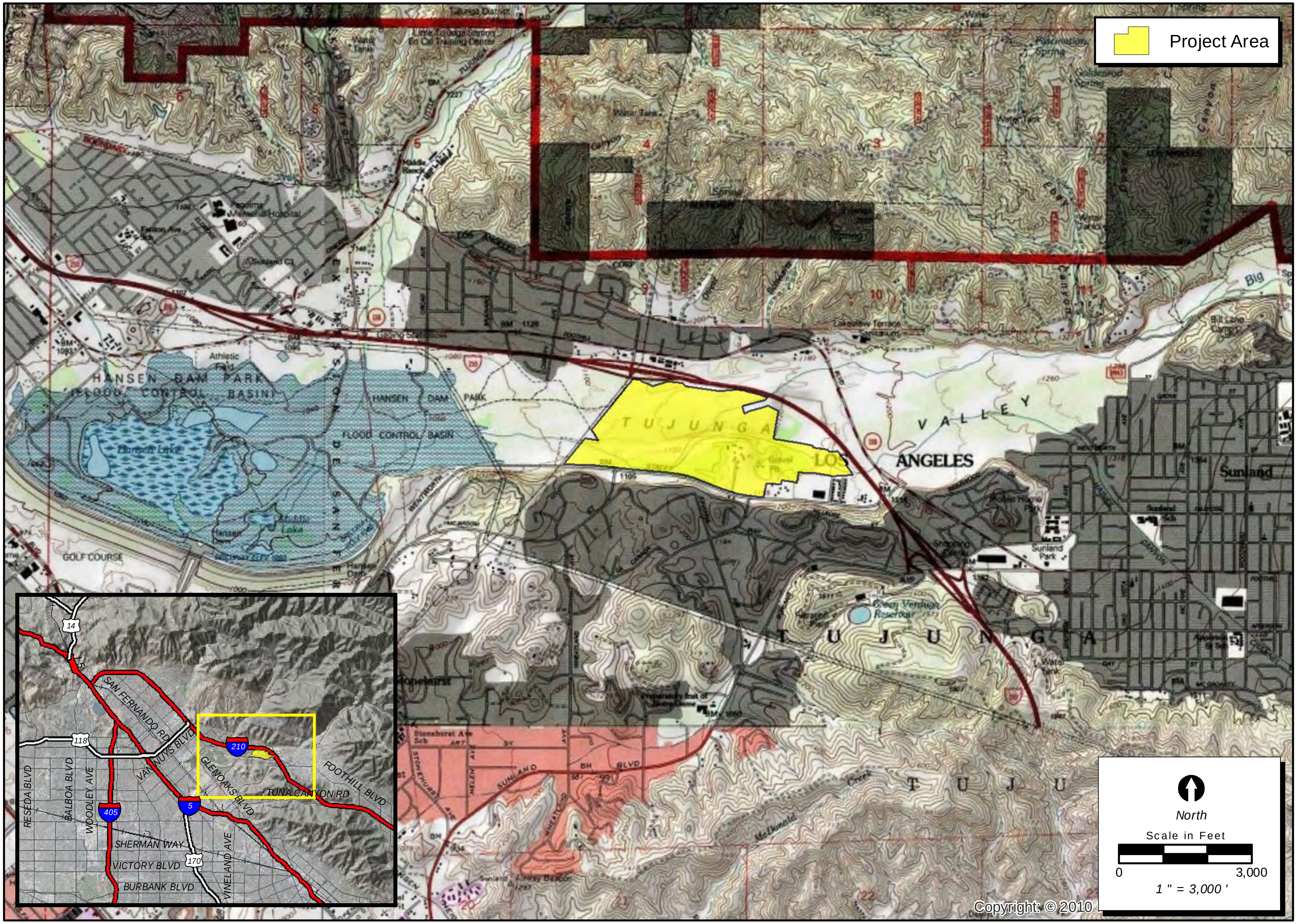

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Figure 1. Project Location

2010-116.006 Big Tujunga Wash Mitigation Area

ECORP Consulting, Inc.
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Aerial Date: March 2008
Map Date: 2010

Figure 2. Big Tujunga Wash Mitigation Area

2010-116.006 Big Tujunga Wash Mitigation Area

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ENVIRONMENTAL CONSULTANTS

Habitat for the least Bell's vireo typically consists of multi-layered riparian vegetation comprised of willows (*Salix* sp.) of varying heights and mule fat (*Baccharis salicifolia*). The habitat this species prefers is typically fairly open and incorporates a high amount of 'edge' features where the riparian habitat meets open water or open sand bars. Least Bell's vireos utilize both heavy understory and high canopy areas as foraging habitat. They establish breeding territories approximately one acre in size and typically build their nests within five feet of the ground within a variety of shrub and tree species.

The least Bell's vireo was listed as endangered by the state of California in October 1980 and was listed as endangered by the federal government in May 1986 (USFWS 1994). The population decline that led to the listing was due to extreme loss of riparian habitat and parasitism by the brown-headed cowbird (*Molothrus ater*). Least Bell's vireos are common hosts of the brown-headed cowbird, with populations experiencing parasitism levels as high as 80% (USFWS 1998). Furthermore, parasitized least Bell's vireo pairs rarely fledge any of their own young (Kus 1999). Critical habitat for the least Bell's vireo was designated by the USFWS in February 1994 (USFWS 1994); however, the Mitigation Area is not located within any designated critical habitat for the least Bell's vireo. The closest designated critical habitat is located approximately 20 miles northwest of the Mitigation Area in the Santa Clara River (Santa Clara River Unit; USFWS 1994).

3.0 METHODS

3.1 Literature Review

Prior to conducting field work, a literature search was conducted to determine the locations of the least Bell's vireo and other sensitive species within the United States Geological Survey (USGS) Sunland 7.5-minute topographical quadrangle and surrounding quads. Data regarding the potential occurrence of special-status species were gathered from the following sources:

- California Natural Diversity Database (CNDDB; CDFG 2012b);
- *Special animals list* (CDFG 2011a);
- *State and federally listed endangered and threatened animals of California* (CDFG 2011b); and
- Previous reports for the Mitigation Area (ECORP 2010, Gonzales Environmental Consulting 2009).

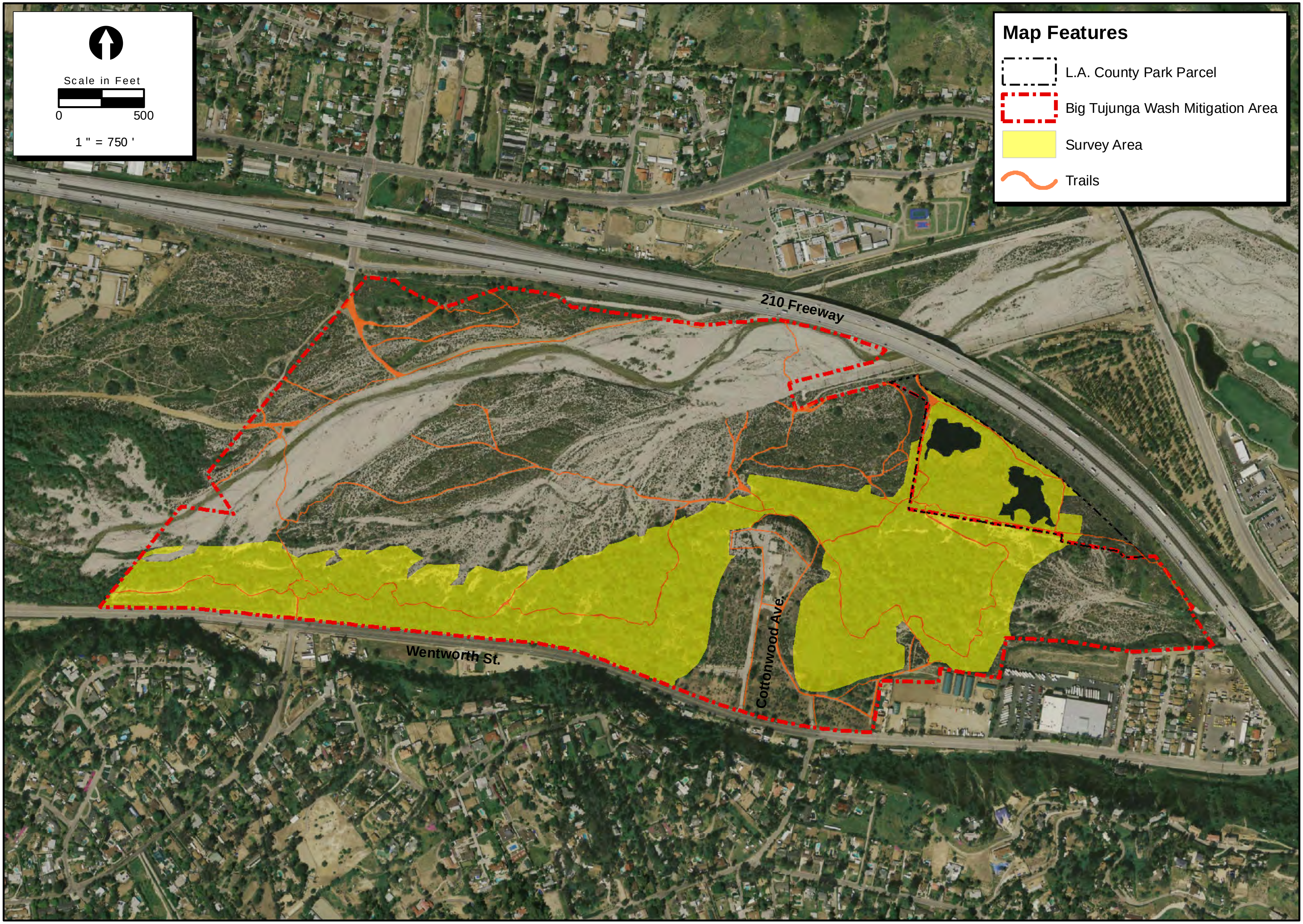
3.2 Site Characteristics

Topographical features and site conditions present at the Mitigation Area, including hills, slopes, drainages, water features, and soils were documented by the biologists who conducted the surveys. Vegetation mapping was conducted in 2009 and these data were used for the habitat assessment for the 2012 surveys (ECORP 2009).

3.3 Field Investigation

Surveys were conducted according to the USFWS Least Bell's Vireo Survey Guidelines (USFWS 2001) from mid-April through mid-July within suitable habitat present in the Mitigation Area (Figure 3). A total of eight surveys were conducted with at least ten (10) days between each survey. Five surveys were conducted concurrently with those for the southwestern willow flycatcher (*Empidonax traillii extimus*; Leatherman Bioconsulting 2012). Surveys were conducted by biologists familiar with the calls, songs, and plumage characteristics of the least Bell's vireo and other riparian bird species. Surveys were generally conducted in the morning hours before 11:00 a.m., when least Bell's vireos are known to be the most active and vocal. Surveys were not conducted during mornings with unacceptable weather conditions such as sustained high winds (more than 10 miles per hour [mph]), extreme temperatures (less than 55 degrees [°] Fahrenheit [F] or greater than 100ºF taken at 6 inches above the ground in the shade), rain, hail, or dense fog.

ECORP biologists conducted the surveys on foot throughout all suitable habitat while listening for least Bell's vireo vocalizations and scanning the canopy with binoculars to identify bird species. All wildlife species observed during the surveys were recorded in field notes. Locations of sensitive species observed were noted on the data sheets and coordinates were recorded using a handheld Global Positioning System (GPS) unit. In addition, numbers and locations of brown-headed cowbirds were recorded, in accordance with the protocol.



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Map Date: 10/15/2012
Photo Source: DigitalGlobe March 2008

Figure 3. Least Bell's Vireo Survey Area

2010-116.006 Big Tujunga Wash Mitigation Area

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4.0 RESULTS

4.1 Literature Review

A search of the CNDDB revealed one documented record of several male least Bell's vireos located approximately two miles west of the Mitigation Area in 2003 (CDFG 2012b). Two additional records of least Bell's vireo are located within 10 miles of the Mitigation Area, one historical sighting (1978) approximately 8 miles west of the Mitigation Area at the Van Norman Dam, and another from 2004 approximately 9 miles southwest of the Mitigation Area in the Sepulveda Wildlife Basin Area (CNDDB 2012b).

A review of previous reports and focused surveys reports prepared for the Mitigation Area was also conducted. Focused least Bell's vireo surveys were conducted in the Mitigation Area in 2009 and least Bell's vireo was not been detected within or immediately adjacent to the Mitigation Area (Gonzales Environmental Consulting 2009, ECORP 2010).

4.2 Site Characteristics

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 local rainfall amounts and water releases from the Dam. Haines Canyon Creek, located on the south side of the site, is a relatively narrow, densely vegetated perennial stream with flow originating from the Tujunga Ponds. These water features are surrounded by riparian vegetation, which provides suitable habitat for least Bell's vireo. Year-round disturbances in the riparian areas appear to be minimal, limited to hiking, equestrian use, and some associated trash. Patches of nonnative invasive plant species that are targeted for treatment and permanent removal as part of the MMP and LTMMP are interspersed throughout the riparian habitat (Chambers Group, Inc. 2000, Chambers Group, Inc. 2006). In the surrounding uplands to the north and east of the survey area, there are remnants of houses and some trash and debris piles.

The Tujunga Ponds, which are located just outside the northeast corner of the Mitigation Area, consist of two fairly large ponds (greater than 150 feet across), which are referred to as the East and West Ponds and are connected by a small channel. The East Pond is fed by an underground freshwater source located along the eastern bank; the water then flows into the West Pond and eventually into Haines Canyon Creek. Both ponds are densely vegetated along the banks with freshwater marsh and riparian woodland plant species, which also provide suitable habitat for least Bell's vireo.

4.2.1 Plant Communities and Habitat

Vegetation mapping was conducted in the Mitigation Area in 2009 (ECORP 2009) and vegetation communities were described according to *A Manual of California Vegetation* (Sawyer and Keeler-Wolfe 1995). Detailed descriptions of the vegetation communities occurring within the Mitigation Area can be found in the 2009 Annual Report for the Big Tujunga Wash Mitigation Area (ECORP 2009).

The Mitigation Area supports several types of riparian and upland vegetation communities. The riparian communities consist of Southern Willow Scrub and Southern Cottonwood-Willow

Riparian Woodland and are found throughout a majority of the southern and eastern portions of the Mitigation Area associated with Haines Canyon Creek and the south fork of the Big Tujunga Wash. These communities represent suitable least Bell's vireo habitat within the Mitigation Area (Figures 4 and 5). Upland communities present in the Mitigation Area consist of California Buckwheat Scrub, California Sagebrush-California Buckwheat Scrub, Riversidean Alluvial Fan Sage Scrub, Sycamore Woodland Alluvial Scrub, and California Sycamore-Coast Live Oak Woodland. These communities are found in the northern and central portions of the Mitigation Area and are not suitable habitat for least Bell's vireo.

Figure 4. Representative riparian habitat (present in the middle portion of the photo) within the Mitigation Area.

Figure 5. Riparian habitat adjacent to Haines Canyon Creek.

4.3 Least Bell's Vireo Survey Results

Least Bell's vireos were neither observed nor detected during the surveys, despite the presence of suitable riparian habitat. Survey data sheets for three of the eight surveys are included in Appendix A (the remaining five survey data sheets are included under a separate cover, Leatherman BioConsulting 2012). Dates, times, surveyors, and weather conditions during the eight protocol surveys are summarized below in Table 1. A complete list of wildlife species observed during the surveys is included as Appendix B.

Brown-headed cowbirds were observed during the focused surveys. Potential sources of cowbird populations in the area included horse ranch properties to the east and west. Brown-headed cowbirds are known to commute from 5.5 to 10 miles between breeding and feeding locations (Curson et al. 1999).

Table 1. Weather Conditions during Field Surveys

Date	Surveyors*	Time		Temperature (°F)		Cloud Cover (%)		Wind Speed (mph)	
		Start	End	Start	End	Start	End	Start	End
04/30/12	SS, BV	0715	1115	57	73	0	95	0-1	0-1
05/10/12	SS, TW	0615	0945	62	68	100	100	0-1	0-1
5/21/12	BL	0530	1130	59	86	0	0	0-2	0-2
6/4/12	BL	0530	1100	65	67	100	50	0-2	2-4
6/18/12	BL	0530	1030	61	74	40	0	0-2	2-4
7/2/12	BL	0530	1115	59	76	0	0	0-2	2-4
7/16/12	BL	0530	1130	57	84	100	0	0-2	2-4
7/26/12	SS	0600	1105	65	76	0	70	0-1	0-1
*BL=Brian Leatherman, BV=Becky Valdez, SS=Shannan Shaffer, TW=Terrance Wroblewski									

4.4 Other Sensitive Wildlife

Two CDFG SSCs were observed in the Mitigation Area during the protocol least Bell's vireo surveys: yellow warbler (*Dendroica petechia*) and olive-sided flycatcher (*Contopus cooperi*). Yellow warblers were seen during at least two of the least Bell's vireo surveys, indicating they are utilizing the riparian habitat in the Mitigation Area for breeding. The olive-sided flycatcher was observed once, during the first survey, suggesting it was migrating through the area. One state-listed endangered species, the willow flycatcher (*Empidonax traillii*), was observed on the third survey. These two individuals were not observed during subsequent surveys, suggesting that they were migrants using the area as a migratory stopover (Leatherman BioConsulting 2012).

Nesting habitat for other bird species protected by the Migratory Bird Treaty Act of 1918 (USFWS 1918) and California Fish and Game Code (CDFG 2012a) was observed throughout the riparian areas during the surveys. Although no active nests were directly observed during the protocol surveys, it is assumed that the Mitigation Area is used by many different bird species for breeding purposes.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Although the majority of the habitat within the Mitigation Area appears to be suitable habitat, least Bell's vireos were not detected within the Mitigation Area. However, focused least Bell's vireo surveys conducted downstream of the Mitigation Area in the Hansen Dam Basin in 2009 resulted in the observation of 44 occupied sites by least Bell's vireo; 39 locations were occupied by pairs and five sites occupied by single males (Griffith Wildlife Biology 2009). Based on historical range information of least Bell's vireo in the area, it appears that the population is expanding upstream from Hansen Dam Basin (Griffith Wildlife Biology 2009). As long as the dense riparian habitat remains suitable in the Mitigation Area, there is potential for least Bell's vireo to occupy the site in the future.

In accordance with the LTMMP for the Mitigation Area, brown-headed cowbird trapping was conducted in the Mitigation Area and surrounding areas between April and June 2012. Results of this trapping effort are found under separate cover (Griffith Wildlife Biology 2012); however, trapping resulted in the removal of 122 brown-headed cowbird males, females, and juveniles. The removal of this parasitic bird species increases the likelihood that sensitive riparian bird species such as the least Bell's vireo will inhabit and breed in the Mitigation Area. Brown-headed cowbirds directly threaten survival of the species they parasitize by laying eggs in the host nest and leaving the host bird to raise the cowbird offspring. This usually results in the death of the offspring of the host species because the host is more likely to rear the larger and more aggressive cowbird chick(s).

Three additional sensitive species were observed during the surveys (willow flycatcher, yellow warbler, and olive-sided flycatcher). The willow flycatcher is a state-listed endangered species in areas where the bird is found to be nesting (CDFG 2011a). The two solitary willow flycatcher individuals were observed during one survey only, indicating that these animals were most likely migrants utilizing the Mitigation Area as a migratory stopover (Leatherman BioConsulting 2012). The yellow warbler and olive-sided flycatcher are CDFG SSC and are not listed under the federal or state Endangered Species Acts (CDFG 2011a). No additional surveys are required for these species.

The Mitigation Area provides suitable nesting habitat for bird species protected under the Migratory Bird Treaty Act of 1918 (USFWS 1918) and California Fish and Game Code (CDFG 2012a); however, active bird nests were not observed during the focused surveys. Nonetheless, all nesting migratory bird species would be subject to standard protections for nesting birds under the federal Migratory Bird Treaty Act and California Department of Fish and Game code.

The results of this survey are considered to be valid for one year, at the discretion of the USFWS.

6.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me or under my supervision. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.

SIGNED: Kristen Mobraaten

Kristen Mobraaten
Wildlife Biologist

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APPENDIX A

Survey Data Sheets (Partial)

Biological Resources Survey Form

Project Name Big T Project # 2010-016 ~~.006~~ Task G ~~Billing Group~~ Phase G9

Location Sunland Survey Type LBVI #1

Surveyor(s) S. Shaffer, B. Valdez Date 4/30/12 Time (Start) 07:15 (End) 11:15

General Habitat Description of Area Riparian

Weather (Cloud cover, Estimated wind speed, precipitation) 0-95%/ 0-1 / 0

Temperature (In C, taken at 6" above the ground in the shade) (Start) 57°F (End) 73°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	CAQU	O V		
	COYE	V		
	SAPH	V		
	SOSP	O V		
	WREN	V		
	SPTO	V		
	WESJ	V		
	NUWO	O V		
	AMKE	V		
	COHA	V		
	WTSW	O		
	BEWR	O V		
	AMRO	V		
	CATH	O V		
	RWBL	O V		
	CALT	O V		
	OCWA	V		
	MALL	O		
	EUST	O		
	AMCO	O		
	MODO	O		
	RUDU	O		
	Cottontail	O		
	BLPH	O V		
	CAGO	O V		
	Coyote	O		
	GREG	O		
	BHGR	V		
	BUSH	O V		
	LEGO	O V		

General Comments:

No LBVI detected

* B = Burrow, C= Carcass, Fe = Feathers, Fu = Fur, N = Nest, O = Observed, S = Scat, T = Tracks, V = Vocalization

Biological Resources Survey Form

Project Name Big T Project # 2010-116.006 Task G ~~Billing Group~~ Phase G9

Date 4/30/12 Survey Type LBVI #1

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	AMGR	OV		
	ANHU	OV		
	RWSW	O		
	W. fence lizard	O		
	BHCO	V		
	Alligator Lizard	O		
	OSFL	O		
	Coachwhip	O		

General Comments:

* B = Burrow, C= Carcass, Fe = Feathers, Fu = Fur, N = Nest, O = Observed, S = Scat, T = Tracks, V = Vocalization

Biological Resources Survey Form

Project Name BGT Project # 2010-116.006 Task 6 ~~Billing Group~~ Phase G9

Location Sunland Survey Type LBVI #2

Surveyor(s) S. Shaffer, T Wroblewski Date 5/10/12 Time (Start) 6:15 (End) 9:45

General Habitat Description of Area Riparian

Weather (Cloud cover, Estimated wind speed, precipitation) 100% / 0-1 / 0

Temperature (In C, taken at 6" above the ground in the shade) (Start) 62 (End) 68

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	COYE			
	CALT			
	BUSH			
	AMCR			
	WSJA			
	SPTO			
	SOSP			
	BLPH			
	ACWO			
	NOMO			
	BHGR			
	Opossum			
	RWBL			
	ANHU			
	BEWR			
	LEGO			
	YEWA			376472, 3792439
	NRWS			
	Cottontail			
	CAGE			
	MALL			
	SUSC			
	AMCO			
	AMGO			
	NUWO			
	HOFI			
	CORM			
	W. stem fence liz			
	ALHU			
	SAPH			

General Comments:
New cuts to trail (photos 1&2) NO LBVI detected
0376551, 3792464

* B = Burrow, C= Carcass, Fe = Feathers, Fu = Fur, N = Nest, O = Observed, S = Scat, T = Tracks, V = Vocalization

Biological Resources Survey Form

Project Name: Big T | Project #: 2010-~~0~~16.006 | Task: G | Phase ~~Billing~~ Group: G9

Location: Sunland | Survey Type: LBVI #8

Surveyor(s): S. Shaffer | Date: 7/26/12 | Time (Start): 06:00 (End): 11:05

General Habitat Description of Area: Riparian

Weather (Cloud cover, Estimated wind speed, precipitation): 0-70% / 0-1 / 0

Temperature (In C, taken at 6" above the ground in the shade) (Start): 65 F (End): 76 F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	CALT	O		
	Desert cottontail	O		
	SPTO	OV		
	WESJ	OV		
	COHA	V		
	EUST	O		
	WREN	V		
	AMRO	V		
	MODO	OV		
	HOFI	OV		
	NUWO	OV		
	western fence liz	O		
	ANHU	O		
	SAPH	OV		
	NOMO	V		
	NRWS	O		
	COYE	VO		
	RWBL	V		
	AMGO	O		
	ALHU	O		
	AMCR	O		
	BEWR	V		
	LEGO	O		
	MALL	O		
	AMCO	O		
	GRHE	O		
	RUDU	O		
	GREG	O		
	Coachwhip	O		
	CAWR	V		

General Comments:

* B = Burrow, C= Carcass, Fe = Feathers, Fu = Fur, N = Nest, O = Observed, S = Scat, T = Tracks, V = Vocalization

Biological Resources Survey Form

Project Name Big T Project # 2010-116 .006 Task G ~~Billing Group~~ Phase G9
Date 7/26/12 Survey Type LBVI #8

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	Coyote	OS		
	RSHA	V		
	BHGR	V		
	BUSH	O		
	OCWA	V		
	~~B~~ CATH	V		

General Comments:

* B = Burrow, C= Carcass, Fe = Feathers, Fu = Fur, N = Nest, O = Observed, S = Scat, T = Tracks, V = Vocalization

APPENDIX B

Wildlife Species Observed

Scientific Name	Common Name
AMPHIBIANS	
HYLIDAE	**TREEFROGS**
Pseudacris regilla	Pacific treefrog
RANIDAE	**TRUE FROGS**
Lithobates catesbeianus	American bullfrog**
REPTILES	
ANGUIDAE	**ALLIGATOR LIZARDS**
Elgaria multicarinata	southern alligator lizard
COLUBRIDAE	**EGG-LAYING SNAKES**
Masticophis flagellum	coachwhip
EMYDIDAE	**SLIDERS**
Trachemys scripta elegans	red-eared slider**
TEIIDAE	**WHIPTAILS AND RACERUNNERS**
Aspidoscelis tigris	western whiptail
PHRYNOSOMATIDAE	**SPINY LIZARDS**
Sceloporus occidentalis	western fence lizard
Uta stansburiana	side-blotched lizard
BIRDS	
ACCIPITRIDAE	**HAWKS**
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
AEGITHALIDAE	**BUSHTITS**
Psaltriparus minimus	bushtit
ANATIDAE	**DUCKS, GEESE AND SWANS**
Anas platyrhynchos	mallard
Branta canadensis	Canada goose
Oxyura jamaicensis	ruddy duck
APODIDAE	**SWIFTS**
Aeronautes saxatalis	white-throated swift
ARDEIDAE	**HERONS AND EGRETS**
Ardea alba	great egret
Ardea herodias	great blue heron
Butorides virescens	green heron
Nycticorax nycticorax	black-crowned night heron

Scientific Name	Common Name
BOMBYCILLIDAE	**WAXWINGS**
Bombycilla cedrorum	cedar waxwing
CARDINALIDAE	**GROSBEAKS AND BUNTINGS**
Pheucticus melanocephalus	black-headed grosbeak
COLUMBIDAE	**PIGEONS AND DOVES**
Zenaida macroura	mourning dove
Columba livia	rock pigeon**
CORVIDAE	**JAYS, CROWS, AND THEIR ALLIES**
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
EMBERIZIDAE	**SPARROWS AND THEIR ALLIES**
Melospiza melodia	song sparrow
Pipilo crissalis	California towhee
Pipilo maculatus	spotted towhee
FALCONIDAE	**FALCONS**
Falco sparverius	American kestrel
FRINGILLIDAE	**FINCHES**
Spinus lawrencei	Lawrence's goldfinch
Spinus psaltria	lesser goldfinch
Spinus tristis	American goldfinch
Carpodacus mexicanus	house finch
HIRUNDINIDAE	**SWALLOWS**
Hirundo rustica	barn swallow
Petrochelidon pyrrhonota	cliff swallow
Stelgidopteryx serripennis	northern rough-winged swallow
ICTERIDAE	**BLACKBIRDS AND ORIOLES**
Agelaius phoeniceus	red-winged blackbird
Molothrus ater	brown-headed cowbird
MIMIDAE	**MOCKINGBIRDS AND THRASHERS**
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
ODONTOPHORIDAE	**NEW WORLD QUAIL**
Callipepla californica	California quail
PARULIDAE	**WOOD-WARBLERS**
Dendroica petechia	yellow warbler*
Geothlypis trichas	common yellowthroat
Vermivora celata	orange-crowned warbler
PHALACROCORACIDE	**CORMORANTS**
Phalacrocorax auritus	double-crested cormorant
PICIDAE	**WOODPECKERS**
Colaptes auratus	northern flicker
Melanerpes formicivorus	acorn woodpecker

Scientific Name	**Common Name**
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	downy woodpecker
PODICIPEDIDAE	**GREBES**
Podilymbus podiceps	pied-billed grebe
RALLIDAE	**RAILS**
Fulica americana	American coot
STURNIDAE	**STARLINGS AND MYNAS**
Sturnus vulgaris	European starling**
STRIGIDAE	**OWLS**
Bubo virginianus	great horned owl
SYLVIIDAE	**GNATCATCHERS, KINGLETS, OLD WORLD WARBLERS**
Chamaea fasciata	wrentit
THRAUPIDAE	**TANAGERS**
Piranga ludoviciana	western tanager
TROCHILIDAE	**HUMMINGBIRDS**
Archilochus alexandri	black-chinned hummingbird
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
TROGLODYTIDAE	**WRENS**
Campylorhynchus brunneicapillus	cactus wren
Thryomanes bewickii	Bewick's wren
TURDIDAE	**BLUEBIRDS**
Turdus migratorius	American robin
TYRANNIDAE	**TYRANT FLYCATCHERS**
Contopus cooperi	olive-sided flycatcher*
Empidonax difficilis	Pacific-slope flycatcher
Empidonax traillii	willow flycatcher***
Myiarchus cinerascens	ash-throated flycatcher
Sayornis nigricans	black pheobe
Sayornis saya	Say's phoebe
VIREONIDAE	**VIREOS**
Vireo huttoni	Hutton's vireo
MAMMALS	
CANIDAE	**DOGS**
Canis lupus familiaris	domestic dog**
Canis latrans	coyote
DIDELPHIDAE	**OPOSSUMS**
Didelphis virginiana	Virginia opossum
FELIDAE	**CATS**
Lynx rufus	bobcat
LEPORIDAE	**HARES AND RABBITS**
Syvilagus audubonii	desert cottontail

Scientific Name	Common Name
MURIDAE	**MICE AND RATS**
Neotoma fuscipes	dusky-footed woodrat (nest)
EQUIDAE	**HORSES AND ALLIES**
Equus caballus	horse**
SCIURIDAE	**SQUIRRELS**
Spermophilus beecheyi	California ground squirrel

* California Department of Fish and Game (CDFG) Species of Special Concern (SSC)
** nonnative species
*** state-listed endangered species

APPENDIX C

Plant Species Observed

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
Rhus integrifolia	lemonade sumac
Toxicodendron diversilobum	Pacific poison oak
APIACEAE	**CARROT FAMILY**
*Conium maculatum**	poison hemlock
*Foeniculum vulgare**	sweet fennel
APOCYNACEAE (or ASCLEPIADACEAE)	**DOGBANE FAMILY**
*Vinca major**	periwinkle
ASTERACEAE	**SUNFLOWER FAMILY**
*Ageratina adenophora**	sticky eupatory
Ambrosia acanthicarpa	annual bursage
Ambrosia artemisiifolia	annual ragweed
Artemisia californica	coastal sagebrush
Artemisia douglasiana	California mugwort
Artemisia dracunculus	wild tarragon
Baccharis salicifolia	mule fat
*Carduus pychocephalus**	Italian thistle
*Centaurea melitensis**	tocalote
Cirsium occidentale var. *occidentale*	cobweb thistle
Conyza canadensis	Canadian horseweed
Heterotheca grandiflora	telegraph weed
Heterotheca sessiliflora	golden aster
*Lactuca serriola**	prickly lettuce
Lepidospartum squamatum	scalebroom
Malacothrix saxatilis	cliff desert dandelion
Pluchea odorata	salt marsh fleabane
Pseudognaphalium biolettii (bicolor)	bicolor cudweed
Pseudognaphalium canescens	fragrant everlasting
Rafinesquia californica	California plumeseed
Senecio flaccidus var. *douglasii*	sand-wash butterweed
*Sonchus asper**	spiny sowthistle
*Sonchus oleraceus**	common sowthistle
Stephanomeria pauciflora var. *pauciflora*	wire-lettuce

Scientific Name	Common Name
*Tanacetum parthenium**	feverfew
*Taraxacum officinale**	common dandelion
BETULACEAE	**BIRCH FAMILY**
Alnus rhombifolia	white alder
BIGNONIACEAE	**BIGNONIA FAMILY**
*Catalpa bignonioides**	southern catalpa
BRASSICACEAE	**MUSTARD FAMILY**
*Hirschfeldia incana**	shortpod mustard
*Lobularia maritime**	sweet alyssum
Nasturtium officinale	watercress
*Sisymbrium altissimum**	tumble mustard
CACTACEAE	**CACTUS FAMILY**
Opuntia littoralis	coastal prickly pear
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**
Sambucus nigra ssp. *caerulea (= S. mexicana)*	blue elderberry
*Stellaria media**	common chickweed
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Chenopodium sp.	goosefoot
CRASSULACEAE	**STONECROP FAMILY**
Dudleya lanceolata	coastal dudleya
CURCURBITACEAE	**GOURD FAMILY**
Marah macrocarpus	Cucamonga manroot
CUSCUTACEAE	**DODDER FAMILY**
Cuscuta sp.	dodder
*Chamaesyce maculata**	spotted spurge
Croton californicus	croton
*Euphorbia peplus**	petty spurge
*Ricinus communis**	castor bean
FABACEAE	**PEA FAMILY**
Acmispon scoparius (= Lotus s.)	common deerweed
*Medicago sativa**	alfalfa
*Spartium junceum**	Spanish broom
FAGACEAE	**OAK FAMILY**
Quercus agrifolia	California live oak
Quercus berberidifolia	scrub oak
GERANIACEAE	**GERANIUM FAMILY**
*Erodium cicutarium**	red stemmed filaree
*Geranium rotundifolium**	roundleaf geranium
GROSSULARIACEAE	**GOOSEBERRY FAMILY**
Ribes aureum	golden currant
HYDROPHYLLACEAE	**WATERLEAF FAMILY**
Eriodictyon crassifolium	thickleaf yerba santa
Phacelia ramosissima	branching phacelia
JUGLANDACEAE	**WALNUT FAMILY**

Scientific Name	Common Name
Juglans californica (List 4.2)	southern California walnut
LAMIACEAE	**MINT FAMILY**
*Marrubium vulgare**	horehound
Salvia mellifera	black sage
Stachys sp.	hedge nettle
LOASACEAE	**LOASA FAMILY**
Mentzelia laevicaulis	smoothstem blazingstar
MALVACEAE	**MALLOW FAMILY**
*Ficus carica**	edible fig
*Malva parviflora**	cheeseweed
*Malva sylvestris**	high mallow
MYRTACEAE	**MYRTLE FAMILY**
Eucalyptus sp. *	gum tree
NYCTAGINACEAE	**FOUR O'CLOCK FAMILY**
*Mirabilis jalapa**	four o'clock
OLEACEAE	**OLIVE FAMILY**
*Fraxinus uhdei**	evergreen ash
Fraxinus velutina	velvet ash
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissonia bistorta	California sun cup
Camissonia californica	California evening primrose
Clarkia unguiculata	elegant clarkia
Epilobium brachycarpum	tall annual willowherb
Oenothera elata	evening primrose
PAPAVERACEAE	**POPPY FAMILY**
Eschscholzia californica	California poppy
PLANTAGINACEAE	**PLANTAIN FAMILY**
*Plantago major**	common plantain
*Plantago psyllium**	sand plantain
PLATANACEAE	**PLANE TREE FAMILY**
Platanus racemosa	western sycamore
POLEMONIACEAE	**PHLOX FAMILY**
Eriastrum densifolium	giant woolly star
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum fasciculatum	California buckwheat
Eriogonum gracile	slender wooly buckwheat
Polygonum hydropiperoides	swamp smartweed
Pterostegia drymarioides	California thread-stem
Rumex sp.	dock
*Rumex crispus**	curly dock
*Rumex pulcher**	fiddle dock
PRIMULACEAE	**PRIMROSE FAMILY**
*Anagallis arvensis**	scarlet pimpernel
RANUNCULACEAE	**BUTTERCUP FAMILY**
Delphinium cardinale	scarlet larkspur

Scientific Name	Common Name
RHAMNACEAE	**BUCKTHORN FAMILY**
Ceanothus sp.	ceanothus
ROSACEAE	**ROSE FAMILY**
Heteromeles arbutifolia	toyon
Prunus ilicifolia ssp. *ilicifolia*	holly-leaf cherry
Rosa californica	California rose
Rubus ursinus	California blackberry
SALICACEAE	**WILLOW FAMILY**
Populus fremontii	Fremont's cottonwood
Salix exigua	narrowleaf willow
Salix gooddingii	Goodding's 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 attenuata	coyote tobacco
*Nicotiana glauca**	tree tobacco
Solanum americanum	American black nightshade
ULMACEAE	**ELM FAMILY**
*Ulmus parvifolia**	Chinese elm
URTICACEAE	**NETTLE FAMILY**
*Urtica dioica**	stinging nettle
VITACEAE	**GRAPE FAMILY**
Vitis girdiana	desert wild grape
ZYGOPHYLLACEAE	**CALTROP FAMILY**
*Tribulus terrestris**	puncture vine
ANGIOSPERMS (MONOCOTYLEDONS)	
AGAVACEAE (or LILIACEAE)	**AGAVE FAMILY**
Hesperoyucca whipplei (=Yucca w.)	chaparral yucca
AMARYLLIDACEAE	
Amaryllis belladonna	belladona lily
ASPHODELACEAE	
*Aloe vera**	aloe
CYPERACEAE	**SEDGE FAMILY**
Cyperus sp.	flatsedge
*Cyperus involucratus**	umbrella plant
POACEAE	**GRASS FAMILY**
*Agrostis viridis**	bentgrass
*Arundo donax**	giant reed

Scientific Name	Common Name
*Avena barbata**	slender oat
*Avena fatua**	wild oat
*Bromus diandrus**	ripgut brome
*Bromus rubens**	red brome
*Cynodon dactylon**	bermuda grass
*Echinochloa crus-galli**	barnyard grass
*Ehrharta calycina**	perennial veldtgrass
*Lolium perenne**	perennial ryegrass
*Piptatherum miliaceum**	smilo grass
*Polypogon monspeliensis**	rabbitsfoot grass
*Schismus barbatus**	Mediterranean schismus
*Triticum aestivum**	common wheat
*Vulpia myuros**	rat-tail fescue

*nonnative species

APPENDIX I

Results of 2012 Focused Surveys for Southwestern Willow Flycatcher and Least Bell's Vireo

September 6, 2012

Ms. Mari Quillman
ECORP CONSULTING
1801 Park Court Place, Building B, Suite 103
Santa Ana, California 92701

Subject: Results of 2012 Focused Surveys for the Southwestern Willow Flycatcher and Least Bell's Vireo for the Big Tujunga Wash Mitigation Area

Dear Mari:

This letter reports the results of focused surveys to evaluate the presence or absence of the federally and state listed Endangered southwestern willow flycatcher (*Empidonax traillii extimus*) in cottonwood/willow riparian forest habitat in the Big Tujunga Wash Mitigation Area (Mitigation Area) in Los Angeles County, California. The federally and state listed least Bell's vireo (*Vireo pusillus bellii*) was also included as a focal species during each of the five surveys reported here. The County of Los Angeles Department of Public Works (LACDPW) purchased the 214-acre site in 1998 to serve as mitigation for their flood control projects throughout the county. The Mitigation Area is within the Big Tujunga floodplain, immediately downstream and south of the Interstate 210 freeway overcrossing, just west of the community of Sunland in the City of Los Angeles (Figure 1, attached). The riparian habitat is located between Wentworth Street, which forms most of the southern boundary, and Interstate 210, which forms part of the eastern and northern boundaries. The western boundary of the survey area occurs along transmission line towers.

The area surveyed extends approximately from the intersection of Wentworth Street and Interstate 210 at the east end of the site to the transmission line crossing of the wash 1,200 feet west of Wheatland Avenue. The total linear distance of the habitat is approximately one mile, but the width of the habitat varies considerably from an estimated 100 feet to over 600 feet in some areas. Big Tujunga Wash does not support similar riparian woodland upstream of Interstate 210, whereas similar habitat continues in the downstream direction in the Hansen Dam Park area.

BACKGROUND

The willow flycatcher (*Empidonax traillii*) is a state-listed Endangered species (CDFG 1991), whereas only the southwestern subspecies (*E.t. extimus*) is federally-listed as Endangered (USFWS 1995). This survey focused on the southwestern willow flycatcher because it is the only subspecies that nests in southern California. However, migrants of all the subspecies may occur in the area during spring and fall migration, so multiple visits to the survey area are required to determine if individuals observed during the first surveys are nesting birds.

The willow flycatcher was formerly a common summer resident in suitable habitat throughout California (Grinnell and Miller 1944). It has now been extirpated as a breeding bird from most of its California range, and is seriously threatened in southern California primarily because of habitat loss and degradation, and brood parasitism by brown-headed cowbirds (*Molothrus ater*) (Garrett and Dunn 1981; USFWS 1995). Critical habitat for the southwestern willow flycatcher was designated in 2005 (USFWS 2005).

The willow flycatcher closely resembles other Empidonax flycatcher species in California, but the indistinct (or completely lacking) eye ring, broader and longer bill, and generally lighter appearance through the breast and throat help to distinguish it from other species. The species' vocalizations are the best form of identification in the field (but can't be used to identify subspecies). The southwestern willow flycatcher is a migratory bird, occurring in this region only during the breeding season (late May to early August). The male arrives later in the spring than most migrants, usually in mid to late May or early June. Nests are constructed in thickets of trees and shrubs in a fork or horizontal branch between three and 15 feet above the ground.

The southwestern willow flycatcher breeds in riparian habitats along rivers, streams, or other wetlands in floodplains and broader canyons, preferring dense riparian thickets near surface water (Sogge et al. 2010), often with adjacent open areas for foraging. Vegetation structure, composition, and extent vary widely but generally include extensive areas dominated by dense stands of willows (*Salix* spp.), mule fat (*Baccharis salicifolia*), or other tree species (including tamarisk [*Tamarix* sp.] in some areas), usually with scattered cottonwood (*Populus* spp.) overstory (USFWS 1995). These riparian areas provide both nesting and foraging habitat. Southwestern willow flycatchers will nest in areas with suitable habitat regardless of the elevation (from sea level to high mountains).

EXISTING HABITAT

Riparian habitat in the survey area is dominated by southern cottonwood-willow riparian forest (Holland 1986). Arroyo willow (*Salix lasiolepis*) and mulefat are the most common species throughout, occurring in the area surrounding the ponds, the main stream channel across the length of the site, and as isolated patches and "fingers" of habitat away from the main stream. Red willow (*Salix laevigata*) and black willow (*Salix goodingii*) are well represented, and occasional individuals of Fremont's cottonwood (*Populus fremontii*) and white alder (*Alnus rhombifolia*) form the canopy over the shrubbier arroyo willows. The understory is dominated by sticky eupatorium (*Ageratina adenophora*), mugwort (*Artemisia douglasiana*), and poison oak (*Toxicodendron diversilobum*). A diverse mix of native annuals, grasses, and sedges make up the herbaceous layer. The riparian forest occupies approximately 61 acres.

Habitat restoration and enhancement measures were implemented to improve habitat quality. Approximately 15 acres of giant reed (*Arundo donax*) were removed from the riparian forest habitat in 2000, and mulefat and arroyo willow cuttings were planted throughout the area. Extensive areas that were formerly dominated by giant reed appear now to be suitable nesting habitat for the southwestern willow flycatcher. Other management actions to restrict recreational use of the area have also resulted in higher quality habitat.

METHODS

Prior to conducting the focused survey, a search was conducted of the California Natural Diversity Data Base (CDFG 2012) and other references to determine if and to what extent the southwestern willow flycatcher is known to occur in the project region.

Focused surveys for the southwestern willow flycatcher were conducted by Mr. Brian Leatherman (USFWS permit # TE 827493-6; CDFG MOU). Survey methods followed the guidelines developed by the U. S. Fish and Wildlife Service as described below. Observations of the listed species were recorded in the field and waypoints were taken using GPS technology for mapping purposes. The focus of the surveys was on the detection and identification of the target species, but all wildlife incidentally observed or detected on the Mitigation Area was documented. Identifications were made with the aid of 8 X 42 Bosch & Lomb Elite binoculars. A list of the species observed during the surveys is enclosed.

The surveys for the southwestern willow flycatcher followed the mandatory protocol developed by Sogge et. al (2010) and guidance promulgated by the U. S. Fish and Wildlife Service (USFWS 2000). This protocol requires that five surveys be conducted within three certain periods between May 15 and July 17. Sogge et. al (2010) recommend that surveys be conducted between dawn and 10:30 a.m. under suitable weather conditions. Surveys reported here were generally conducted between dawn and 11:30 a.m. because of the two dimensional depth of suitable habitat in some areas (which takes longer to survey than linear habitats). The habitat requirements and survey methods for the least Bell's vireo are consistent with the flycatcher's and focused surveys can be conducted concurrently. Dates, times and weather data for the focused surveys are shown in Table 1.

Table 1. Dates, Times and Weather Conditions for Willow Flycatcher Surveys

DATE	TIME		WEATHER CONDITIONS		
	Start	Finish	Temp. (°F)	Ave. Wind (mph)	Cloud Cover
5/21/2012	0530		59	0-2	0%
		1130	86	0-2	0%
6/4/2012	0530		65	0-2	100%
		1100	67	2-4	50%
6/18/2012	0530		61	0-2	40%
		1030	74	2-4	0%
7/2/2012	0530		59	0-2	0%
		1115	76	2-4	0%
7/16/2012	0530		57	0-2	100%
		1130	84	2-4	10%

The riparian habitat surveyed for southwestern willow flycatcher is irregularly shaped and includes two large ponds and a stream (with water). Generally, the upstream habitat is broad and more extensive (up to 600 feet wide), and the downstream habitat is roughly linear. Surveys were conducted by walking slowly and methodically along established trails under the canopy of the riparian habitat. Because of the width of the habitat in some areas, side routes were often taken from the main trails to survey interior habitat areas. Surveys were conducted from along the edge of the habitat when vegetation density precluded surveys from under the canopy. Taped vocalizations of the southwestern willow flycatcher were played every 50 to 100 feet in an attempt to elicit a response from potentially present individuals. The tape was played for roughly 15 seconds, stopped for one or two minutes to listen for a response, and then played again before moving to the next spot.

RESULTS

Two willow flycatchers were observed during the first focused survey on May 21, 2012. The locations of these sightings are shown in Figure 2. Both birds were detected when they were heard issuing several "fitz-bew" and "brrrit" calls in response to tape playback. Both of the willow flycatchers discontinued calling shortly after tape playback was stopped. Both flycatchers appeared to be solitary birds and neither exhibited behaviors to suggest that they were nesting. No willow flycatchers were observed during the subsequent four focused surveys.

Interpretation of the survey results, based on the guidelines provided in Sogge et. al (2010), leads to the conclusion that the observed willow flycatchers were migrants. Migrant willow flycatchers are expected to occur in the area during the spring and fall migration period (Garrett and Dunn 1981, Sogge et al. 2010); however, migrant flycatchers in this area are usually the more common northern subspecies (*E.t. brewsteri* and *E.t. adastus*), and not the federally endangered southwestern subspecies (*E.t. extimus*) (Unitt 1987). The first two survey periods (May 15-31 and June 1-24) are conducted during a time when migrant willow flycatchers of all three California subspecies might occur in the region. Unless nesting behavior is observed during these first two surveys, it is the final survey period (June 25 to July 17) in which detected birds are likely either breeding birds or non-breeding resident floaters (non-paired birds). Migrant willow flycatchers are typically no longer moving through the southwest during this third survey period.

No nesting southwestern willow flycatchers were reported in the vicinity in the California Natural Diversity Data Base (CDFG 2012). No critical habitat for the southwestern willow flycatcher was designated in the Big Tujunga watershed or any other streams in Los Angeles County when it was designated in 2005 (USFWS 2005). However, a proposed revision to the critical habitat designation includes a section of Big Tujunga Canyon that appears to encompass the Mitigation Area (USFWS 2011). Until the USFWS issues a final rule, the 2005 critical habitat designation remains in effect.

No least Bell's vireos were observed or detected during the focused surveys reported here.

Brown-headed cowbirds were not observed in the riparian habitat on the project site during the focused surveys this year. A cowbird trapping program is operated annually at the Mitigation

Area, and the presence of nearby traps are likely responsible for the lack of observations of free-ranging cowbirds in the area.

CONCLUSION

Focused surveys were conducted for the southwestern willow flycatcher in the Big Tujunga Wash Mitigation Area. Although two willow flycatchers were observed during the first survey, neither exhibited breeding behavior when observed, nor were they observed in the riparian habitat on subsequent surveys. The flycatchers were therefore considered migrants. Based on the lack of records for the region and the negative survey results during the final four focused surveys, the southwestern willow flycatcher is likely absent as a breeder at this time. The Mitigation Area currently is not within designated critical habitat but could be when the USFWS publishes its final rule on the 2012 proposed revision. No least Bell's vireos were observed or detected during the surveys.

A copy of this letter report will be sent to the USFWS and CDFG per the conditions of the 10(a)(1)(A) permit and MOU. Figures 1 and 2, the references cited, a list of the wildlife observed, and the required willow flycatcher survey forms are enclosed. Survey certification is provided below. It has been a pleasure to conduct this survey effort for ECORP Consulting. If you have any comments or questions regarding the information provided in this report you can reach me by phone at (714) 701-0863, or by email at bleathermanwlb@aol.com.

Sincerely,

LEATHERMAN BIOCONSULTING, INC.

Brian Leatherman
Principal Biologist

Enclosures

C:/...ecorp/ecorp.04/big twifl rpt 2012

CERTIFICATION:

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.

Brian Leatherman
Permit No. TE827493-6

10/1/2012
Date

REFERENCES

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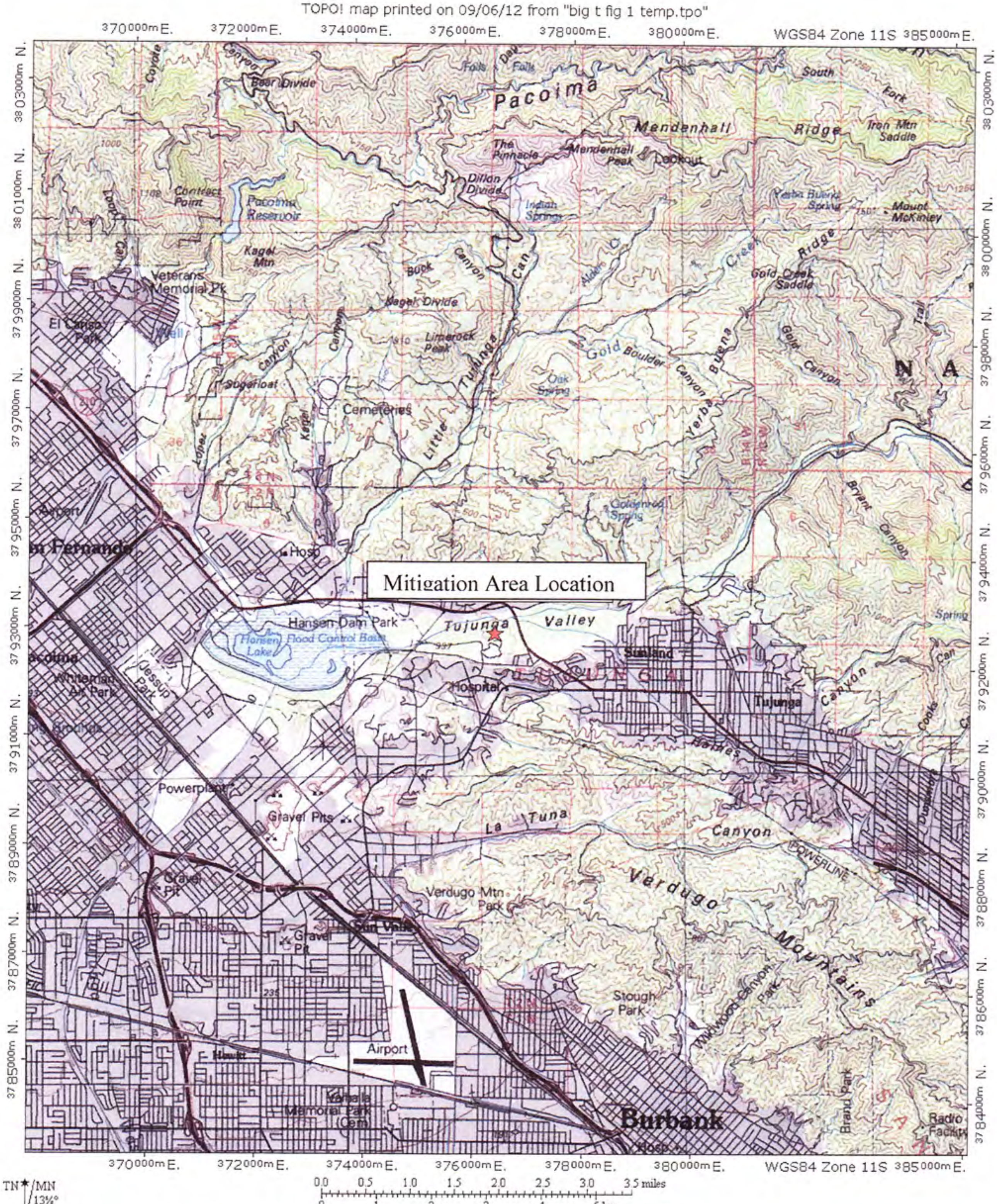
TOPO! map printed on 09/06/12 from "big t fig 1 temp.tpo"



Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

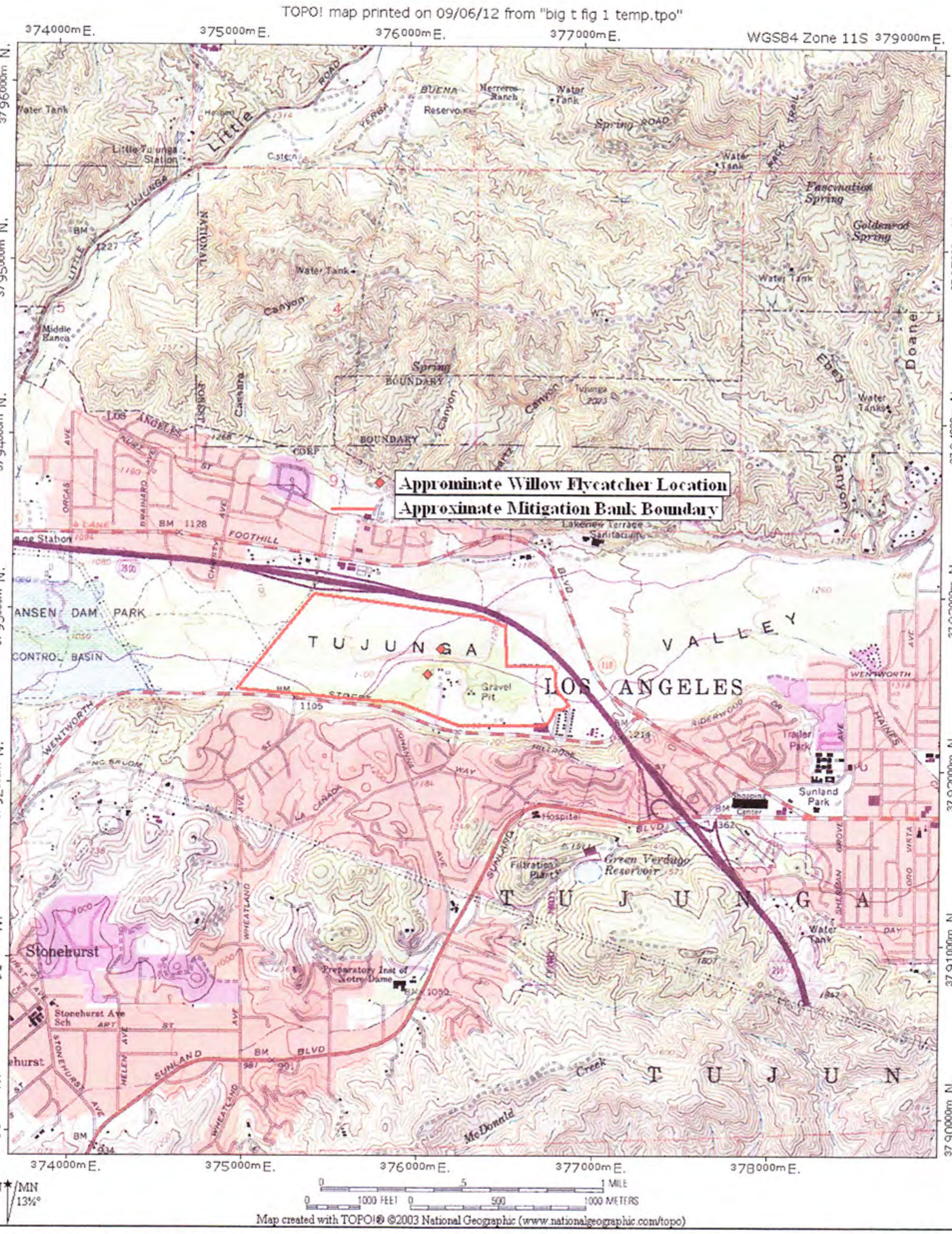
Big Tujunga Wash Mitigation Area

Project Region

Figure 1

LEATHERMAN BIOCONSULTING, INC.
Biological Surveys, Management & Monit.

Source: TOPO!



Big Tujunga Wash Mitigation Area

2012 Willow Flycatcher Locations

Figure 2

LEATHERMAN BIOCONSULTING, INC.
Biological Surveys, Management & Monit.

Source: TOPO! Sunland USGS quadrangle

The following is a list of species observed or detected on the project site. Non-native species are indicated by an asterisk. Species on CDFG's Special Animals list are indicated by two asterisks. Other species may have been overlooked or inactive/absent because of the season (amphibians are active during rains, reptiles during summer, some birds (and bats) migrate out of the area for summer or winter, some mammals hibernate etc.). Taxonomy and nomenclature generally follow Stebbins (2003) for amphibians and reptiles, AOU (1998) for birds, and Jones et al. (1992) for mammals.

SCIENTIFIC NAME	COMMON NAME
AMPHIBIA	**Amphibians**
Hylidae	**Treefrogs and allies**
Hyla regilla	Pacific treefrog
Ranidae	**True frogs**
* *Rana catesbeiana*	Bullfrog
REPTILIA	**Reptiles**
Emydidae	**Box and Water Turtles**
* *Trachemys scripta*	Red-eared slider
Phrynosomatidae	**Phrynosomatids**
Sceloporus occidentalis biseriatus	Western fence lizard
Uta stansburiana	Side-blotched lizard
Teiidae	**Whiptail lizards**
Cnemidophorus tigris	Western whiptail
Anguidae	**Alligator lizards**
Elgaria multicarinata	Southern alligator lizard
AVES	**Birds**
Podicipedidae	**Grebes**
Podilymbus podiceps	Pied-billed grebe
Phalacrocoracidae	**Cormorants**
Phalacrocorax auritus	Double-crested cormorant
Ardeidae	**Herons and Egrets**
Ardea herodias	Great blue heron
Butorides virescens	Green heron
Nycticorax nycticorax	Black-crowned night-heron
Anatidae	**Geese and ducks**
Anas platyrhynchos	Mallard
Accipitridae	**Raptors**
** *Accipiter cooperii*	Cooper's hawk
Buteo lineatus	Red-shouldered hawk
Buteo jamaicensis	Red-tailed hawk
Falconidae	**Falcons**
Falco sparverius	American kestrel
Odontophoridae	**Quail**
Callipepla californica	California quail
Rallidae	**Rails and coots**
Fulica americana	American coot

Columbidae	**Pidgeons and doves**
* *Columba livia*	Rock dove
Zenaida macroura	Mourning dove
Strigidae	**Owls**
Bubo virginianus	Great-horned owl
Trochilidae	**Hummingbirds**
Archilochus alexandri	Black-chinned hummingbird
Calypte anna	Anna's hummingbird
Picidae	**Woodpeckers**
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	Downy woodpecker
Colaptes auratus	Northern flicker
Tyrannidae	**Tyrant flycatchers**
Empidonax difficilis	Pacific-slope flycatcher
Empidonax traillii	Willow Flycatcher (migrants only)
Sayornis nigricans	Black phoebe
Myiarchus cinerascens	Ash-throated flycatcher
Vireonidae	**Vireos**
Vireo huttoni	Hutton's vireo
Corvidae	**Jays and crows**
Aphelocoma californica	Western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Hirundinidae	**Swallows**
Stelgidopteryx serripennis	Northern rough-winged swallow
Petrochelidon pyrrhonota	Cliff swallow
Hirundo rustica	Barn swallow
Aegithalidae	**Bushtits**
Psaltriparus minimus	Bushtit
Troglodytidae	**Wrens**
Thryomanes bewickii	Bewick's wren
Timaliidae	**Wrentits**
Chamaea fasciata	Wrentit
Mimidae	**Mockingbirds and thrashers**
Mimus polyglottos	Northern mockingbird
Toxostoma redivivum	California thrasher
Bombycillidae	**Waxwings**
Bombycilla cedrorum	Cedar waxwing
Parulidae	**Wood warblers**
** *Dendroica petechia*	Yellow warbler
Geothlypis trichas	Common yellowthroat
Thraupidae	**Tanagers**
Piranga ludoviciana	Western tanager
Emberizidae	**Towhees and sparrows**
Pipilo maculatus	Spotted towhee
Pipilo crissalis	California towhee
Melospiza melodia	Song sparrow
Cardinalidae	**Grosbeaks and buntings**
Pheucticus melanocephalus	Black-headed grosbeak
Icteridae	**Blackbirds and orioles**
Agelaius phoeniceus	Red-winged blackbird

Fringillidae	**Finches**
Carpodacus mexicanus	House finch
Carduelis psaltria	Lesser goldfinch
Carduelis tristis	American goldfinch
Carduelis lawrencei	Lawrence's goldfinch
MAMMALIA	**Mammals**
Leporidae	**Hares and rabbits**
Sylvilagus audubonii	Desert cottontail
Sciuridae	**Squirrels**
Spermophilus beecheyi	California ground squirrel
Muridae	**Old world rats and mice**
Neotoma fuscipes	Dusky-footed woodrat (nest)
Canidae	**Dogs/wolves/foxes**
* *Canis familiaris*	Domestic dog
Canis latrans	Coyote (scat, tracks)
Felidae	**Cats**
Lynx rufus	Bobcat
Equidea	**Horses and allies**
* *Equus caballus*	Domestic horse

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **Big Tujunga Wash Mitigation Area** State: **CA** County: **LA**

USGS Quad Name: **Sunland** Elevation: **350** (meters)

Creek, River, or Lake Name: **Big Tujunga Wash**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* **X** *No* ___

Survey Coordinates: Start: E **0376696m** N **3792613m** UTM Datum: **NAD83** (See instructions)

Stop: E **0375004m** N **3792532m** UTM Zone: **11S**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.
Survey # 1 Observer(s): Brian Leatherman	Date: 5/21/2012 Start: 5:30 Stop: 11:30 Total hrs: 6.0	2	0	0	0	Two individuals observed, both were migrants (not observed in subsequent surveys)	# Birds / Sex / UTM E / UTM N
Survey # 2 Observer(s): Brian Leatherman	Date: 6/4/2012 Start: 5:30 Stop: 11:00 Total hrs: 5.5						# Birds / Sex / UTM E / UTM N
Survey # 3 Observer(s): Brian Leatherman	Date: 6/18/2012 Start: 5:30 Stop: 10:30 Total hrs: 5.0						# Birds / Sex / UTM E / UTM N
Survey # 4 Observer(s): Brian Leatherman	Date: 7/2/2012 Start: 5:30 Stop: 11:15 Total hrs: 5.8						# Birds / Sex / UTM E / UTM N
Survey # 5 Observer(s): Brian Leatherman	Date: 7/16/2012 Start: 5:30 Stop: 11:30 Total hrs: 6.0						# Birds / Sex / UTM E / UTM N
Overall Site Summary. Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 28.0		Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ___ No X. If yes, report color combination(s) in the comments section on back of form and report to USFWS.	

Reporting Individual: **Brian Leatherman** Date Report Completed: **9/6/2012**

US Fish & Wildlife Service Permit #: **TE827493-7** State Wildlife Agency Permit #: **SC-001562**

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Brian Leatherman** Phone # **(714)701-0863**
Affiliation **Leatherman BioConsulting, Inc.** E-mail bleathermanwlb@aol.com
Site Name **Big Tujunga Wash Mitigation Area** Date report Completed **9/6/2012**
Was this site surveyed in a previous year? Yes____ No____ Unknown_X__
Did you verify that this site name is consistent with that used in previous yrs? Yes____ No____ Not Applicable____
If name is different, what name(s) was used in the past? ____
If site was surveyed last year, did you survey the same general area this year? Yes____ No____ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes x No____ If no, summarize below.

Management Authority for Survey Area: Federal____ Municipal/County X State____ Tribal____ Private____
Name of Management Entity or Owner (e.g., Tonto National Forest) **LADPW**

Length of area surveyed: **1.7** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)
____ Mixed native and exotic plants (mostly native, 50 - 90% native)
____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)
____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Alnus rhombifolia, Populus fremontii, Salix spp

Average height of canopy (Do not include a range): **10** (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

APPENDIX J

2012 Focused Arroyo Toad Surveys

FINAL

2012 Focused Arroyo Toad Surveys for the Big Tujunga Wash Mitigation Area

Prepared for:
County of Los Angeles
Department of Public Works
900 S. Fremont Avenue
Alhambra, California 91803-1331

Prepared by:
ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
1801 Park Court Place
Building B, Suite 103
Santa Ana, California 92701

August 2012

2012 Focused Arroyo Toad Surveys
for the
Big Tujunga Wash Mitigation Area

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SUMMARY

Focused surveys were conducted in 2012 for the federally listed endangered arroyo toad (*Anaxyrus californicus*) as part of the endangered native wildlife monitoring program for the Big Tujunga Wash Mitigation Area. Focused surveys consisted of six paired daytime and nighttime surveys, following the U.S. Fish and Wildlife Service protocol. No arroyo toads were detected on the site during these surveys. Incidental observations over the course of the surveys identified three special-status fish species and one special-status reptile species: Santa Ana sucker (*Catostomus santaanae*), a federally listed as threatened species and a California Department of Fish and Game (CDFG) Species of Special Concern (SSC); Santa Ana speckled dace (*Rhinichthys osculus* spp.3), a CDFG SSC; arroyo chub (*Gila orcuttii*), a CDFG SSC; and two-striped garter snake (*Thamnophis hammondii*), a CDFG SSC. In addition, the following nonnative species were also observed: American bullfrog (*Lithobates catesbeianus*), largemouth bass (*Micropterus salmoides*), bullhead species (*Ameirus* sp.), fathead minnow (*Pimephales promelas*), western mosquitofish (*Gambusia affinis*), and red swamp crayfish (*Procambarus clarkii*).

1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to summarize the methodology and findings of focused surveys for the federally listed endangered arroyo toad (*Anaxyrus californicus*) conducted by ECORP Consulting, Inc. (ECORP) at the Big Tujunga Wash Mitigation Area (Mitigation Area). The surveys were conducted to determine the presence/absence of arroyo toad as part of implementation of the endangered native wildlife monitoring program in accordance with the Master Mitigation Plan (MMP) for the site.

The MMP was first 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 MMP 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 MMP included programs for the removal of nonnative (invasive) species, development of a formal trails system, and development of public awareness and education program at the site. Implementation of the MMP 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 was contracted by the Los Angeles County Department of Public Works (LACDPW) in July 2007 to continue MMP activities as part of implementation of the Long-term Management Plan (LTMP).

1.2 Location and Setting

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

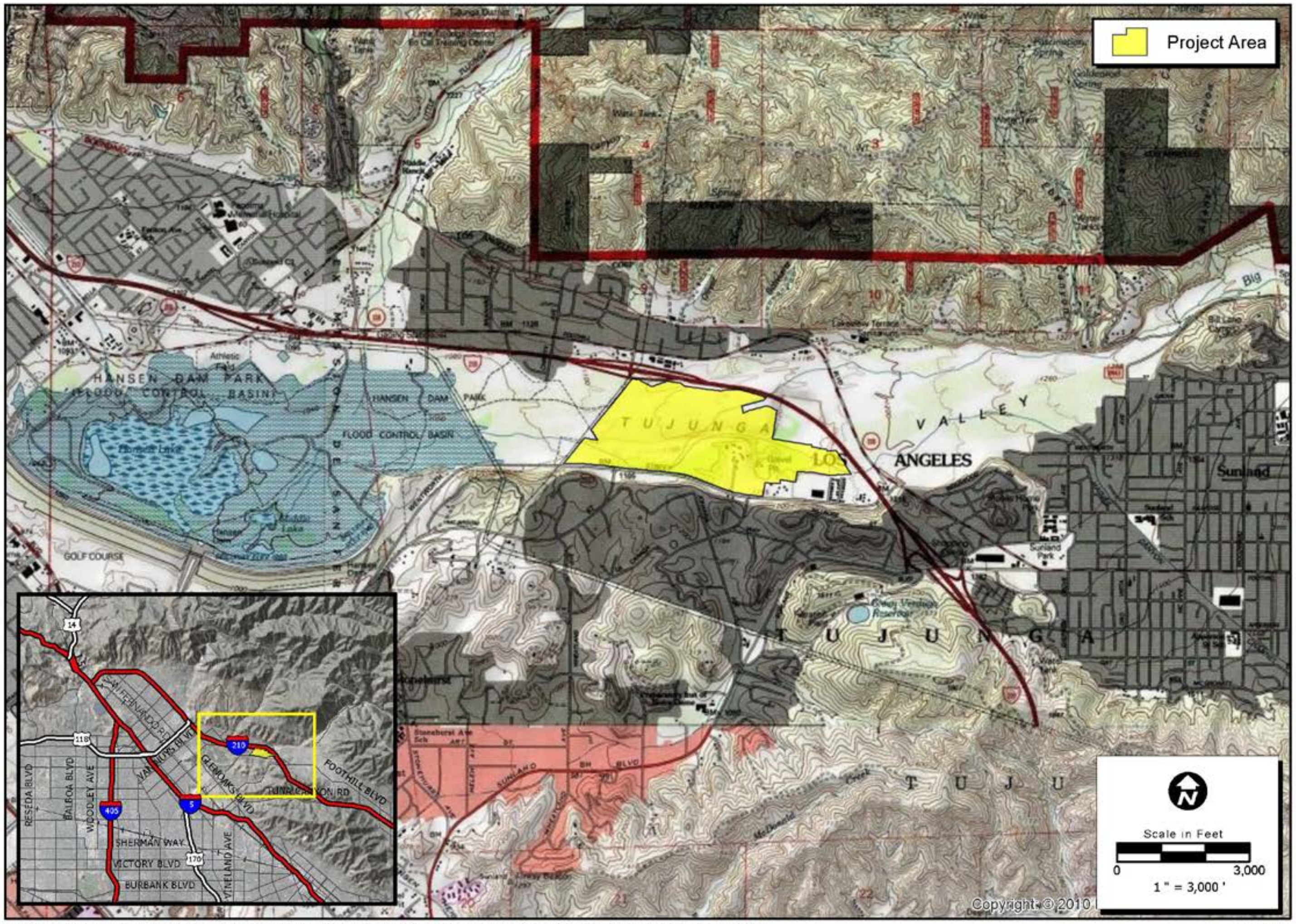
The Mitigation Area supports two watercourses: Big Tujunga Wash and Haines Canyon Creek (Figure 2). Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam. Water flow within the Big Tujunga Wash is dependent on controlled releases from the Big Tujunga Dam (approximately 12 miles to the northeast) and from local rainfall. Flow is therefore intermittent, leaving it dry for large portions of the year. 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. Water flow is perennial and is 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. Between the two watercourses, suitable habitat for arroyo toad is only found in the Big Tujunga Wash.

1.3 Arroyo Toad Natural History

The arroyo toad is federally listed as endangered and is a CDFG SSC (CDFG 2011). Formerly considered a subspecies of the western toad (*Anaxyrus boreas*), the arroyo toad was afforded full species status in the 1990s (USFWS 1999). The arroyo toad is a riverine amphibian of coastal streams and waterways of southern California. Arroyo toads occur in coastal southern California from the Salinas River Basin in Monterey and San Luis Obispo Counties south to northern Baja California, Mexico. Arroyo toad habitat is typically found within wide, terraced riparian floodplains rather than in narrow, rocky channels with “plunge” pools. Sandy river washes are an integral component of their habitat and they typically prefer an open, rather than closed, riparian canopy (USFWS 2005). They are associated with riparian habitat containing sandy braided streambeds with stands of cottonwood (*Populus* spp.), western sycamores (*Plantus racemosa*), and willows (*Salix* spp.). Arroyo toads aestivate outside of flooded portions of these streams during the rainy season until April to June, when the waters have receded to form exposed shallow pools and rivulets with a slow current (Stebbins 2003).

Key identification features for arroyo toads are a light-colored, v-shaped stripe between the eyelids, light coloration on the sacral humps, and a faded coloration on the frontal portion of the parotid glands (Camp 1915). Adult arroyo toads are nocturnal and breed within gently flowing portions of stream habitats. The males vocalize the breeding call, a long and high-pitched trill, from their breeding streams. Females locate the males and then lay eggs in shallow, sandy parts of streams having sandy or small gravel beds (Jennings and Hayes 1994). Eggs are small, dark, and deposited in strings in streams along shallow, quiet rivulets, and along the edges of pools with little or no water movement. Listening for calling male toads is a reliable way to detect this species.

Females lay eggs from March to July; however, the season may be extended during exceptionally wet years. Tadpoles develop within 65 to 85 days, during which they are vulnerable to predation and water quality disturbances (Stebbins 2003). Tadpoles tend to be



Location: N:\2010\2010-116 Big Tujunga Wash Mitigation Area\MAPS\Mitigation_Monitoring\Report_2011\Tujunga_ProjectVicinity_AT_20120807.mxd *(ekeethe 8/7/2012)*

8/7/2012

Figure 1. Project Location

2012 Focused Arroyo Toad Surveys
Big Tujunga Wash Mitigation Area
2011-116

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Aerial Date: DigitalGlobe March 2008
Map Date: 2012

Figure 2. Arroyo Toad Survey Area

2012 Focused Arroyo Toad Surveys
Big Tujunga Wash Mitigation Area
2011-116

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quite sedate, generally resting in shallow and quiet portions of the stream. Juvenile toads, which look like smaller versions of the adults, forage within sandy and sunny portions of their natal floodplain.

Due to the arroyo toad's particular habitat needs, they are vulnerable to several types of disturbances within floodplains (USFWS 2009). Most southern California riverine systems possess a modified hydrology due to placement of dams and water diversion structures. Unseasonal water releases (outside of the normal rainy season) from reservoirs are common occurrences with manipulated river systems. Any modification of the hydroperiod can have a negative effect on arroyo toad populations, potentially scouring deposited eggs and tadpoles that may be present, or reducing flows during periods when larvae are not yet ready to metamorphose. In addition, the pumping of groundwater from a stream channel may lower the water tables and alter the presentation of surface water habitat.

Manipulated systems can also have increased riparian vegetation, reducing the open sandbar habitat this species needs during its life cycle. Other forms of disturbance that affect toad populations include off-highway vehicle activity, pollution in the form of litter and hazardous waste contamination, human activity within drainage courses, and introduction of invasive aquatic predators such as the American bullfrog (*Lithobates catesbeianus*) or African clawed frog (*Xenopus laevis*). Multiple years of such manipulation may result in the extirpation of some arroyo toad populations.

2.0 METHODS

2.1 Literature Review

A review of the CDFG's California Natural Diversity Database (CNDDB) was performed before surveys were conducted to determine the nearest recorded location of arroyo toads to the survey area (CDFG 2012). In addition, a review of any known special-status species that have been documented in the Sunland and the 8 surrounding USGS 7.5-minute topographic quadrangles was conducted.

2.2 Arroyo Toad Survey Methodology

Focused surveys were conducted in the Big Tujunga Wash following the U.S. Fish and Wildlife Service (USFWS) Survey Protocol for the Arroyo Southwestern Toad (USWFS 1999), requiring both daytime and nighttime survey components to be conducted within the same 24-hour period. The presence of other vertebrates within the survey reach was also recorded. Six field surveys were conducted between April and July, with at least seven days between each survey and at least one survey performed in April, May, and June. Surveys were conducted by ECORP biologists Adam Schroeder and Brian Zitt (USFWS Arroyo Toad Recovery Permit TE-27460A-0). The locations of biological observations were recorded using a handheld Geographic Positioning System (GPS) unit (Garmin 60CSx™) in Universal Transverse Mercator (UTM) coordinates, North American Datum (NAD) 1983. The daytime survey component included an assessment of arroyo toad habitat suitability, as well as documenting the presence of any arroyo toad eggs, larvae, or juveniles. The entire portion of the stream channel was surveyed and appropriate routes for the nighttime survey were selected. Selected routes provided the most efficient access to allow for suitable listening stations for toad calls.

The nighttime surveys were conducted between one hour after dusk and midnight, when air temperatures at dusk were 55 degrees Fahrenheit (°F) or greater. These surveys consisted of walking slowly and carefully along stream banks to avoid impacting eggs and/or creation of excess siltation affecting water clarity. The arroyo toad is sensitive to both light and sound, and requires special survey methods. Headlights and flashlights were used sparingly during the survey to reach suitable listening stations. Once there surveyors remained still and silent for approximately 15 minutes listening for the toad's call. If no calls were detected, surveyors searched along the stream channel to visually locate toads using eye-shine techniques. During the surveys, every precaution was taken not to disturb potential breeding pools by stirring up excess silt deposits and care was taken to avoid injury to potentially occurring arroyo toads.

A digital camera was used to document toads and other wildlife during the surveys. Surveys were not conducted during adverse weather conditions such as rain, high winds, or flood flows or when a full or near-full moon would illuminate the survey area.

Plant and wildlife species were identified using a variety of sources, such as:

- *The Jepson manual* (Hickman 1993),
- *Western Amphibians and Reptiles* (Stebbins 2003),
- *The American Ornithologists' Union* (2012), and
- *Mammal Species of the World*. (Wilson and Reeder 2005).

3.0 RESULTS

This section summarizes the results of the arroyo toad surveys, including a literature review, site characteristics, plant communities, and incidental wildlife species. Representative photographs taken during the survey are included as Appendix A.

3.1 Literature Review

Results from the CNDDB records search of Sunland and the 8 surrounding quadrangles found the closest record to the Mitigation Area approximately 11 miles away in the Agua Dulce quadrangle within the Santa Clara River drainage in 2001. The nearest location in the same watershed was recorded upstream of the Big Tujunga Reservoir, approximately 14 miles from the Mitigation Area (CDFG 2012). Results of specimen records from the Los Angeles County Natural History Museum (LACNHM) indicate the last time specimens of the species were collected from Big Tujunga Wash was 1951 (HerpNET 2012).

3.2 Arroyo Toad Survey Results

Throughout the survey period the Big Tujunga Wash, supplied by releases from the Big Tujunga Dam, sustained a continuously wetted stream channel. This low-gradient stream channel varied in width (approximately 10 to 40 feet) and depth (from a few inches to 2 feet) with a mix of substrate types consisting of boulder, cobble, gravel, sand, and fine sediments. Flow habitats were characterized as a combination of riffle and glide with low-flow side channels and a few intermittent pools, mainly in areas upstream of rock dams.

The stream channel supports a variety of plants generally categorized as southern willow scrub and mule fat scrub (Holland 1986). Although dominated by willows and mule fat (*Baccharis salicifolia*) these plant communities included a mix of cottonwood, white alder (*Alnus rhombifolia*), western sycamore, elderberry (*Sambucus mexicana*), tree tobacco (Nicotiana *glauca*), tamarisk (*Tamarix* sp.), cattail (*Typha latifolia*), sedge (*Cyperus* spp.), sticky eupatory (*Ageratina adenophora*), giant reed (*Arundo donax*), petty spurge (*Euphorbia peplus*), and rabbits-foot grass (*Polypogon montspeliensis*). Filamentous algae, muskgrass (*Chara* spp.), and mosquito fern (*Azolla filoculoides*) were present in the stream portion of the channel. The upland habitat immediately adjacent to the stream channel consisted of a sparsely vegetated alluvial fan sage community.

Despite the presence of suitable habitat, no observations or vocalizations of arroyo toads were detected during the focused surveys. Table 1 below shows the weather conditions during each survey. Field data sheets from each survey are included as Appendix B.

Table 1. Weather Data for the Arroyo Toad Surveys

Date	Survey #	Surveyors	Survey Type	Time		Air Temp. (°F)		Water Temp. (°F)		Cloud Cover (%)		Wind Speed (mph)		Moon Phase
				Start	End	Start	End	Start	End	Start	End	Start	End	
4/23/12	1	BZ, AS	Day	1530	1851	60	59	62	61	100	100	2-4	2-4	New
			Night	2031	2254	60	58	60	60	100	100	0-2	0-2	
5/15/12	2	BZ, AS	Day	1730	1925	86	72	80	76	0	0	0-2	0-2	1/4
			Night	2050	2400	65	60	69	69	0	0	0-2	0-2	
6/12/12	3	BZ, AS	Day	1934	2029	76	74	78	76	0	0	0-2	0-2	1/4
			Night	2150	0120	74	61	74	71	0	0	0-2	0-2	
6/19/12	4	BZ, AS	Day	1850	2015	77	71	81	77	0	0	0-2	0-2	New
			Night	2135	0008	68	62	72	71	0	0	2-5	2-5	
6/26/12	5	BZ, AS	Day	1830	2010	83	70	81	78	0	0	3-5	3-5	1/4
			Night	2130	2400	67	60	72	70	0	0	0-2	0-2	
7/16/12	6	BZ, AS	Day	1640	1845	84	78	82	77	0	0	3-5	3-5	New
			Night	2200	0018	64	62	71	70	0	0	3-5	3-5	

BZ=Brian Zitt, AS=Adam Schroeder

3.3 Incidental Observations

Wildlife species recorded during the surveys were characteristic of wash and riparian habitats in the region. Seven species of fish were identified in the stream channel during the surveys. Native fishes included the federally threatened and CDFG SSC Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus* spp. 3), a CDFG SSC, and arroyo chub (*Gila orcutti*), a CDFG SSC. Nonnative fishes included bullhead species (*Ameirus* sp.), fathead minnow (*Pimephales promelas*), largemouth bass (*Micropterus salmoides*), and western mosquitofish (*Gambusia affinus*).

Five native reptile species were observed during the surveys. Common reptile species detected included side-blotched lizard (*Uta stansburiana*) and western fence lizard (*Sceloporus occidentalis*). A single adult two-striped garter snake (*Thamnophis hammondii*), a CDFG SSC, was observed in the stream channel during survey #2. Three native and one nonnative amphibian species, none of which possess state or federal protection status, were commonly observed during the course of the surveys. These species included the western toad, Baja California treefrog (*Pseudacris hypochondriaca hypochondriaca*), California treefrog (*Pseudacris cadaverina*) and American bullfrog. When observed, American bullfrogs were captured by-hand, processed (i.e., sexed, weighed, measured, and checked for stomach content), and removed from the site. A total of 19 American bullfrogs (13 adults, 5 juveniles, and 1 tadpole) were captured during the surveys. Native species observed within the stomach of captured American bullfrogs included a juvenile two-striped garter snake and Baja California treefrog.

Seventeen bird species were observed over the course of the surveys. Common bird species observed included black phoebe (*Sayornis nigricans*), common yellowthroat (*Geothlypis trichas*), killdeer (*Charadrius vociferous*), common raven (*Corvus corax*), and Anna's hummingbird (*Calypte anna*). Mammals were detected through tracks left on soft sand and mud associated with the wetted stream channel and included raccoon (*Procyon lotor*) and domestic dog (*Canis lupus familiaris*). Red swamp crayfish (*Procambarus clarkii*), a nonnative invertebrate, were also observed during the surveys. A complete listing of the species recorded during the surveys is included in Appendix C.

Throughout the course of the surveys evidence of human activity was observed in the survey area, including footprints, trash, graffiti, foot and horse trails, rock dams, and footbridges.

4.0 CONCLUSION

The arroyo toad is a habitat specialist, relying on specific features associated with larger river and wash systems in southern California. These features include seasonal flooding and inundation following drying periods. This natural cycle (hydroperiod) provides breeding opportunities for the species as winter flooding retracts and exposes shallow, slow moving breeding pools appropriate for the larval development of the toad's life cycle.

Any change or manipulation of the hydroperiod, through damming and/or controlling upstream water releases, can result in negative impacts to the toad's reproductive efforts by directly affecting larval and tadpole survival (USFWS 2009). A second negative impact of damming and/or controlling upstream water releases is reduction of high magnitude flood events. High magnitude flood events can be very important for setting up and maintaining physical characteristics within the stream channel that the arroyo toad is dependent upon. These physical characteristics include the deposition of loose sand and fine substrates in and adjacent to the wettest stream channel. These sand deposits form benches where adult toads forage and burrow during periods of activity, and aestivate during periods of reduced rainfall.

Within the survey area, bank and instream substrate types were largely dominated by cobbles and consolidated fines, with very little sand or gravel. The Big Tujunga Dam may be hindering development of suitable arroyo toad habitat in the downstream area by reducing the magnitude of flood events associated with winter rains, and altering the grain size of sediment moving through the system. Sandy benches, commonly associated with optimal arroyo toad habitat, were sparse throughout the survey area; however, the hydroperiod observed by surveyors was appropriate for native amphibians, with breeding pools forming in late winter and persisting through spring.

Observed disturbances that had the potential to negatively impact arroyo toad presence included foot and equestrian traffic, man-made rock dams, trash, and the presence of nonnative species. Arroyo toad eggs, larvae, and metamorphs are highly susceptible to trampling by humans on streamside flats at popular recreational sites (Sweet 1992). Rock dams impair the normal flow within the stream channel and can change sediment dispersal, stream habitat types (from riffle, rapid, or glide to deep pools or runs) and instream habitat complexity (presence of filamentous algae and aquatic macrophytes). In addition, these altered habitats often create suitable foraging and breeding habitat for invasive aquatic species. When rock dams were observed during the surveys they were taken down.

Nonnative species (plant and wildlife) were observed throughout the survey area. In general, nonnative plants have aggressive growth rates and the ability to survive in a variety of environmental conditions. They have the ability to alter the natural hydrology of a stream channel by reducing the availability of surface waters, eliminating sandbars, and altering upland habitats; all of which are required of the arroyo toad (USFWS 2009). Nonnative wildlife species impact natives through competition for resources. Nonnative wildlife species, particularly American bullfrogs, are major predators of arroyo toads (Stephenson and Calcarone 1999).

Arroyo toad adults, tadpoles, or eggs were not detected in the survey area despite the presence of suitable breeding habitat. There were, however, direct observations of successful reproduction by the closely related western toad. A search of the CNDDB and LACNHM resulted in no recent records for the species within the Big Tujunga watershed, and the closest extant record for the species being recorded in the Santa Clara watershed in 2001, approximately 11 miles away (CDFG 2012). With the most recent LACNHM records dating from 1951 for this species in the Big Tujunga drainage, it is likely that extirpation of the species took place decades ago. With no viable populations present downstream of the Big Tujunga Dam, natural re-colonization of the Big Tujunga Wash by the species is considered unlikely.

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APPENDIX A

Representative Site Photos

Photo A: The upper portion of the survey area looking upstream on April 23 2012.

Photo B: The lower portion of the survey area looking upstream on June 19 2012.

Photo C: Western toad egg strings observed on April 23 2012.

Photo D: Western toad tadpoles observed on April 23 2012.

Photo E: A western toad observed on April 23 2012.

Photo F: A two-striped garter snake observed on May 15 2012.

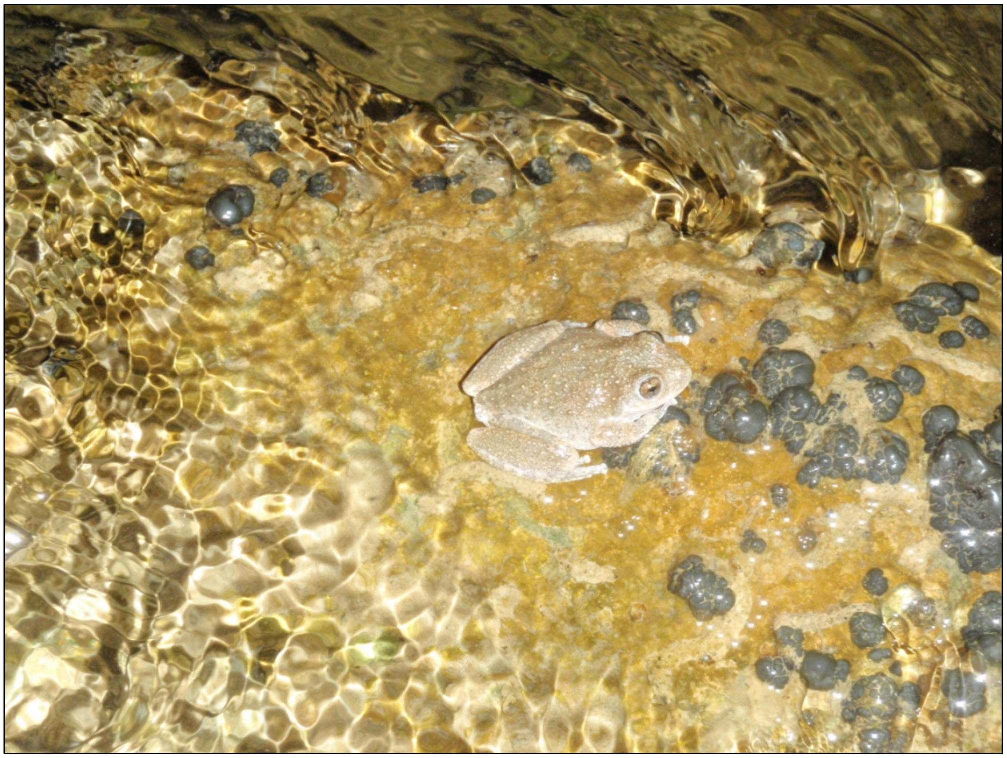

Photo G: A California treefrog observed on June 19 2012.

Photo H: A Baja California treefrog observed on April 23 2012.

Photo I: An American bullfrog captured on May 15 2012.

Photo J: An American bullfrog captured on May 15 2012 with a two-striped garter snake in its stomach.

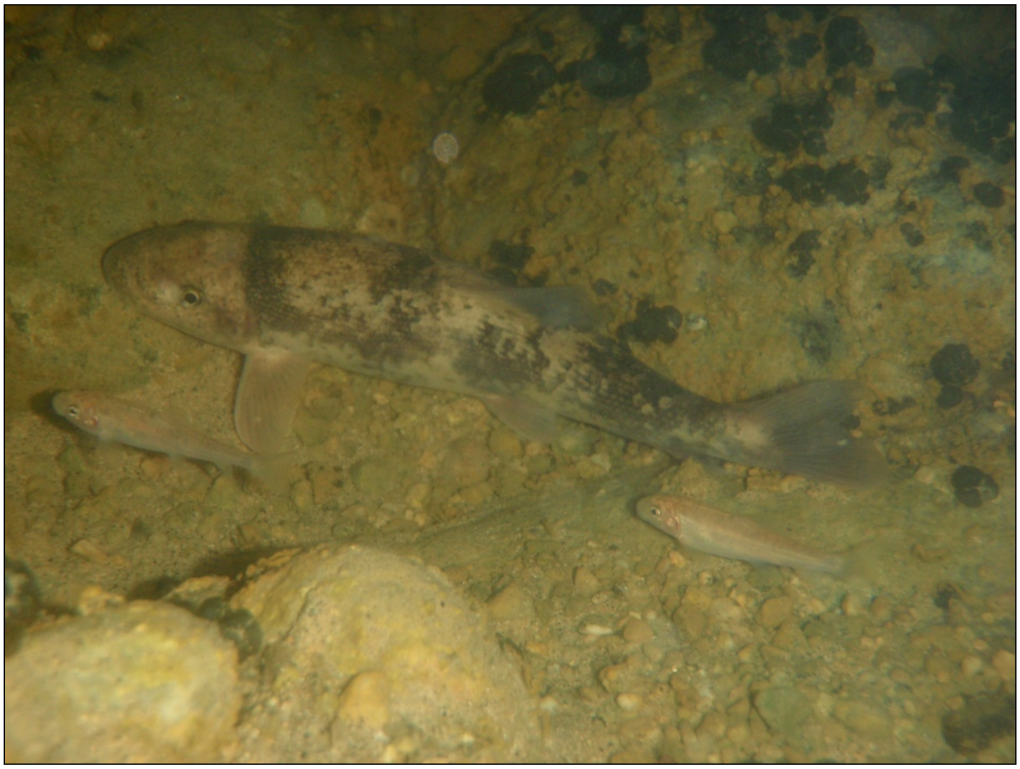

Photo K: An adult and two first year Santa Ana sucker observed on June 26 2012.

Photo L: An adult arroyo chub observed on June 19 2012.

Photo M: A juvenile largemouth bass captured on June 26 2012.

Photo N: A man-made rock dam observed on June 26 2012.

APPENDIX B

Survey Data Sheets

ARROYO TOAD (*Anaxyrus californicus*) SURVEY ECORP Consulting, Inc. ENVIRONMENTAL CONSULTANTS

Date: 23APR 2012 Project Name: BIG T MITIGATION BANK
Sunset Time (hrs): 19:31 Project Number: 2010-116.006 G 610
Survey Number: #1 Moon Phase (circle one): New 1/4 1/2 3/4 Full
Lead Surveyor Name: BRIAN ZITT
Other Personnel: ADAM SCHROEDER

DAYTIME SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (°F)	WIND (MPH)	SKY (% Clouds)
START	1530	60	2-4	100
STOP	1851	59	2-4	100

– lightly sprinkling

NIGHT SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (°F)	WIND (MPH)	SKY (% Clouds)
START	2031	60	0-2	100
STOP	2254	58	0-2	100

ARROYO TOAD RESULTS			
EGGS	LARVAE	JUVENILES	ADULTS with S/V LENGTH (If permitted)
Ø	Ø	Ø	Ø

SITE INFORMATION		
SURFACE WATER PRESENT Y/N: YES	SURVEY ACREAGE %:	PROPERTY ACREAGE: Surveyed Big T Wash from powerline to the 210 Fwy bridge.

NEAREST CROSS STREET(S): Wheatland Ave. / 210 Fwy

OTHER AMPHIBIANS OBSERVED/HEARD: W. toads (adults, eggs, tadpoles) no calls. Bullfrog (adult, juv. tad) removed, adults were calling.
Pac. t. californica / Baja P. treefrogs calling and obs. throughout survey area
n=18 n=3

DISTURBANCES OBSERVED: Dogs, trash, graffiti, rock dams, human tracks

VEGETATION COMMUNITIES: Banks lined w/ alder, cottonwood, mulefat, willow saplings and grasses
Instream, chara, live roots, woody debris, no algae. Exotic plants: eupatory, tree tobacco, tamarisk, castor beans

COMMENTS (Continue on back if needed, including sketch maps):
Water temp 59°F Obs. Santa Ana sucker X2 (~60mm TL) Continuously wetted good flow (7.3m/sec)
– juv. BF had treefrog in stomach.

Page 1 of 1

ARROYO TOAD (*Anaxyrus californicus*) SURVEY

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Date: 15MAY2012 Project Name: Big T Mitigation Bank
Sunset Time (hrs): 19:48 Project Number: 2010-116.006
Survey Number: #2 Moon Phase (circle one): New 1/4 1/2 3/4 Full
WANING CRESCENT
Lead Surveyor Name: B. Zitt
Other Personnel: A. Schroeder

DAYTIME SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (ºF)	WIND (MPH)	SKY (% Clouds)
START	1730	86°	0-2	0
STOP	1925	72°	>1	0

NIGHT SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (ºF)	WIND (MPH)	SKY (% Clouds)
START	2050	65°	0	0
STOP	2400	60°	0-2	0

ARROYO TOAD RESULTS			
EGGS	LARVAE	JUVENILES	ADULTS with S/V LENGTH (If permitted)
Ø	Ø	Ø	Ø

SITE INFORMATION

SURFACE WATER PRESENT Y/N: Yes
SURVEY ACREAGE %:
PROPERTY ACREAGE:

NEAREST CROSS STREET(S): Wheatland/210 freeway

OTHER AMPHIBIANS OBSERVED/HEARD: Western Toads, Treefrogs, Bullfrogs (5 males, 2 females, 1 sub-adult)

DISTURBANCES OBSERVED: trash, non-native species = gut content of one of the bullfrogs contained a juvenile two-striped garter snake.

VEGETATION COMMUNITIES:
In stream: Chara, azula, filamentous algae, rocks covered in periphyton, woody debris, live tree roots.
Bank vegetation: Mulefat, cottonwood, willow, alder, sedges/grasses

COMMENTS (Continue on back if needed, including sketch maps):
A lot of trash found on the site: clothing, bottles, cans, sleeping bags, food packaging
Obs. adult two-striped garter snake.

Page 1 of 1

ARROYO TOAD (*Anaxyrus californicus*) SURVEY ECORP Consulting, Inc. ENVIRONMENTAL CONSULTANTS

Date: June 12, 2012 Project Name: BIG T
Sunset Time (hrs): 2005 Project Number: 2010-116.006
Survey Number: #3 Moon Phase (circle one): New 1/4 1/2 3/4 Full Last Qtr.
Lead Surveyor Name: B Zitt
Other Personnel: A. Schroeder

DAYTIME SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (°F)	WIND (MPH)	SKY (% Clouds)
START	1934	76	0-2	0
STOP	2029	74	0-2	0

NIGHT SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (°F)	WIND (MPH)	SKY (% Clouds)
START	2150	74	0-2	0
STOP	0120	61	0-2	0

ARROYO TOAD RESULTS			
EGGS	LARVAE	JUVENILES	ADULTS with S/V LENGTH (If permitted)
Ø	Ø	Ø	Ø

SITE INFORMATION		
SURFACE WATER PRESENT Y/N: YES	SURVEY ACREAGE %:	PROPERTY ACREAGE:
NEAREST CROSS STREET(S): 210 fwy / Wheatland Ave.		
OTHER AMPHIBIANS OBSERVED/HEARD: OBS: W. toad (adults) Bullfrog (adults) B. california treefrog (adult & tads) Pacific treefrog (adults) HEARD: treefrogs		
DISTURBANCES OBSERVED: exotic species, trash, dogs		
VEGETATION COMMUNITIES:		
COMMENTS (Continue on back if needed, including sketch maps): Obs. 3 arroyo chub, 10 speckled dace, 39 largemouth bass, 1 Santa Ana Sucker (~70mm) Entire reach was wetted, still good flow although water levels have slightly receeded from previous visit. Water temp ranged from 78-71°F		

Page 1 of 1

ARROYO TOAD (*Anaxyrus californicus*) SURVEY ECORP Consulting, Inc. ENVIRONMENTAL CONSULTANTS

Date: 19JUN2012 Project Name: Big T mitigation bank
Sunset Time (hrs): 2007 Project Number: 2010-116.006
Survey Number: #4 Moon Phase (circle one): New ¼ ½ ¾ Full
Lead Surveyor Name: B ZITT
Other Personnel: A SCHROEDER

DAYTIME SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (°F)	WIND (MPH)	SKY (% Clouds)
START	1850	77	0-2	0
STOP	2015	71	0-2	0

NIGHT SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (°F)	WIND (MPH)	SKY (% Clouds)
START	2135	68	2-5	0
STOP	0008	62	2-5	0

ARROYO TOAD RESULTS			
EGGS	LARVAE	JUVENILES	ADULTS with S/V LENGTH (If permitted)
Ø	Ø	Ø	Ø

SITE INFORMATION

SURFACE WATER PRESENT Y/N: YES	SURVEY ACREAGE %:	PROPERTY ACREAGE:

NEAREST CROSS STREET(S): Wheatland/210 fwy

OTHER AMPHIBIANS OBSERVED/HEARD: W. toad, BF's (2 gravid females & 2 subadults) treefrogs

DISTURBANCES OBSERVED: trash, non-native species,

VEGETATION COMMUNITIES: BANK VEG: willow, cottonwood, mulefat, alder mix with sedges/grasses. Instream filamentous algae, chara, azolla live tree roots, woody debris, rocks covered w/ periphyton

COMMENTS (Continue on back if needed, including sketch maps): Several LMB (100-500 ind.) ranging from 60-100mm TL.
Still good flow ~ 0.3m/sec, level has dropped about 2-4" from last week. Raccoon tracks
Algae/chara beds forming - not dense.
Trash: tires, plastic bottles, containers, food packaging, styrofoam, clothing (boots, shoes, belts, pants, shirts, underwear) luggage, CDs/VHS tapes, paper cups, glass bottles

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ARROYO TOAD (*Anaxyrus californicus*) SURVEY ECORP Consulting, Inc. ENVIRONMENTAL CONSULTANTS

Date: JUN 26, 2012 Project Name: BIG T WASH MITIGATION BANK

Sunset Time (hrs): 2008 Project Number: 2010-116.006

Survey Number: #5 Moon Phase (circle one): New 1/4 ½ ¾ Full WAXING CRESCENT

Lead Surveyor Name: BRIAN ZITT

Other Personnel: ADAM SCHROEDER

DAYTIME SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (ºF) AIR	WIND (MPH)	SKY (% Clouds)
START	1830	83	3-5	0
STOP	2010	70	3-5	0

NIGHT SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (ºF)	WIND (MPH)	SKY (% Clouds)
START	2130	67	0-2	0
STOP	2400	60	0-2	0

ARROYO TOAD RESULTS			
EGGS	LARVAE	JUVENILES	ADULTS with S/V LENGTH (If permitted)
Ø	Ø	Ø	Ø

SITE INFORMATION

SURFACE WATER PRESENT Y/N: YES

SURVEY ACREAGE %:

PROPERTY ACREAGE:

NEAREST CROSS STREET(S): wheatland & 210 fwy bridge

OTHER AMPHIBIANS OBSERVED/HEARD:
W. toad Bullfrog
Ca. treefrog

DISTURBANCES OBSERVED: Non-native species, dogs, trash

VEGETATION COMMUNITIES:

COMMENTS (Continue on back if needed, including sketch maps): Largemouth bass (fingerling) throughout; One large bullhead sp.
AMCR, GBHE, MALL, KILL, BLPH,
Day water temp 8[illegible]°F
Night water temp 72°F
obs. 4 adult SAS (120, 120, 140, 150mm); several YOY (30-35mm)
YOY Dace n=15 (30-40mm)
YOY Chub n=20 (30-45mm) adult chub n=2 (75mm)

Flowing, wetted width ~15-20', depth ~6"-18"

Page ____ of ____

ARROYO TOAD (*Anaxyrus californicus*) SURVEY ECORP Consulting, Inc. ENVIRONMENTAL CONSULTANTS

Date: 7/16/2012 Project Name: Big T Wash Mit Bank
Sunset Time (hrs): 2004 Project Number: 2011-0116.006 G G10
Survey Number: #6 Moon Phase (circle one): New ¼ ½ ¾ Full
Lead Surveyor Name: Brian Zitt
Other Personnel: Adam Schroeder

DAYTIME SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (ºF)	WIND (MPH)	SKY (% Clouds)
START	1640	84	3-5	0
STOP	1845	78	3-5	0

NIGHT SURVEY CONDITIONS				
	TIME (Hrs)	TEMP (ºF)	WIND (MPH)	SKY (% Clouds)
START	2200	64	3-5	0
STOP	0018	62	3-5	0

ARROYO TOAD RESULTS			
EGGS	LARVAE	JUVENILES	ADULTS with S/V LENGTH (If permitted)
Ø	Ø	Ø	Ø

SITE INFORMATION		
SURFACE WATER PRESENT Y/N: YES	SURVEY ACREAGE %:	PROPERTY ACREAGE:
NEAREST CROSS STREET(S): Wheatland / Foothill / Cottonwood 210 fwy bridge		
OTHER AMPHIBIANS OBSERVED/HEARD: CA treefrogs, American bullfrogs		
DISTURBANCES OBSERVED: Invasive species - bullfrogs, Largemouth bass Dogs, trash, paints Rock dams		
VEGETATION COMMUNITIES: willow, mulefat, cottonwood, sycamore sedges, cattails, grasses Fil. algae, chara, azolla		
COMMENTS (Continue on back if needed, including sketch maps): Wash still has water, good flow wetted width ranging from 8-20' Santa Ana sucker & arroyo chub observed.		

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APPENDIX C

Wildlife Species List

APPENDIX C. Wildlife Species Observed Within and Adjacent to the Project Site

SCIENTIFIC NAME	COMMON NAME
MALACOSTRACA	**CRABS, LOBSTERS, SHRIMP**
Cambaridae	**Freshwater Crayfish**
* *Procambarus clarkii*	Red swamp crayfish
ACTINOPTERYGII	**RAY-FINNED FISHES**
Ictaluridae	**Catfishes and Bullheads**
* *Ameirus* sp.	Bullhead sp.
Poeciliidae	**Livebearers**
* *Gambusia affinis*	Western mosquitofish
Centrarchidae	**Sunfishes**
* *Micropterus salmoides*	Largemouth bass
Catostomidae	**Sucker Fishes**
Catostomus santaanae	Santa Ana sucker
Cyprinidae	**True Minnows**
* *Pimephales promelas*	Fathead minnow
Gila orcuttii	Arroyo chub
Rhinichthys osculus ssp. 3	Santa Ana speckled dace
AMPHIBIA	**AMPHIBIANS**
Bufonidae	**True Toads**
Anaxyrus boreas	Western toad
Hylidae	**Treefrogs and allies**
Pseudacris hypochondriaca hypochondriaca	Baja California treefrog
Pseudacris cadaverina	California treefrog
Ranidae	**True Frogs**
* *Lithobates catesbeianus*	American bullfrog
REPTILIA	**REPTILES**
Phrynosomatidae	**Spiny Lizards**
Sceloporus occidentalis	Western fence lizard
Uta stansburiana	Common side-blotched lizard
Teiidae	**Whiptails**
Aspidoscelis tigris	Western whiptail
Anguidae	**Alligator Lizards**
Elgaria multicarinata	Southern alligator lizard
Colubridae	**Colubrid Snakes**
Thamnophis hammondii	Two-striped garter snake
AVES	**BIRDS**
Anatidae	**Ducks, Geese, and Swans**
Anas platyrhynchos	Mallard
Ardeidae	**Herons, Bitterns, and Allies**
Ardea herodias	Great blue heron
Cathartidae	**New World Vultures**
Cathartes aura	Turkey vulture
Accipitridae	**Eagles, Hawks, Kites**
Buteo jamaicensis	Red-tailed hawk
Charadriidae	**Lapwings and Plovers**
Charadrius vociferus	Killdeer

Columbidae	**Pigeons, Doves**
Columba livia	Rock pigeon
Trochilidae	**Hummingbirds**
Calypte anna	Anna's hummingbird
Tyrannidae	**Tyrant Flycatchers**
Sayornis nigricans	Black phoebe
Myiarchus cinerascens	Ash-throated flycatcher
Corvidae	**Jays and Crows**
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Hirundinidae	**Swallows**
Stelgidopteryx serripennis	Northern rough-winged swallow
Parulidae	**Wood Warblers**
Geothlypis trichas	Common yellowthroat
Emberizidae	**Towhees and Sparrows**
Pipilo crissalis	California towhee
Melospiza melodia	Song sparrow
Zonotrichia leucophrys	White-crowned sparrow
Icteridae	**Blackbirds**
Agelaius phoeniceus	Red-winged blackbird
MAMMALIA	**MAMMALS**
Sciuridae	**Squirrels**
Spermophilus beecheyi	California ground squirrel
Leporidae	**Rabbits and Hares**
Sylvilagus audubonii	Desert cottontail
Canidae	**Dogs, Wolves, and Coyotes**
Canis latrans	Coyote (tracks)
* *Canus lupis familiaris*	Domestic dog (tracks)
Procyonidae	**Raccoons and Ringtails**
Procyon lotor	Northern raccoon (tracks)

* Nonnative species

APPENDIX K

Functional Analysis and Success Monitoring Studies

Functional Assessment / Success Monitoring Completion Memo

October 22, 2012
(2010-116.007/008)

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

SUBJECT: Completion of 2012 Functional Analysis/Success Monitoring Data Collection in the Cottonwood/Willow Restoration Areas at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu;

This memorandum serves as documentation of the functional analysis/success monitoring data collection completed for the Big Tujunga Wash Mitigation Area (Mitigation Area) and presents the preliminary findings of the studies completed. ECORP Consulting, Inc. (ECORP) biologists Cara Snellen, Tania Asef, and Carley Lancaster conducted the data collection effort on August 14, 15, and 16, 2012. Data collection was completed using a methodology previously established for the Mitigation Area. 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 2011 Functional Analysis and Success Monitoring Report. A modified version of the hydrogeomorphic (HGM) approach was used for the functional assessment of the riparian or floodplain habitat in the Mitigation Area. 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. The 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 2011 Functional Analysis and Success Monitoring Report.

Functional Analysis Results

Mature native trees formed an open canopy of approximately 55 percent cover in the riparian habitat at the Mitigation Area; no non-native trees are present. The native shrub understory, although poorly developed at 6.3 percent cover, was thriving relative to the non-native understory (0.2 percent cover). The results for percent cover of both native and non-native trees and shrubs in the Mitigation Area riparian habitat are summarized in Table 1.

Table 1. Percent Cover in the Mitigation Area Riparian Habitat

	Percent Cover	
Vegetation Layer	**Native**	**Non-native**
Tree	55.3	0.0
Shrub	6.3	0.2

Success Monitoring Results

Native tree species comprised a relatively open tree layer with approximately 44 percent cover; no non-native trees were present in the restoration areas. The shrub layer was apparently underdeveloped with native species accounting for approximately 11 percent and non-natives for 2 percent. Ground cover was slightly dominated by non-native species (13.4 percent) while cover of natives was approximately 9 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 2.

Table 2. Percent Cover in the Restoration Areas

	Percent Cover	
Vegetation Layer	**Native**	**Non-native**
Tree	43.8	0.0
Shrub	10.5	2.1
Ground	8.8	13.4

The complete results of the functional analysis data collection and success monitoring will be summarized in the 2012 annual report for the project; no separate functional analysis and success monitoring report will be produced for 2012.

ECORP's contract states that a progress invoice will be submitted at the completion of the success monitoring fieldwork and the submittal of this letter of verification. Therefore, the information within this memorandum provides evidence that the field work has been completed. If you have any questions regarding the contents of this memorandum, please contact me at (714) 648-0630.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: Cara Snellen DATE: October 22, 2012

Cara Snellen
Biologist

Methods, Results, and Discussion

Appendix K. Full Methods, Results, and Discussion of the 2012 Functional Analysis and Success Monitoring

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 willow riparian habitat in the Big Tujunga Wash Mitigation Area (Mitigation Area) with the baseline functional analysis previously completed on the site (Chambers 1998). The functional analysis is used as a tool to assess the overall success of the habitat restoration program initiated in late 2000. Additionally, success monitoring and analysis was implemented in 2009 as a quantitative method to specifically evaluate the performance of the riparian restoration areas. This document includes the results of the functional analysis and success monitoring for 2012.

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 wetland 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 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 (EV) were used for the functional assessment of willow 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 wetland function, three variables were added to address wildlife values. HGM implicitly assumes that wildlife values will be present if the wetland 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 the willow riparian habitat system, the evaluation variables are combined into algorithms that express their relationship in the most streamlined fashion possible. 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 among 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 among 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 among 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., $FU = (EV1*EV2 \ldots.*EVn)^{1/n}$) 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.

It was assumed that most evaluation variables used in the riparian model acted independently and contributed cumulatively to overall habitat function. Therefore, an additive function was used to describe the relationship among 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 willow 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 (e.g., 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 (Riparian 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 willow riparian habitat is:

$$FU_{willow} = \frac{[((STD+COV)EXO+CON+CAR+FPA+TOP)REG+URB+RAR+RIC+SPE]}{10}$$

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:

$$FCU = FU_{willow} * \text{Acres of willow riparian habitat}$$

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.
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% 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, 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).

Characteristics of Flood-prone Area (FPA) [cont'd]	
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.
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 a 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 2012 focused surveys and/or monitoring and maintenance activities. 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 2012 focused surveys and/or monitoring and maintenance activities. Suitable habitat present on the site.
Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	
0.0	Less than 10 species of wildlife detected during the 2012 focused surveys and/or monitoring and maintenance activities.

Terrestrial Wildlife (Vertebrate) Species Richness (RIC) [cont'd]	
0.2	Between 11 and 30 species of wildlife detected during the 2012 focused surveys and/or monitoring and maintenance activities.
0.5	Between 31 and 50 species of wildlife detected during the 2012 focused surveys and/or monitoring and maintenance activities.
0.7	Between 51 and 60 species of wildlife detected during the 2012 focused surveys and/or monitoring and maintenance activities.
1.0	Over 60 species of wildlife detected during the 2012 focused surveys and/or monitoring and maintenance activities.
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 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 Mitigation Area.

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, all of which comprise CAR.

A stratified random sampling scheme was used to avoid biased data collection. The points were selected by dividing the Mitigation Area willow 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 willow 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 grid segment. 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 used, with 80 trees and 80 shrubs measured, in the willow 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 willow riparian habitat. The sampling point locations for the Mitigation Area are shown in Figure 10-1 in the 2012 Annual Report; these sampling points were selected during initiation of the habitat restoration program in late 2000 (Chambers 2000). Field sampling for functional analysis was conducted on the site on August 14, 15, and 16, 2012.

Two classifications of vegetation (trees and shrubs) were included in the point-centered quarter measurements in the willow riparian habitat. The distance to the mid-point of 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 for each quarter of the sampling point. The distance to the mid-point of the nearest shrub, defined as a plant of small to medium height (i.e., between 0.5 and 2 m [1.6 and 6.6 ft]) with a woody base, was also measured for each quarter. Young individuals of the genus *Salix* were considered a shrub if their 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 willow riparian sampling locations in the Mitigation Area was impassable due to dense vegetation or steep topography. For those locations, the distance randomly selected to be walked to determine the second sampling point was estimated and the sampling point was then accessed by an alternate route. Alternatively, the distance was modified by reducing the number of paces in the selected compass direction to a passable extent.

2.2.2 Data Analysis

Functional analysis values for STD, COV, TOP, and CAR were determined by analyzing data collected for the willow 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 willow 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 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, 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 to 4 m (6.6 to 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 percent cover by 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, leaf litter, and detritus within the boundaries of each quadrat. These values were averaged to estimate 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 above 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 flat topography with no rocks or boulders to a value of 2 or greater for a transect with numerous boulders and/or slopes. Scores were averaged to determine a mean value per 100 linear meters (328.1 linear feet).

2.3 Success Monitoring and Analysis Methods

In order to provide a more thorough assessment of the willow 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). Twenty-four restoration areas were originally created within the Mitigation Area. However, when the habitat restoration plan was initiated in 2000, only 23 of the areas were included for monitoring (areas 1 through 22 and 24). Point transect lines, either 7.6 or 15.2 m (25 or 50 ft) in length, dependent on area dimensions, were established in the 10 selected restoration areas (areas 1 through 6, 11, 13, 19, and 22). 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 by 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 of natives, non-natives, and bare ground were also noted at each transect point for determination of native, non-native, and overall vegetation cover (i.e., both natives and non-natives).

Transect lines were established to best represent the restoration area as determined by the ECORP biological monitor on site. 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 used for each survey for consistency in photographic comparisons. All plant species were identified on site using the Jepson Manual and recorded to develop a compendium of plant species that occur in the Mitigation Area's willow riparian habitat. Transect locations within the sampled restoration areas for the Mitigation Area are shown in Figure 10-2 in the 2012 Annual Report. Field sampling for the success analysis was conducted in the Mitigation Area on August 14, 15, and 16, 2012.

3.0 RESULTS

3.1 Functional Analysis Results

Approximately 57 trees and 111 shrubs per acre were found in the willow riparian habitat at the Mitigation Area. All of the trees and approximately 90 percent of the shrubs encountered were native species. The trees form an open canopy throughout the site in most areas (61.9 percent cover overall) and the shrub understory is poorly developed at approximately 10 percent cover. The relative density of trees and shrubs at the community level was approximately 32 percent trees and 68 percent shrubs. However, overall tree cover dominated the community with a relative dominance value of approximately 86 percent. The results for overall density, relative density, dominance (percent cover), and relative dominance for the Mitigation Area willow riparian habitat are summarized in Table 3-1.

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	56.9	100.0	61.9	100.0
Shrubs	110.5	89.7	10.2	98.5
Non-native Species				
Trees	0.0	0.0	0.0	0.0
Shrubs	12.6	10.3	0.2	1.5
Summary All Species				
Trees	56.9	31.6	61.9	85.7
Shrubs	123.1	68.4	10.3	14.3

Overall organic cover was moderate at approximately 60 percent; however, cover of annual grasses was relatively low at approximately 9 percent. The average number of topographic features encountered per 100 m (328.1 ft) was approximately 20. 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 willow 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 m)
60.1	8.8	2.9	20.3

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 (no non-native trees). The density of native shrubs is moderate at 111 plants per acre, and native tree density is 57 individuals per acre. Native tree cover is approximately 62 percent overall, indicating a moderately open canopy. No non-native trees are present in the willow riparian habitat (0.0 percent cover). Despite the apparently underdeveloped shrub understory (10.2 percent natives and 10.3 percent overall), native shrubs are well-represented with a relative dominance value of approximately 99 percent. A score of 0.7 was selected to best represent the structural diversity of this habitat.

Riparian Habitat – Cover (COV)	
Score	**Criteria**
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.

Riparian vegetation on the site is diverse with a total of 23 native species represented (21 different genera). Native trees in the willow riparian habitat had an average aerial cover (dominance value) of approximately 44 m^2, resulting in the moderate cover value of approximately 62 percent in the native tree canopy. However, relative dominance of native trees in the Mitigation Area's willow riparian habitat is 100 percent. Native shrubs provided 3.7 m^2 of aerial cover, on average, creating an underdeveloped understory of approximately 10 percent cover. Therefore, a score of 0.8 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 willow 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.

The I-210 freeway forms the boundary of the willow 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 willow riparian habitat including sticky eupatory (*Ageratina adenophora*), umbrella sedge (*Cyperus involucratus*), edible fig (*Ficus carica*), and castor bean (*Ricinus communis*); however, overall cover of exotic invasive species was low at less than 2 percent for exotic shrub species. Furthermore, no non-native trees were present within the habitat. 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, scour, or deposition.

The willow 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 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**

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 20 topographic features are present per 100 m (328.1 ft). A score of 1.0 assigned to this variable best represents the topographic complexity, which includes numerous features such as pits, hummocks, rills, large boulders, and fallen wood debris.

Available Organic Carbon (CAR)	
Score	**Criteria**
0.9	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.

A moderate amount of available organic carbon in the form of organic debris, leaf litter, and detritus was present on the site. Fourteen of the 20 quadrats had 50 percent or greater cover of organic carbon, and two of those quadrats had 100 percent organic carbon cover. Because the average amount of organic carbon for the site was approximately 60 percent, a score of 0.9 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 the 2012 focused surveys and/or monitoring and maintenance activities. Suitable habitat present on the site.

A total of 2 listed and 6 sensitive wildlife species were observed on site during 2012. Santa Ana sucker (*Catostomus santaanae*), a federally listed threatened fish species and a California Species of Special Concern (SSC) (CDFG 2011a; CDFG 2011b), 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. Two-striped garter snake (*Thamnophis hammondii*), a SSC, was observed near the Tujunga ponds. A willow flycatcher (*Empidonax traillii*), a state listed endangered bird species, was observed within the willow riparian habitat. Other sensitive species observed in or near the Mitigation Area willow riparian habitat during focused surveys and/or monitoring and maintenance activities include yellow warbler (*Setophaga petechia*) and olive-sided flycatcher (*Contopus cooperi*), both SSCs, and Cooper's hawk (*Accipiter cooperii*), a California Department of Fish and Game (CDFG) Watch List (WL) species. Due to the detection of 8 listed and/or sensitive wildlife species and presence of suitable habitat, a score of 1.0 was assigned to this variable.

Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	
Score	**Criteria**
1.0	Over 60 species of wildlife detected during the 2012 focused surveys and/or monitoring and maintenance activities.

A total of 95 wildlife species were detected in 2012, including 1 crustacean, 7 fishes, 5 amphibians, 7 reptiles, 66 birds, and 9 mammals. After removing crustaceans, fishes, and domestic mammals, 85 of the 95 species represent terrestrial vertebrate wildlife species that are included in the score for this variable. Therefore, the willow riparian habitat was assigned a score of 1.0 for this variable.

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 12 habitat specialists, wildlife species that have specific habitat requirements, were observed on site during 2012. These include pied-billed grebe (*Podilymbus podiceps*), double-crested cormorant (*Phalacrocorax auritus*), green heron (*Butorides virescens*), black-crowned night heron (*Nycticorax nycticorax*), western tanager (*Piranga ludoviciana*), Nuttall's woodpecker (*Picoides nuttallii*), willow flycatcher, downy woodpecker (*Picoides pubescens*), yellow warbler, 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 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. Pied-billed grebe, double-crested cormorant, green heron, black-crowned night heron, common yellowthroat, and red-winged blackbird were found in and around the Tujunga Ponds.

Song sparrows breed in dense riparian thickets and emergent wetlands. This species was found around the Tujunga Ponds and along streamside wetland and willow riparian habitat along Haines Canyon Creek. The willow flycatcher is a state-listed endangered riparian songbird that is found in dense riparian thickets near water. This species was detected along Haines Canyon Creek during the 2012 focused protocol surveys for Southwestern willow flycatcher and least Bell's vireo. Two individuals were observed; however, breeding has not been confirmed at the site and the individuals were likely migrants.

The western tanager is highly associated with mixed woodlands and was observed in the willow 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, a SSC, is typically found in wet, deciduous thickets, especially willows. All of these species were observed in the willow riparian habitat throughout the site. Nuttall's woodpecker was also observed within the oak woodland habitat on site.

The wildlife species detected in 2012 were a result of incidental observations made during focused protocol surveys, functional analysis and success monitoring activities, exotic species removal efforts, and trail maintenance visits. Due to the observation of 12 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 willow riparian habitats is:

$$FU_{willow} = \frac{[((STD + COV)EXO + CON + CAR + FPA + TOP)REG + URB + RAR + RIC + SPE]}{10}$$

The calculation for the FU value for the willow riparian habitat is therefore:

$$FU_{willow} = \frac{[((0.7 + 0.8)\ 1.0 + 1.0 + 0.9 + 0.8 + 1.0)\ 1.0 + 0.6 + 1.0 + 1.0 + 1.0]}{10}$$

For the willow riparian habitat, the FU is calculated to be 0.88 per acre. To calculate the total FCU for the willow riparian habitat in the Mitigation Area, the following formula was used:

$$FCU_{Big\ T} = FU_{willow}\text{ (acres of willow riparian habitat)}$$

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, 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 used 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 willow riparian habitat in the Mitigation Area in 2012 is:

$$FCU_{Big\ T} = (0.88_{\ FUwillow})\text{(91.2 acres of willow riparian habitat)} = 80.26$$

3.4 Discussion and Comparison of Functional Values

The FCU value of the willow riparian habitat in the Mitigation Area increased by 5.48 units from 74.78 units in 2011 to 80.26 units in 2012. The FU value between 2011 and 2012 also increased from 0.82 to 0.88, respectively. This increase in the FU value was likely due to the fact that the scores for TOP, RIC, and SPE had all increased this year. The increase in both RIC and SPE are likely due to the inclusion of focused wildlife surveys this year. However, this does not suggest an increase in the number of species that use the site. Rather, the repeated visits conducted by biologists during the focused survey season allows for the development of a much larger species list. The increase in the FU value can also be explained by the increased score for TOP. The increase in topographic complexity of the Mitigation Area, along with additional species observations, resulted in the highest FU value since 2008, when it was also 0.88. The FCU value for 2012, already expected to be high due to the FU value, was further driven by the increase in the number of acres of willow riparian habitat. Prior to 2009, the number of acres of willow riparian habitat that were mapped in 1997 was used for the FCU calculation (76.0 acres). The increased acreage of willow riparian habitat (91.2 acres) explains why the FCU in 2012 is the highest value calculated for the Mitigation Area.

The FCU calculated in 2011 is approximately 34 percent greater than that of baseline conditions recorded in 1997. Table 3-3 presents a comparison of FCU values for each variable in 1997 (baseline), 2008, 2009, 2010, 2011, and 2012.

Table 3-3. Comparison of Functional Capacity Values

Variable	2012	2011	2010	2009	2008	1997
Structural Diversity (STD)	0.7	0.7	0.7	0.8	0.8	0.7
Riparian Habitat Cover (COV)	0.8	1.0	1.0	1.0	1.0	1.0
Percent of Exotic Invasive Species/Vegetation (EXO)	1.0	1.0	1.0	0.8	1.0	0.8
Contiguity of Habitat (CON)	1.0	1.0	1.0	1.0	1.0	1.0
Available Organic Carbon (CAR)	0.9	0.9	0.8	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)	1.0	0.8	0.7	0.7	0.7	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
Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	1.0	0.6	0.8	1.0	1.0	0.7
Presence of Habitat Specialists (Terrestrial Vertebrate Wildlife) (SPE)	1.0	0.8	1.0	1.0	0.6	0.9
FU	**0.88**	**0.82**	**0.84**	**0.85**	**0.88**	**0.79**
Acres	**91.2**	**91.2**	**91.2**	**91.2**	**76.0**	**76.0**
FCU	**80.26**	**74.78**	**76.61**	**77.52**	**66.88**	**59.74**

The score for COV has decreased to 0.8 as a result of the reduced amount of cover in the willow riparian habitat. Currently, native tree cover is approximately 62 percent, whereas in 2011 native trees created a dense multi-layer canopy (116 percent cover) with twice as much average aerial cover (68.3 m^2 [735.1 ft^2] in 2011 but only 44.0 m^2 [473.6 ft^2] in 2012). This decrease may partly be due to the complete removal of non-native trees, which contributed some cover in 2011 (approximately 1 percent). The removal of non-native plant species began again in late 2009 once the revised Streambed Alteration Agreement was issued by the CDFG. As a result, cover of non-native trees and shrubs has decreased steadily since the effort was reinitiated. Non-native shrub cover is currently at 0.2 percent and no non-native trees are present in the willow riparian habitat. However, the 2012 score for EXO did not change as it had already reached the highest possible value back in 2010. Although the score for STD remained unchanged and the native shrub understory is poorly developed with only 10.2 percent cover, it should be noted that native shrub species still strongly dominate the shrub layer (98.5 percent relative dominance). A total of 13 native shrub species were present this year, which is one more species than last year.

The amount of debris, leaf litter, and detritus, although still lower than that in 2009 (84.3 percent), has increased substantially over the last two years. From a record low of approximately 38 percent in 2010, the amount of carbon-rich material jumped to 54 percent in 2011, and increased again to 60 percent this year. This change is likely due to the timing of the 2012 monitoring effort; data were collected relatively late in the summer. Temperatures in the Mitigation Area were high and there was less water available to the riparian vegetation. Trees and shrubs appeared stressed and leaf loss was evident. Many annual species had also finished their life cycles. As a result, additional vegetative debris, leaf litter, and detritus had accumulated on the ground. The score for CAR is poised to reach the highest possible value with any increase in carbon-rich materials next year. The accumulation of carbon-rich materials also partially explains the increased score for TOP. The willow riparian habitat currently includes approximately 20 topographic features per 100 meters, whereas only 10 features were measured in 2010 and 14 features in 2011. During field sampling, it was noted that debris, leaf litter, and detritus had accumulated, often at the base of vegetation, creating hummocks. Other topographic features appeared to be the result of recent sedimentation events.

The score for RAR has not changed since the implementation of the functional analysis, although the number of listed and/or sensitive wildlife species observed decreased over the last two years. This trend appears to be reversing; a total of 8 sensitive wildlife species were observed in the Mitigation Area this year, whereas only 6 sensitive species were observed in 2011. It should also be noted that a second listed species, willow flycatcher, has now been detected on the site. This is likely a reflection of focused wildlife survey tasks added this year; focused surveys were previously conducted in 2009. Focused sensitive wildlife surveys for native fish, least Bell's vireo, southwestern willow flycatcher, and arroyo toad are required every 3 years, or as needed, during the long-term monitoring phase of the Mitigation and Monitoring Plan (MMP). All listed and/or sensitive wildlife species detections during years lacking surveys (e.g., 2011) were from incidental observations made during the functional analysis and success monitoring activities, non-native plant removal efforts, and quarterly maintenance visits. These focused surveys provide additional opportunities for species observation, resulting in an overall increase in species richness. Eighty-five terrestrial wildlife species were detected in the Mitigation Area this year, which is a 70 percent increase from the 50 species in 2011. The score for RIC increased to 1.0 as a result. However, the number of sensitive wildlife species this year is slightly lower than that observed in 2009 (98 species), when focused surveys were also conducted.

The score for SPE increased from 0.8 in 2011 back to 1.0 this year. This is a result of a increase in the number of habitat specialists; 12 species were detected, whereas only 7 species were detected last year. The number of habitat specialists is again similar to numbers seen in 2009 (14 species) and 2010 (13 species). Again, this is undoubtedly due to the inclusion of focused wildlife surveys for 2012, which increased the number of observation opportunities. Habitat specialists that have been consistently recorded at the site for several years, including black-crowned night heron, western tanager, and double-crested cormorant, were once again documented at the site.

In conclusion, the FCU value increased as a result of increases in topographic complexity, species richness, and number of habitat specialists (TOP, RIC, and SPE). A combination of additional carbon-rich materials and sedimentation events resulted in the higher score for TOP, although the extra leaf litter was not enough to increase the score for CAR. The higher scores for both RIC and SPE can be attributed to the focused surveys conducted in the Mitigation Area, increasing the number of wildlife observations. Although the FCU value was not negatively affected, the amount of cover in the willow riparian habitat has decreased, resulting in a lower score for COV. The complete eradication of non-native trees may partly account for this change. Tree stress and subsequent leaf loss, due to the lateness of the season, may also explain the reduction in cover. Native cover of trees has fluctuated considerably over the past four years (48.8, 60.8, 116.0, and 61.9 percent). It is unlikely that natural changes in the willow riparian habitat alone can account for such fluctuations. The point-centered quarter method has two limitations – an individual tree (or shrub) should not be measured twice, and an individual must be measured in each quarter (Mueller and Dombois 1974). Additionally, as with any data collection effort, once selected, transect and quadrat locations should be fixed for subsequent visits. Permanent location markers were never established, and although efforts were made to accurately place the quadrats using GPS, actual placement likely varied from year to year. The changing dynamics of the riparian vegetation, the length of time the monitoring program has been in place, and the number of different biologists that have conducted the data collection efforts have all possibly affected the accuracy of the point-centered quarter method. However, despite the reduction in riparian cover and potential methodological problems, the high FCU value indicates that overall habitat quality has improved substantially since the initiation of the program.

3.5 Success Analysis Results

Percent cover was determined for both native and non-native species in each of the three vegetation layers (tree, shrub, and ground), and results are presented in Table 3-4. Native tree species comprised a relatively open layer with approximately 29 percent cover; no non-native trees were present in the restoration areas. The shrub layer was poorly developed, with native species accounting for approximately 13 percent and non-natives for 4 percent. Ground cover was slightly dominated by non-native species (25 percent), while cover of natives was approximately 11 percent. However, ground cover was low for both groups.

Table 3-4. Percent Cover by Vegetation Layer and Plant Category

	Percent Cover	
Vegetation Layer	**Native**	**Non-native**
Tree	28.7	0.0
Shrub	12.7	3.8
Ground	10.5	25.0

Additionally, total percent cover in the restoration areas was determined for native and non-native species. Native plant cover was moderate at approximately 55 percent cover; non-native plant cover was relatively low (28.8 percent). Bare ground accounted for approximately 30 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
55.2	28.8	30.2

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. It was also determined that future success monitoring would focus on the success criterion 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 willow 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. The results presented herein represent the fourth year of quantitative monitoring specifically for 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 (ECORP 2008a). However, it was determined in 2009 that this success criterion had not been met in the riparian restoration areas based on the success monitoring and analysis results (54.2 percent). 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 percent and shrubs 13.2 percent) as compared to the willow riparian habitat (native trees 148.5 percent and shrubs 19.2 percent). 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. The removal program has proved extremely successful in eradicating non-native trees (0 percent cover). Ground cover of non-native species has been reduced considerably from approximately 75 percent in 2011 to 25 percent this year. Although still limited, non-native shrubs have increased slightly in the restoration areas; cover is approximately 4 percent whereas it was only 3 percent in 2011. Overall, non-native cover has been reduced nearly 65 percent, primarily as a result of the non-native plant removal efforts. In 2011, non-native cover in the restoration areas was approximately 91 percent, but decreased to 29 percent this year. Overall native cover has subsequently increased to approximately 55 percent, specifically in the shrub and ground layers. As non-native ground species were removed, open space was created, providing opportunities for native species to become established. Native shrub and ground cover are currently 13 and 11 percent, respectively, whereas native cover was only approximately 5 percent shrubs and 8 percent ground species in 2011. Native trees do not appear to benefit from the removal program; cover was approximately 29 percent in the restoration areas, which is actually a slight decrease from last year (35.2 percent). As there were no noticeable native tree deaths, the decrease in cover is likely due to the timing of the monitoring effort. Temperatures in the Mitigation Area were high when the data were collected late in the summer and there was less water available to the riparian vegetation. Native trees appeared stressed and leaf loss was evident. It is possible that changes in cover can also be attributed to limitations in the measurement methodology. For a data collection effort using point transects (line-intercept method), once selected, transect locations should be fixed for subsequent visits. Permanent location markers were never established and therefore actual placement likely varied from year to year, despite efforts to accurately place the transects using GPS. Changes in vegetation cover may not be accurately determined if the same swath of vegetation (i.e., that which falls along the transect line) is not measured every year.

The eradication of non-native trees in the restoration areas indicates that the non-native plant removal program has been effective on some level. The overall health of the willow riparian habitat within the Mitigation Area, as determined by the functional analysis and field observations, further demonstrates the program's effectiveness. However, even though cover has decreased, non-natives are still a problem within the restoration areas. In 2011, the non-native removal program was adjusted to address this problem. As non-native cover is still relatively high, efforts will remain focused on the restoration areas. Furthermore, invasive ground species will continue to be targeted for removal.

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, success analysis results in 2009, the first year of implementation, indicated that the restoration areas provided limited native cover. The intense non-native plant removal program that was subsequently implemented appears to be very effective in providing establishment opportunities and increasing cover of natives in the willow riparian habitat overall, as indicated by this year's functional analysis. Non-native trees have also been eradicated from the restoration areas. The 2012 success analysis results indicate that non-native plant species, although diminished, are still present in the restoration areas. The opening of the tree canopy that resulted from the non-native tree removal program has provided open space and sunlight for ground cover species. Non-native grasses and weeds continue to germinate in high numbers and these fast-growing species could potentially out-compete the native plant species. In order to get better control of non-native grasses and weeds, and to provide additional opportunities for native species to become established, the non-native plant removal program will need to continue. The focus of the program will continue to include the non-native shrubs but will now also include a concerted effort to target grasses and weeds. If the non-native plant removal program is focused within the restoration areas and maintained at the same level of intensity, the success criterion of 75 percent native cover may be achieved.

Functional Assessment Data Sheets

BIG TUJUNGA WASH

Date: 8/15/12 Field Crew: Cara Snellen Carley Lancaster

Sample Plot No: 4a Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal Las.	3	10.4	6^2	Scale Broom	2.6	2.7^2
2	Laurel Sum.	3	20.4	12^2	Heterothica Cos.	6.4	1^2
3	Sal Las.	3	20.6	7.7^2	Het. Ces	3.3	1.3^2
4	Sal. Las	3	12.8	5.5^2	CA Buckwheat	2.1	1.5^2

[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: 0%

No. of seedlings/saplings: 0 Non-native Cover: 0%

GPS Coordinates: S11 375351 3792604 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 4 Transect Length: 20.6 (m)

Comments:

Picture # 797 NE

BIG TUJUNGA WASH

Date: 8/15/12 Field Crew: Cara S. Carley L.

Sample Plot No: 4B Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	lasiolepis	3	15.4	6^2	Scale Broom	2.7	2.7^2
2	Lasiolepis	3	13.3	5.5^2	Het. Ces	1.2	1.4^2
3	lasiolepis	3	16.6	11.1^2	Het. Ces	2.4	$.5^2$
4	Lasiolepis	3	15.6	7.7^2	Het. Ces	3.5	$.9^2$

[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%

No. of seedlings/saplings: 0 Non-native Cover: 2%

GPS Coordinates: S11 375337 3792598 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 4 Transect Length: 16.6 (m)

Comments:

Picture #798 facing SW

BIG TUJUNGA WASH

Date: 8/15/12 Field Crew: Cara S. Carley L.

Sample Plot No: 9A Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Gooddingii	3	12.3	8.8^2	CA Buck	2.1	1.9^2
2	Lasiolepis	3	16.4	6.4^2	CA Buck	3.1	2.2^2
3	Lasiolepis	3	19.2	5.6^2	CA Buck	3.7	1.9^2
4	CA Walnut Juglans Cal.	3	9.4	6.3^2	CA Buck	1.9	$.7^2$

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 30% % Cover annual grasses: 0%

No. of seedlings/saplings: 0 Non-native Cover: ~~0%~~ 2%

GPS Coordinates: S11 375266 3792576 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 19.2 (m)

Comments:

photograph 799 facing west

BIG TUJUNGA WASH

Date: 8/15/12

Field Crew: Cara S. Carley L.

Sample Plot No: 9B

Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Alnus Rhom	3	15	7^2	Ribes	1.2	$.3^2$
2	Goodingii	3	4.9	8^2	Mugwort	2	$.2^2$
3	Lasiolepis	3	22.2	6.4^2	mulefat	5.5	2.3^2
4	Goodingii	3	5.1	4.3^2	Mugwort	2.1	$.1^2$

[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: 0%

No. of seedlings/saplings: 0

Non-native Cover: 0 %

GPS Coordinates: S11 375252 3792564 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: #5

Transect Length: 22.2 (m)

Comments:

Should be North of creek, just SW of 9A
Photograph 800 facing NE

BIG TUJUNGA WASH

Date: 8/16/12 Field Crew: Cara S. Carley L.

Sample Plot No: 12a Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	lasiolepis	3	6.8	2.1²	CA Rose	2.6	.8²
2	Cottonwood	3	7.2	7.8²	CA Rose	2.1	.6²
3	lasiolepis	3	5.7	7.9²	Ribes	3.1	.6²
4	lasiolepis	3	4.4	9.5²	Poison oak	2	3²

[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: 0 Non-native Cover: 10%

GPS Coordinates: S11 375510 3792523 UTM NAD83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 10 (m)

Comments:

Photograph 814 facing North

1800 834-0064

BIG TUJUNGA WASH

Date: 8/16/12 Field Crew: Cara S Oartey L

Sample Plot No: 12b Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal. las	3	4	3[2]	Poison Oak	3.1	1[2]
2	Sal. las	3	4.1	7.3[2]	poison oak	3.9	1.5[2]
3	Sal. las	3	7.1	10.4[2]	poison oak	3	1.6[2]
4	Quer. dum	3	3.5	2.4	CA Rose	2.8	1.4[2]

[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: 5%

No. of seedlings/saplings: 0 Non-native Cover: 5%

GPS Coordinates: S11 375508 3792499 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 4 Transect Length: 11.3 (m)

Comments:

Photograph 815 facing South

BIG TUJUNGA WASH

Date: 8/15/12 Field Crew: Cara Snellen Carley Lancaster

Sample Plot No: 15A Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Salix Lasiolepis	3	2.5	7.5^2	Mulefat	17.5	7^2
2	Alnus Rhombifolia	3	3.7	13.6^2	Scale broom	13.9	2.3^2
3	Salix Lasiolepis	3	8.3	8.6^2	Mulefat	6.2	3.4^2
4	Salix Lasiolepis	3	4.8	2.2^2	Mugwort	20	3^2

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 95% % Cover annual grasses: 0%

No. of seedlings/saplings: 0 Non-native Cover: 0%

GPS Coordinates: S11 375869 3792576 UTM NAD83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 20 (m)

Comments:

- Picture 776 facing SW
- Non-native mulberry on creek bank → has been flagged

BIG TUJUNGA WASH

Date: 8/15/12 Field Crew: Cora Snelleen Cartey Lancaster

Sample Plot No: 15B Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Salix Lasiolepis	3	11.5	3^2	Heterotheca cesaflora	3.5	1.5^2
2	Alnus Rhombifolia	3	13.6	13.6^2	upitory	14.4	$.2^2$
3	Salix Lasiolepis	3	11.2	10.8^2	mulefect	4.2	2.8^2
4	NA				Scale broom	6.1	3^2

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 40% % Cover annual grasses: 20%

No. of seedlings/saplings: 0 Non-native Cover: 20%

GPS Coordinates: S11 375877 3792587 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 14.4 (m)

Comments:

Photo 775 Facing West

BIG TUJUNGA WASH

Date: 8/16/12 Field Crew: Cara S. Carley L.

Sample Plot No: 19a Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal. Las.	3	10	4^2	Eupitory	9	$.3^2$
2	Sal. Las.	2	1.4	2.7^2	NA		
3	Sal. Las.	3	2.9	5.8^2	Sting. Net.	6.8	$.2^2$
4	Sal. Las.	3	.9	7^2	Sel. Amer.	6.3	1.4^2

[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: 60%

No. of seedlings/saplings: 0 Non-native Cover: 60%

GPS Coordinates: S11 376010 3792615 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 10 (m)

Comments:

North of creek, East of Crossing on bank
photograph 833 facing SW

BIG TUJUNGA WASH

Date: 8/16/12 Field Crew: Cara S. Carley L.

Sample Plot No: 19 b Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal. Las.	2	3.4	1.6²	Detera	7.4	.7²
2	Sal. las.	3	10.5	12²	Lasiolepis	6.9	1.3²
3	Box Elder	3	4.4	6.2²	Umb. Sed. (nat.)	11.1	.4²
4	Sal. Las	3	5.6	10²	Ellpitory	10.0	.3²

[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: 3%

No. of seedlings/saplings: 0 Non-native Cover: 3%

GPS Coordinates: S11 376001 3792604 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 5 Transect Length: 11.1 (m)

Comments:

Photograph 832 facing NE
East side of trail

BIG TUJUNGA WASH

Date: 8/16/12 Field Crew: Cara S. Carley L.

Sample Plot No: 23a Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal. las	3	7	5²	Sel. Amer	3.9	.8²
2	Sal. las	3	6.8	10²	Sel. Amer.	1.4	1²
3	Sambucus	3	6	3	mulefat	7	2²
4	Alnus Rhom.	2	1.5	.7	Sel. Am	6	.4²

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 40% % Cover annual grasses: 10%

No. of seedlings/saplings: 0 Non-native Cover: ~~10%~~ 15%

GPS Coordinates: S11 376072 3792639 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 4 Transect Length: 10 (m)

Comments:

Photo 839 facing East

BIG TUJUNGA WASH

Date: 8/16/12 Field Crew: Cara S. Carley C.

Sample Plot No: 23b Location: Big T

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal. las.	3	2.7	7.3²	Sel. Amer.	2.4	.8²
2	Sal. las.	3	6	5²	Eupitory	7	.3²
3	Box elder	3	5.6	5.6²	Sel. Amer.	13.7	1.2²
4	Lasiolepis	3	7.4	6.5²	CA Blackberry	6.8	2.2²

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 75% % Cover annual grasses: 0%

No. of seedlings/saplings: 0 Non-native Cover: 2%

GPS Coordinates: S11 376052 3792638 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 13.7 (m)

Comments:

- Entrance @ cactus patch
- photos 834 & 835 → possible garden?
- photo 838 facing East

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TA & CS

Sample Plot No: 24A Location: [illegible]

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	sal las	3	4.8	7^2	mugwort	.1	$(.3)^2$
2	sal good.	3	9.4	12^2	mugwort	.2	$(.3)^2$
3	pop. fremont	3	20.5	2^2	mugwort	1	$(.3)^2$
4	"	3	8.4	13.4^2	mugwort	.3	$(.3)^2$

[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: 5

No. of seedlings/saplings: 0 Non-native Cover: 5

GPS Coordinates: S11 376167 3792688 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 20.5 (m)

Comments: Found unk. plant w/ purple pre-bloom flowers.

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TA &, CS

Sample Plot No: 24B Location:

Photo 761 Facing E.

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Salix. good.	3	2.6	3^2	ribes	6.9	1.5^2
2	salix las.	3	15.2	10^2	urtica dio nettle	1.0	1.1^2
3	salix ~~good~~ las.	3	3	6^2	urtica dio. nettle	2.5	$.1^2$
4	salix las.	3	3.7	5.7^2	nettle "	.7	$.2^2$

[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: 1

No. of seedlings/saplings: 0 Non-native Cover: 1

GPS Coordinates: S11 376188 3792699 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 15.2 (m)

Comments:

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TA & CS

Sample Plot No: 30 A Location:

Photo 755 (facing West)

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal Las	3	6.0	5.6²	Bac Sal	14.1	5.0²
2	Sal Las	3	7.2	8.9²	Bac Sal	17.2	3.4²
3	Pop Fre	3	3.2	3²	Bac SAL	2.8	3.0²
4	Sal Las	3	6.5	7.7²	~~Sen Doug.~~	~~22.1~~	~~0.8²~~
					Ficus Car	4.6	1.5²

[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: 10

No. of seedlings/saplings: 0 Non-native Cover: 20

GPS Coordinates: S11 376544 3792514 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 17.2 (m)

Comments:

Walnut tree ~~[illegible]~~ (Just E)

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TA & CS

Sample Plot No: 30B Location:

Photo 756 Facing N.

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	~~Sal Los~~	3	2.3	2.3^2	Ficus Car.	2.1	1.0^2
2	Sal. Las.	3	1.8	9^2	Ficus Car.	6.8	0.6^2
3	Sal Las.	3	1.9	4.8^2	Ribes Aureum	8.0	2.2^2
4	Sal Las.	3	7.0	12^2	Ribes Aureum	10.4	0.8^2

[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: 0

No. of seedlings/saplings: 0 Non-native Cover: 0

GPS Coordinates: S11 376542 3792520 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10.4 (m)

Comments:

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TA & CS

Sample Plot No: 31 A Location:

Photo 758 facing N.

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal. Las	3	4.7	3^2	mugwort ~~Artemesia~~ Artemesia Doug	4.3	$(0.2)^2$
2	Sal. Las	3	8.6	7^2	Urtica Dioica	4.3	$(.1)^2$
3	Sal. Las.	3	9.0	8^2	Bac. Sal	3.3	$(1.5)^2$
4	Sal. Las.	3	9.3	6^2	Bac. Sal	3.5	$(5.0)^2$

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 70 % Cover annual grasses: 0

No. of seedlings/saplings: 0 Non-native Cover: 3

GPS Coordinates: S11 376490 3792421 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 4 Transect Length: 9.3 (m)

Comments:

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TA & CS

Sample Plot No: 31B Location:

Photo 757 Facing West.

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sal. Lav.	2	4.9	9^2	Solanum Amor.	14	$(0.5)^2$
2	Sambucus	3	3.6	5.4^2	Eri Fas	14.1	1.3^2
3	Sal Lav.	3	12	6^2	Castor Bean N/A	12 N/A	$(1.0)^2$ N/A
4	Sal. Lasi.	3	8.0	10^2	N/A	N/A	N/A

[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: 0

No. of seedlings/saplings: 0 Non-native Cover: 0

GPS Coordinates: S11 376540 3792411 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 14.1 (m)

Comments: Difficult to distinguish willows, and hard to find shrubs behind the thick willow stand.

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TA & CS

Sample Plot No: 38 A Location: ~~[illegible]~~
photo 751 facing SE

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Salix Lasiolepis	3	12.6	14.2^2	Eri Fas	3.1	1^2
2	Salix Laevigata	3	12.8	6^2	Yucca Lip	4.8	1^2
3	Salix Laevigata	3	21.7	5^2	~~[illegible]~~ v	26.1	$.7^2$
4	Sambucus	2	7.3	2^2	Eri Fas	3.8	1.1^2

[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: 20

No. of seedlings/saplings: 0 Non-native Cover: 20

GPS Coordinates: S11 376701 3792591 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 21.7 (m)

Comments:

Southern Eucalyptus is still partially alive though girdled and sprayed.

BIG TUJUNGA WASH

Date: 8/14/12 Field Crew: TSA & CS

Sample Plot No: 38B Location:

photo 750 facing NE

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	Sambucus	2	2.3	2.8^2	BacSal	2.3	4.55^2
2	Sambucus	2	3.4	5.1^2	BacSal	9.2	7.0^2
3	Sambucus	2	13.8	4.4^2	Eri Fas	2.7	2.1^2
4	Sal Las	3	23.4	11.6	Eri Fas	2.1	0.9^2

[1]Height Categories: **1** = <2m; **2** = 2-4m; **3** = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris/leaf litter, etc: 60 % Cover annual grasses: 30

No. of seedlings/saplings: 0 Non-native Cover: 30

GPS Coordinates: S11 376695 3792618 UTM NAD 83

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 4 Transect Length: 23.4 (m)

Comments:

Sambucus had tons of dotter (w/ flower we brought back)

Success Monitoring Site Photographs

Photo 1: Restoration Area 1

Photo 2: Restoration Area 2


Photo 3: Restoration Area 3


Photo 4: Restoration Area 4

Photo 5: Restoration Area 5

Photo 6: Restoration Area 6

Photo 7: Restoration Area 7

Photo 8: Restoration Area 8

Photo 9: Restoration Area 9

Photo 10: Restoration Area 10

Photo 11: Restoration Area 11

Photo 12: Restoration Area 12


Photo 13: Restoration Area 13


Photo 14: Restoration Area 14

Photo 15: Restoration Area 15

Photo 16: Restoration Area 16

Photo 17: Restoration Area 17

Photo 18: Restoration Area 18


Photo 19: Restoration Area 19


Photo 20: Restoration Area 20

Photo 21: Restoration Area 21

Photo 22: Restoration Area 22

Photo 23: Restoration Area 24

Success Monitoring Data Sheets

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/14/12
Surveyors:	Coordinates: Easting: 376171 Northing: 3792662
Section: Site 1	

Photo#: 760	Direction: E/W	Length: 25 ft.

Native	Non-Native	Both	No Plants
✓		✓	

Species	Ground Layer	Shrub Layer	Tree Canopy
1. rubes ursinus	✓	✓	
2. sal las		✓	✓
* 3. ~~sal las~~ earharta	✓		
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Trail across creek now blocked. by branches.

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/14/12
Surveyors: TA + CS	Coordinates: 376103 3792679
Section: 2	

Photo#: 768	Direction: N/S	Length: 50 ft.

Native	Non-Native	Both	No Plants
卌 卌 卌 卌 |	卌 卌	||||	✓✓✓✓✓ 卌 卌 ||

Species	Ground Layer	Shrub Layer	Tree Canopy
1. erodium cicutarium	|		
2. Bromus. mad.	卌 卌 ||		
3. Eri. Fas.	卌 ||	|	
4. Sal Las.	||	卌 ||	卌 卌 卌
5. cottonwood		||	
6. mugwort	|		
7. Eorharda	|		
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/14/12	
Surveyors: TA & CS	Coordinates: 376039 3792656	
Section: 3		
Photo#: 770	Direction: N/S	Length: 50

Native	Non-Native	Both	No Plants
𝍸 |	𝍸 | |	||	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Scalebroom LepSqua	|	|	
2. Ero. cic.	|		
3. BromusMad.	||		
4. Hirschfeldia Incana	||	||	
5. Sal lav		||||	𝍸 |
6. Phacelia Ram.	|		
7. Art Cal.	|		
8.			
9.			
10.			

Note: transect primarily outside riparian zone. NO successful plantings seen. (besides one cottonwood and some ribes present).

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/14/12		
Surveyors: TS, CS	Coordinates: 375953 3792627		
Section: 4			
Photo#: 772		Direction: N-S	Length: 25
Native	Non-Native	Both	No Plants
	IIII		~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ II
Species	Ground Layer	Shrub Layer	Tree Canopy
1. Bromad	III		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

transect not in riparian
few plants

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12		
Surveyors: CS & CL	Coordinates: 376007 3792567		
~~Section~~: site 5			
Photo#: 831		Direction:	Length: 25ft

Native	Non-Native	Both	No Plants
I	~~IIII~~ ~~IIII~~ IIII	I	~~IIII~~ III

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Bro. mac	~~IIII~~ ~~IIII~~ IIII		
2. heterotheca grandiflora	I		
3. hershfeldia	II	I	
4. Mugwort	I		
5. Lob. Merit.	I		
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12		
Surveyors: CSnellen Clancaster	Coordinates: 375829 3792485		
~~Section:~~ site 6			
Photo#: 829		Direction: E-W	Length: 50
Native	Non-Native	Both	No Plants
~~||||~~ |	~~||||~~ ~~||||~~	~~||||~~ ~~||||~~ ~~||||~~ ||	~~||||~~ ~~||||~~ ~~||||~~ ||
Species	Ground Layer	Shrub Layer	Tree Canopy
1. Bro. dian	|||		
2. Bro mag	~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ||		
3. Cottonwood	||	|||	~~||||~~ ~~||||~~ ||
4. Vulpia myuros	|||		
5. Gnephalium Canesins	|		
6. Yucca whiplii	|||	||||	
7. Buckwheat	||||		
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12		
Surveyors: CS & CL	Coordinates: 375812 3792482		
~~Section:~~ Site 7			
Photo#: 821		Direction:	Length:
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	erharda erecta Bro. dian.	Hurshfeld.a CA Sagebrush	Sal. lasiol. mule fat
2.	polygonum Veronica	Ficilia mulefat	Alnus Rhom. Italian thistle
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Creek dam 821 – 825

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/14/12
Surveyors: CS & CL	Coordinates: 375778 3792442
~~Section~~: Site 8	

Photo#: 827	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Bro. dian.	Quer. Agr.	Red willow
		Ficilia	~~Box~~ elderberry (Sambucus)
2.		Gooseberry	Box elder (Acer negundo)
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12		
Surveyors: CS & CL	Coordinates: 375731 3792478		
~~Section:~~ site 9			
Photo#: 819		Direction:	Length:
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	hershfeldia Bro. dian.	muefat Ficilia	mulefat Sal. Lup
2.	Bro. mag.	CA Rose Black Sage	Cottonwood Alnus Rhom
3.		eriastrum Buckwheat	
4.		CA Blackberry Poison oak	
5.			
6.			
7.			
8.			
9.			
10.			

~~Phot~~

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date:
Surveyors: C.S. & C.L.	Coordinates: 375720 3792518
~~Section~~: Site 10	

Photo#: 778	Direction: SW	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Ficilia Ram. Eri. Den.	Scale broom CA Buckwheat	Sal. Lasio.
2.	Poison oak Brom. dia.	Heterotheca grandiflora yucca whiplii	
3.	Amb. Acan. Lact. Cereola	Art. Cal. ~~Ero~~ Crot. Cal.	
4.	Hersh. Inca. Apun. Fic. Ind.	Poison oak Nephalium	
5.	Bro. Mag. Ero. Sicu.	Heter. ces.	
6.	Vul. micarose		
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12		
Surveyors: CS & CL	Coordinates: 375610 3792494		
~~Section:~~ Site 11			
Photo#: 780		Direction: EW	Length: 25ft

Native	Non-Native	Both	No Plants
𝍸 𝍸 𝍸 I		𝍸 IIII	

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Cottonwood			𝍸 𝍸 II
2. Calif. Rose (Rosa Cal)	IIII	I	
3. ~~Rosa cal~~ mulefat		𝍸 𝍸 I	𝍸 𝍸 IIII
* 4. Brom. Diau.	IIII 𝍸		
5. Sal. las.		I	I
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12	
Surveyors: CS CC	Coordinates: 375536 3792505	
~~Section~~: Site 12		
Photo#: 782	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Poison Oak	Poison oak	Scrub Oak
	Bro. Dian.	mugwort,	Sal. Las.
2.	Erharda Smilo grass	Cottonwood	Cottonwood
3.	Bro. mag. Sonchus		
4.	Senecio sp.		
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12	
Surveyors: CS CL	Coordinates: 375512 3792514	
~~Section~~: Site 13		
Photo#: 784	Direction: E W	Length: 25ft

Native	Non-Native	Both	No Plants
~~||||~~ ~~||||~~ ~~||||~~ |||		~~||||~~ ||	

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Rosa Cal	~~||||~~	|||	
2. Sal. las		|	~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~
3. Brom. Dian.	|		
4. Brom. Mag.	~~||||~~ |		
5. Rhibes Arium	|		
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12	
Surveyors: CS & CL	Coordinates: 375478 3792527	
~~Section:~~ Site 14		
Photo#: 786	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Poison Oak Brom. Dia.	Poison Oak Mulefat	Sal. Las. Alnus. Rhom.
2.	Brom. mag. Opuntia	Buckwheat	mulefat Sandbar will.
3.			Laurel Sum. Sal. good.
4.			
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12
Surveyors: CS & CL	Coordinates: 375447 3792549
~~Section:~~ Site 15	

Photo#: 788	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Smilo grass	Box Elder	Mulberry
	Poison Oak	Umbrela Sedge	Sal. good.
2.	CA Blackberry	Eupitory	Sal. Las
		Spanish Sun.	Alnus Rhombifolia
3.		CA Black berry	Frax. sp.
4.			
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date:		
Surveyors:	Coordinates: 375413 3792542		
~~Section:~~ Site 16			
Photo#: 790	Direction:	Length:	

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	CA Blackberry Poison Oak	CA Blackberry Poison Oak	West. Syc. Sal. Las.
2.	Bro. Magiferus Tribe Erh	Stinging nettle Black Sage	Alnus Rhom.
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12		
Surveyors: CS & CL	Coordinates: 375376 3792546		
~~Section:~~ Site 17			
Photo#: 792		Direction:	Length:
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	CA Blackberry Bro. Dian.	Mugwort mulefat	Sal. las. Mulefat
2.		CA Blackberry Edible fig	Cottonwood Alnus Rhomb.
3.		Ficilia	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Cottonwood is leaning over to the side

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12
Surveyors: CS & CL	Coordinates: 375344 3792556
~~Section:~~ site 18	

Photo#: 794	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Bro. Dian. Poison oak	Ficilia Poison oak	Sal las. Mulefat
2.	Polypogon Sp Veronica	CA Sage Br. Muefat	
3.	Umbrella Sedge polygonum hyd.	Eupitory poly. pip. (smart weed)	
4.	Cardimine Oligosperma	Barn yard grass	
5.		Stinging nettle CA Primrose	
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/15/12		
Surveyors: CS & CL	Coordinates: 375297 3792590		
~~Section:~~ Site 19			
Photo#: 796		Direction: NE-SW	Length: 25ft
Native	Non-Native	Both	No Plants
8	7	3	8
Species	Ground Layer	Shrub Layer	Tree Canopy
1. Lasiolepis		1	8
2. Hershpheldia	2	8	
3. Mugwort		1	
4. Black Sage Sal. Mal.	3	2	
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12		
Surveyors: CS & CL	Coordinates: 375314 3792537		
~~Section:~~ Site 20			
Photo#: 813		Direction:	Length:
Native	Non-Native	Both	No Plants
Species	Ground Layer	Shrub Layer	Tree Canopy
1.	hershfeldia	FiCilia	Sal las.
	Brom. dian	Ambrosia	Cottonwood
2.	Brom. mag	Poison oak Ribes Ari.	
3.		Lobalaria meritima	
4.		Detera	
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12	
Surveyors: CS ? CL	Coordinates: 375261 3792532	
~~Section:~~ Site 21		
Photo#: 811	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Bro dian.	CA Buckwheat	Sal Las.
	Bro mar.	Scale broom	Alnus Rhom.
2.	hershfeldia	mulefat	Sal. good.
	Poison oak	CA Sage brush	Laurel Sum.
3.	ficilia	betera	
		Black Sage	
4.		ficilia	
5.			
6.			
7.			
8.			
9.			
10.			

- Homeless incampment

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12
Surveyors: CS & CL	Coordinates: 375202 3792547
~~Section:~~ site 22	

Photo#: 809 facing NW	Direction: E → W	Length: 25ft

Native	Non-Native	Both	No Plants
𝍸 𝍸 𝍸 𝍷𝍷𝍷𝍷		𝍷𝍷𝍷	𝍷𝍷𝍷

Species	Ground Layer	Shrub Layer	Tree Canopy
1. Ficilia Raum	𝍷𝍷		
2. ~~B~~ Sal. good.		𝍸	𝍸 𝍸 𝍸 𝍷𝍷𝍷
3. Bro. Diam.	𝍷𝍷𝍷		
4. Sal. las.			𝍷𝍷𝍷𝍷
5.			
6.			
7.			
8.			
9.			
10.			

BIG T RIPARIAN SUCCESS TRANSECT SHEET	Date: 8/16/12
Surveyors: CS & CL	Coordinates: 375060 3792539
~~Section~~: site 24	

Photo#:	Direction:	Length:

Native	Non-Native	Both	No Plants

Species	Ground Layer	Shrub Layer	Tree Canopy
1.	Bro. Mag.	CA Buckwheat	mulefat
	Bro. dian	het. ces	Red willow
2.	hershfeldia	mulefat	cottonwood
	Avena fatula	CA Blackberry	Sal. Las
3.	erodium	Opun. Lit.	Sal. good.
	Brom. Tec.	CA Rose	
4.		Poison oak	
		Ambrosia (acantracarpa)	
5.			
6.			
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10.			

photograph 805 facing North

APPENDIX L

Plant and Wildlife Compendia

2012 Big Tujunga Wash Mitigation Area Master Plant List

Scientific Name	**Common Name**
GYMNOSPERMS	
PINACEAE	**PINE FAMILY**
*Cedrus deodara**	deodar cedar
*Pinus halepensis**	aleppo pine
ANGIOSPERMS (DICOTYLEDONS)	
ACERACEAE	**MAPLE FAMILY**
Acer negundo var. *californicum*	box elder
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**
Malosma laurina	laurel sumac
Rhus integrifolia	lemonade sumac
Toxicodendron diversilobum	Pacific poison oak
APIACEAE	**CARROT FAMILY**
*Conium maculatum**	poison hemlock
*Foeniculum vulgare**	sweet fennel
APOCYNACEAE (or ASCLEPIADACEAE)	**DOGBANE FAMILY**
*Vinca major**	Periwinkle
ASTERACEAE	**SUNFLOWER FAMILY**
*Ageratina adenophora**	sticky eupatory
Ambrosia acanthicarpa	annual bursage
Ambrosia artemisiifolia	annual ragweed
Artemisia californica	coastal sagebrush
Artemisia douglasiana	mugwort
Artemisia dracunculus	tarragon
Baccharis salicifolia	mule fat
*Carduus pychocephalus**	Italian thistle
*Centaurea melitensis**	tocalote
Cirsium occidentale var.*occidentale*	cobweb thistle
Conyza canadensis	Canadian horseweed
Heterotheca grandiflora	telegraph weed
Heterotheca sessiliflora	golden aster
*Hypochaeris glabra**	smooth cat's ear
*Lactuca serriola**	prickly lettuce
Lepidospartum squamatum	scalebroom
Malacothrix saxatilis	cliff desert dandelion
Pluchea odorata	salt marsh fleabane
Pseudognaphalium biolettii (bicolor)	bicolor cudweed
Pseudognaphalium canescens	fragrant everlasting
Rafinesquia californica	California plumeseed
Senecio flaccidus var. *douglasii*	sand-wash butterweed
*Sonchus asper**	spiny sowthistle
*Sonchus oleraceus**	common sowthistle
Stephanomeria pauciflora var. *pauciflora*	wire-lettuce

Scientific Name	**Common Name**
*Tanacetum parthenium**	feverfew
*Taraxacum officinale**	common dandelion
BETULACEAE	**BIRCH FAMILY**
Alnus rhombifolia	white alder
BIGNONIACEAE	**BIGNONIA FAMILY**
*Catalpa bignonioides**	southern catalpa
BORAGINACEAE	**BORAGE FAMILY**
*Echium candicans**	Pride of Madeira
BRASSICACEAE	**MUSTARD FAMILY**
*Hirschfeldia incana**	shortpod mustard
*Lobularia maritima**	sweet alyssum
Nasturtium officinale	watercress
*Sisymbrium altissimum**	tumble mustard
CACTACEAE	**CACTUS FAMILY**
Opuntia littoralis	coastal prickly pear
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**
Sambucus nigra ssp. *caerulea (= S. mexicana)*	blue elderberry
*Stellaria media**	common chickweed
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Chenopodium sp.	goosefoot
CRASSULACEAE	**STONECROP FAMILY**
Dudleya lanceolata	coastal dudleya
CURCURBITACEAE	**GOURD FAMILY**
Marah macrocarpus	Cucamonga manroot
CUSCUTACEAE	**DODDER FAMILY**
Cuscuta sp.	dodder
*Chamaesyce maculata**	spotted spurge
Croton californicus	croton
*Euphorbia peplus**	petty spurge
*Ricinus communis**	castor bean
FABACEAE	**LEGUME FAMILY**
Acmispon scoparius (= Lotus s.)	common deerweed
*Medicago sativa**	alfalfa
*Spartium junceum**	Spanish broom
FAGACEAE	**OAK FAMILY**
Quercus agrifolia	California live oak
Quercus berberidifolia	scrub oak
GERANIACEAE	**GERANIUM FAMILY**
*Erodium cicutarium**	red-stemmed filaree
*Geranium rotundifolium**	roundleaf geranium
GROSSULARIACEAE	**GOOSEBERRY FAMILY**
Ribes aureum	golden currant
HYDROPHYLLACEAE	**WATERLEAF FAMILY**
Eriodictyon crassifolium	thickleaf yerba santa

Scientific Name	**Common Name**
Phacelia ramosissima	branching phacelia
JUGLANDACEAE	**WALNUT FAMILY**
Juglans californica (List 4.2)	Southern California walnut
LAMIACEAE	**MINT FAMILY**
*Marrubium vulgare**	horehound
Salvia mellifera	black sage
Stachys sp.	hedge nettle
LOASACEAE	**LOASA FAMILY**
Mentzelia laevicaulis	smoothstem blazingstar
MALVACEAE	**MALLOW FAMILY**
*Malva parviflora**	cheeseweed
*Malva sylvestris**	high mallow
*Ficus carica**	edible fig
*Ficus nitida**	Indian fig
MYRTACEAE	**MYRTLE FAMILY**
Eucalyptus sp. *	gum tree
NYCTAGINACEAE	**FOUR O'CLOCK FAMILY**
*Mirabilis jalapa**	marvel of Peru
OLEACEAE	**OLIVE FAMILY**
*Fraxinus udhei**	evergreen ash
Fraxinus velutina	velvet ash
*Ligustrum lucidum**	glossy privet
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissonia bistorta	California sun cup
Camissonia californica	California evening primrose
Clarkia unguiculata	elegant clarkia
Epilobium brachycarpum	tall annual willowherb
Oenothera elata	evening primrose
PAPAVERACEAE	**POPPY FAMILY**
Eschscholzia californica	California poppy
PLANTAGINACEAE	**PLANTAIN FAMILY**
*Plantago major**	common plantain
*Plantago psyllium**	sand plantain
PLATANACEAE	**PLANE TREE FAMILY**
Platanus racemosa	western sycamore
POLEMONIACEAE	**PHLOX FAMILY**
Eriastrum densifolium	giant woolly star
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum fasciculatum	California buckwheat
Eriogonum gracile	slender wooly buckwheat
Polygonum hydropiperoides	swamp smartweed
Pterostegia drymarioides	California thread-stem
Rumex sp.	dock
*Rumex crispus**	curly dock
*Rumex pulcher**	fiddle dock

Scientific Name	**Common Name**
PRIMULACEAE	**PRIMROSE FAMILY**
*Anagallis arvensis**	scarlet pimpernel
RANUNCULACEAE	**BUTTERCUP FAMILY**
Delphinium cardinale	scarlet larkspur
RHAMNACEAE	**BUCKTHORN FAMILY**
Ceanothus sp.	ceanothus
ROSACEAE	**ROSE FAMILY**
Heteromeles arbutifolia	toyon
Prunus ilicifolia ssp. *ilicifolia*	holly-leaf cherry
Rosa californica	California rose
Rubus ursinus	California blackberry
SALICACEAE	**WILLOW FAMILY**
Populus fremontii	Fremont cottonwood
Salix exigua	narrowleaf willow
Salix gooddingii	Goodding's 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 attenuata	coyote tobacco
*Nicotiana glauca**	tree tobacco
Solanum americanum	American black nightshade
ULMACEAE	**ELM FAMILY**
*Ulmus parvifolia**	Chinese elm
URTICACEAE	**NETTLE FAMILY**
Urtica dioica	stinging nettle
VITACEAE	**GRAPE FAMILY**
Vitis girdiana	desert wild grape
ZYGOPHYLLACEAE	**CALTROP FAMILY**
*Tribulus terrestris**	puncture vine
ANGIOSPERMS (MONOCOTYLEDONS)	
AGAVACEAE (or Liliaceae)	**AGAVE FAMILY**
Hesperoyucca whipplei (=Yucca w.)	chaparral yucca
AMARYLLIDACEAE	**AMARYLLIS FAMILY**
*Amaryllis belladonna**	belladonna lily
ASPHODELACEAE	**ALOE FAMILY**
Aloe sp.*	aloe vera
CYPERACEAE	**SEDGE FAMILY**
Cyperus sp.	flatsedge

Scientific Name	**Common Name**
*Cyperus involucratus**	umbrella plant
POACEAE	**GRASS FAMILY**
*Agrostis viridis**	bentgrass
*Arundo donax**	giant reed
*Avena barbata**	slender oat
*Avena fatua**	wild oat
*Bromus diandrus**	ripgut brome
*Bromus rubens**	red brome
*Cynodon dactylon**	bermuda grass
*Echinochloa crus-galli**	barnyard grass
*Ehrharta calycina**	perennial veldtgrass
*Lolium perenne**	perennial ryegrass
*Piptatherum miliaceum**	smilo grass
*Polypogon monspeliensis**	rabbitsfoot grass
*Schismus barbatus**	mediterranean schismus
*Triticum aestivum**	common wheat
*Vulpia myuros**	rat-tail fescue
* non-native species	

2012 Big Tujunga Wash Mitigation Area Master Wildlife List

Scientific Name	**Common Name**
INVERTEBRATES	
MALACOSTRACA	**CRABS, LOBSTERS, SHRIMP**
Cambaridae	**Freshwater Crayfish**
Procambarus clarkia	red swamp crayfish
OSTEICTHYES (BONY FISHES)	
ACTINOPTERYGII	**RAY-FINNED FISHES**
Catostomidae	**Sucker Fishes**
Catostomus santaanae	Santa Ana sucker***
Centrarchidae	**Sunfishes**
Micropterus salmoides	largemouth bass
Cyprinidae	**True Minnows**
Gila orcuttii	Arroyo chub**
Pimephales promelas	fathead minnow
Rhinichthys osculus ssp. 3	Santa Ana speckled dace**
Ictaluridae	**Catfishes and Bullheads**
Ameiurus sp.	bullhead sp.
Poeciliidae	**Livebearers**
Gambusia affinis	western mosquitofish
AMPHIBIANS	
BUFONIDAE	**TRUE TOADS**
Anaxyrus boreas	western toad
HYLIDAE	**TREEFROGS**
Hyla regilla	Pacific treefrog
Pseudacris cadaverina	California treefrog
Pseudacris hypochondriaca	Baja California treefrog
RANIDAE	**TRUE FROGS**
Lithobates catesbeianus	American bullfrog*
REPTILES	
ANGUIDAE	**ALLIGATOR LIZARDS**
Elgaria multicarinata	southern alligator lizard
COLUBRIDAE	**EGG-LAYING SNAKES**
Coluber flagellum	coachwhip
Thamnophis hammondii	two-striped garter snake**
EMYDIDAE	**SLIDERS**
Trachemys scripta elegans	red-eared slider*
TEIIDAE	**WHIPTAILS AND RACERUNNERS**
Aspidoscelous tigris	western whiptail
PHRYNOSOMATIDAE	**SPINY LIZARDS**

Scientific Name	**Common Name**
Sceloporus occidentalis	western fence lizard
Uta stansburiana	side-blotched lizard
BIRDS	
ACCIPITRIDAE	**HAWKS**
Accipiter cooperii	Cooper's hawk**
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
AEGITHALIDAE	**BUSHTITS**
Psaltriparus minimus	bushtit
ANATIDAE	**DUCKS, GEESE AND SWANS**
Anas platyrhynchos	mallard
Branta canadensis	Canada goose
Oxyura jamaicensis	ruddy duck
APODIDAE	**SWIFTS**
Aeronautes saxatalis	white-throated swift
ARDEIDAE	**HERONS AND EGRETS**
Ardea alba	great egret
Ardea herodias	great blue heron
Butorides virescens	green heron
Nycticorax nycticorax	black-crowned night heron
BOMBYCILLIDAE	**WAXWINGS**
Bombycilla cedrorum	cedar waxwing
CARDINALIDAE	**GROSBEAKS AND BUNTINGS**
Pheucticus melanocephalus	black-headed grosbeak
CATHARTIDAE	**NEW WORLD VULTURES**
Cathartes aura	turkey vulture
CHARADRIIDAE	**LAPWINGS AND PLOVERS**
Charadrius vociferus	killdeer
COLUMBIDAE	**PIGEONS AND DOVES**
Zenaida macroura	mourning dove
Columba livia	rock pigeon*
CORVIDAE	**JAYS, CROWS, AND THEIR ALLIES**
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
EMBERIZIDAE	**SPARROWS AND THEIR ALLIES**
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Pipilo maculatus	spotted towhee
Zonotrichia leucophrys	white-crowned sparrow
FALCONIDAE	**FALCONS**

Scientific Name	**Common Name**
Falco sparverius	American kestrel
FRINGILLIDAE	**FINCHES**
Carduelis lawrencei	Lawrence's goldfinch
Carduelis psaltria	lesser goldfinch
Carduelis tristis	American goldfinch
Carpodacus mexicanus	house finch
HIRUNDINIDAE	**SWALLOWS**
Hirundo rustica	barn swallow
Petrochelidon pyrrhonota	cliff swallow
Stelgidopteryx serripennis	northern rough-winged swallow
ICTERIDAE	**BLACKBIRDS AND ORIOLES**
Agelaius phoeniceus	red-winged blackbird
Molothrus ater	brown-headed cowbird*
MIMIDAE	**MOCKINGBIRDS AND THRASHERS**
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
ODONTOPHORIDAE	**NEW WORLD QUAIL**
Callipepla californica	California quail
PARULIDAE	**WOOD-WARBLERS**
Setophaga petechia	yellow warbler**
Geothlypis trichas	common yellowthroat
Oreothlypis celata	orange-crowned warbler
PHALACROCORACIDE	**CORMORANTS**
Phalacrocorax auritus	double-crested cormorant
PICIDAE	**WOODPECKERS**
Colaptes auratus	northern flicker
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	downy woodpecker
PODICIPEDIDAE	**GREBES**
Podilymbus podiceps	pied-billed grebe
RALLIDAE	**RAILS**
Fulica americana	American coot
STURNIDAE	**STARLINGS AND MYNAS**
Sturnus vulgaris	European starling*
STRIGIDAE	**OWLS**
Bubo virginianus	great horned owl
TIMALIIDAE	**WRENTITS**
Chamaea fasciata	wrentit
THRAUPIDAE	**TANAGERS**
Piranga ludoviciana	western tanager

Scientific Name	**Common Name**
TROCHILIDAE	**HUMMINGBIRDS**
Archilochus alexandri	black-chinned hummingbird
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
TROGLODYTIDAE	**WRENS**
Campylorhynchus brunneicapillus	cactus wren
Thryomanes bewickii	Bewick's wren
TURDIDAE	**BLUEBIRDS**
Turdus migratorius	American robin
TYRANNIDAE	**TYRANT FLYCATCHERS**
Contopus cooperi	olive-sided flycatcher**
Empidonax difficilis	Pacific-slope flycatcher
Empidonax traillii	willow flycatcher***
Myiarchus cinerascens	ash-throated flycatcher
Sayornis nigricans	black pheobe
Sayornis saya	Say's phoebe
VIREONIDAE	**VIREOS**
Vireo huttoni	Hutton's vireo
MAMMALS	
CANIDAE	**DOGS**
Canis familiaris	domestic dog*
Canis latrans	coyote
DIDELPHIDAE	**OPOSSUMS**
Didelphis virginiana	Virginia opossum
EQUIDAE	**HORSES AND ALLIES**
Equus caballus	domestic horse*
FELIDAE	**CATS**
Lynx rufus	bobcat
LEPORIDAE	**HARES AND RABBITS**
Syvilagus audubonii	desert cottontail
MURIDAE	**MICE AND RATS**
Neotoma fuscipes	dusky-footed woodrat
PROCYONIDAE	**RACCOONS AND RINGTAILS**
Procyon lotor	Northern raccoon (tracks)
SCIURIDAE	**SQUIRRELS**
Spermophilus beecheyi	California ground squirrel

*Non-native species
**CDFG California Species of Special Concern/Watch List Species/FP Species
***State and/or Federally Listed Species

APPENDIX M

2012 Water Quality Monitoring Report

County of Los Angeles
Department of Public Works

November 2012 Water Quality Monitoring Report

for the

Big Tujunga Wash Mitigation Area

March 2013

MWH

November 2012 Water Quality Monitoring Report

for the

Big Tujunga Wash Mitigation Area

March 2013

Prepared For:

ECORP Consulting, Inc.
1801 Park Court Place, Building B, Suite 103
Santa Ana, CA 92701

Prepared By:

MWH
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Water Quality Monitoring
November 2012

BACKGROUND

The County of Los Angeles Department of Public Works (LACDPW) purchased an approximately 210-acre parcel in Big Tujunga Wash as a mitigation area for Los Angeles County Flood Control District (LACFCD) projects throughout Los Angeles County. In coordination with local agencies, the LACDPW defined a number of measures to improve habitat quality at the site. A Final Master Mitigation Plan (FMMP) was prepared to guide the implementation of these enhancements. The FMMP also includes a monitoring program to gather data on conditions at the site during implementation of the improvements. The FMMP was prepared and is currently being implemented by ECORP Consulting, Inc. (ECORP). MWH, a subconsultant to ECORP, is responsible for the water quality monitoring program described in the FMMP. Water quality 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. In 2010, monitoring was conducted in November; pesticide sampling was conducted in early December. In 2012, monitoring was conducted in February and November. This report presents the results of the water quality sampling for November 2012.

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 outside of the site boundary, at the far eastern side of the site.

Project Site Activities

A timeline of project-related activities including water quality sampling events is presented in **Table 1**.

Table 1
Major Activities to Date at the Big Tujunga Wash Mitigation Area

Date	Activity
4/2000	Baseline water quality sampling
11/2000 to 11/2001	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
12/2000 to 11/2002	Water hyacinth removal
12/2000	Fish Sampling at Haines Canyon Creek
12/2000	Water quality sampling
1/2001 to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2/2001	Partial riparian planting
3/2001	Selective clearing at Canyon Trails Golf Club
3/2001	Water quality sampling
6/2001	Water quality sampling
7/2001	Fish Sampling at Haines Canyon Creek
9/2001	Water quality sampling

Date	Activity
10/2001 to 11/2001	Fish Sampling at Haines Canyon Creek
12/2001	Water quality sampling
1/2002	Final riparian planting
2/2002	Upland replacement planting
3/2002	Water quality sampling
6/2002	Water quality sampling
7/2002	Fish Sampling at Haines Canyon Creek
9/2002	Water quality sampling
10/2002	Grading at Canyon Trails Golf Club begins
11/2002	Fish Sampling at Haines Canyon Creek
12/2002	Water quality sampling
3/2003	Water quality sampling
4/2003	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
6/2003	Water quality sampling
8/2003	Fish Sampling at Haines Canyon Creek
9/2003	Water quality sampling
Fall 2003	Completion of the golf course construction
12/2003	Water quality sampling
1/2004	Fish Sampling at Haines Canyon Creek
4/2004	Water quality sampling
4/2004	Rock Dam Removal Day
6/2004	Angeles National Golf Club (previously named Canyon Trails) opens to the public
7/2004	Water quality sampling
10/2004	Water quality sampling
12/2004	Water quality sampling
4/2005	Water quality sampling
6/2005	Water quality sampling
10/2005	Water quality sampling
12/2005	Water quality sampling
7/2006	Water quality sampling
12/2006	Water quality sampling
12/2007	Water quality sampling
12/2008	Water quality sampling
8/2009 to 10/2009	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/)
12/2009	Water quality sampling
11/2010	Water quality sampling
12/2010	Water quality sampling for pesticides
9/2011 to 1/2012	Water lettuce removal
2/2012	Water quality sampling
11/2012	Water quality sampling

Upstream Land Uses

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). The golf course has been operating since June 2004. Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern. Pesticides potentially used at the Angeles National Golf Course include herbicides, insecticides, fungicides, and grass growth inhibitors (**Table 2**). Pesticide use reports were supplied by the Golf Club in December 2004, February 2005 and April 2007.

Water quality reports for sampling conducted from 2001 to 2004, and in 2006, were also received from the Golf Club. Concentrations of pesticides (including fungicides, herbicides and insecticides) were not detected in any groundwater monitoring wells or surface water samples during any of the sampling events from 2001 to 2004. Except for nitrate, general chemical parameters did not exceed state drinking water standards. Nitrate concentrations above drinking water limits were detected in two of the groundwater monitoring wells (MW-1 [downgradient] and MW-3 [upgradient]) located on the south side of the golf course site during most sampling events from October 2001 (prior to start of golf course construction) to 2004. In addition, low levels of two volatile organic compounds (VOCs) (chloroform and tetrachloroethylene [PCE]) were detected at MW-1 and MW-3 from 2001 to 2004. 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). No other reports have been received.

Actual use of pesticides is based on golf course maintenance needs. Based on the pesticide use information from the Golf Club, analysis of water samples for glyphosate, chlorpyrifos, and organophosphorous pesticides is included in the sampling program for the Big Tujunga Wash Mitigation Area.

Table 2
Pesticides Potentially Used at the Angeles National Golf Club

Manufacturer and Product Name	Active Ingredient	Use
Syngenta Primo Maxx	trinexapac-ethyl	grass growth inhibitor used for turf management
Syngenta Reward	diquat dibromide	landscape and aquatic herbicide
Syngenta Barricade	prodiamine	pre-emergent herbicide
Bayer Prostar 70 WP	flutolanil	fungicide
Monsanto QuikPRO	ammonium salt of glyphosphate and diquat dibromide	herbicide
Monsanto Rodeo® Verdicon Kleenup® Pro Lesco Prosecutor	glyphosate	emerged aquatic weed and brush herbicide
Valent ProGibb T&O	gibberellic acid	plant growth regulator
BASF Insignia 20 WG	pyraclostrobin	fungicide
BASF Stalker	Isopropylamine salt of Imazapyr	herbicide
Dow Agrosciences Surflan A.S.	oryzalin	herbicide
Dow Agrosciences Dursban Pro	chlorpyrifos	insecticide
Mycogen Scythe	pelargonic acid	herbicide

Source: J. Reidinger, Angeles National Golf Club, pers. comm. to M. Chimienti, LACDPW, March 18, 2004 and Angeles National Golf Club Monthly Summary Pesticide Use Reports

MATERIALS AND METHODS

Sampling Stations

Four sampling locations have been identified for the monitoring program for the Big Tujunga Wash Mitigation Area (**Figure 1**). **Table 3** summarizes sampling locations and the conditions observed on November 26, 2012.

Key to Features

Mitigation Area

Station Number	Name
1	Inflow to Tujunga Ponds
2	Outflow from Tujunga Ponds
3	Big Tujunga Wash
4	Haines Canyon Creek, just before exit from site

N 0 450 900 Feet

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Date: April 19, 2012

Big Tujunga Wash Mitigation Area Water Quality Sampling Stations

MWH.

Figure 1

Table 3
Water Quality Sampling Locations and Conditions for November 2012

Date	November 26, 2012		
Air Temperature	Approximately 75-77 degrees Fahrenheit during sample collection period		
Skies	Clear, sunny		
Observations	Water clear at all locations, relatively low turbidity		
Sampling Locations	**Latitude**	**Longitude**	**Time of sample**
Haines Canyon Creek	34 16’ 0.092’’ N	118 21’ 25.716’ ’W	1210
Haines Canyon Creek, inflow to Tujunga Ponds	34 16’ 6.040’’ N	118 20’ 22.616’’ W	1130
Haines Canyon Creek, outflow from Tujunga Ponds	34 16’ 8.263’’ N	118 20’ 30.824’’ W	1100
Big Tujunga Wash	34 16’ 11.615’’ N	118 21’ 4.519’’ W	0930

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 – YSI 550A Field DO meter and thermometer
- pH and temperature – Orion 230A pH meter with HACH 51935 electrode

Pesticides were analyzed by Emax Laboratories, Inc., Torrance, California. All other analyses were performed at Eurofin Eaton 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	laboratory	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.

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 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 presented in **Table 5**. Higher bacteria and turbidity observed in the 4/18/2000 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/2000 samples, due to release from sediments.

November 2012 Results

Water Quality

Results of analyses conducted by Eurofin Eaton 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 26, 2012

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	19.3	18.1	13.8	18.2
Dissolved Oxygen	mg/L	5.0	5.2	9.9	10.3
pH	std units	7.41	7.52	9.14	8.50
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	8.4	4.9	ND	4.6
Orthophosphate-P	mg/L	0.034	0.023	0.013	0.026
Total phosphorus-P	mg/L	0.042	0.024	<0.02	0.026
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	1.1	0.64	0.37	0.48
Fecal Coliform Bacteria	(MPN/100 ml)	230	330	11	130
Total Coliform Bacteria	(MPN/100 ml)	1100	790	79	230

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

* 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.

** 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 2012 are summarized in **Table 7**.

Table 7
Estimated Flows for November 2012

Sampling Date	Approximate Flow (cubic feet per second)		
	Haines Canyon Creek, Outflow from Tujunga Ponds	Haines Canyon Creek, just before exit from site	Big Tujunga Wash
11/26/2012	3	3	4

Comparison of Results with Aquatic Life Criteria

Tables 8 through **13** present objectives established by the United States Environmental Protection Agency (USEPA) and the Los Angeles Regional Water Quality Control Board (Regional Board) for protection of beneficial uses including freshwater aquatic life.

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 13	See Table 13	--
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)	126[f] (geometric mean for *E. coli*) (water contact recreation)	--	--	Swimming stds: 33[g] (geometric mean for enterococci) 126[g] (geometric mean for *E. coli*)
Ammonia-nitrogen (mg/L)	See Tables 11 and 12	See Table 9	See Table 10	--
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). As amended.

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 Single sample limits – *E. coli* density shall not exceed 235/100 ml.

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
Temperature and pH-Dependent Values of the CMC (Acute Criterion)
Mussels Absent

CMC: Mussels Absent, mg N/L										
pH	Temperature, C									
	0	14	16	18	20	22	24	26	28	30
6.5	58.0	58.0	58.0	58.0	43.7	37.0	31.4	26.6	22.5	19.1
6.6	55.7	55.7	55.7	55.7	41.9	35.5	30.1	25.5	21.6	18.3
6.7	53.0	53.0	53.0	53.0	39.9	33.8	28.6	24.3	20.6	17.4
6.8	49.9	49.9	49.9	49.9	37.6	31.9	27.0	22.9	19.4	16.4
6.9	46.5	46.5	46.5	46.5	35.1	29.7	25.2	21.3	18.1	15.3
7.0	42.9	42.9	42.9	42.9	32.3	27.4	23.2	19.7	16.7	14.1
7.1	39.1	39.1	39.1	39.1	29.4	24.9	21.1	17.9	15.2	12.8
7.2	35.1	35.1	35.1	35.1	26.4	22.4	19.0	16.1	13.6	11.5
7.3	31.2	31.2	31.2	31.2	23.5	19.9	16.8	14.3	12.1	10.2
7.4	27.3	27.3	27.3	27.3	20.6	17.4	14.8	12.5	10.6	8.98
7.5	23.6	23.6	23.6	23.6	17.8	15.1	12.8	10.8	9.18	7.77
7.6	20.2	20.2	20.2	20.2	15.3	12.9	10.9	9.27	7.86	6.66
7.7	17.2	17.2	17.2	17.2	12.9	11.0	9.28	7.86	6.66	5.64
7.8	14.4	14.4	14.4	14.4	10.9	9.21	7.80	6.61	5.60	4.74
7.9	12.0	12.0	12.0	12.0	9.07	7.69	6.51	5.52	4.67	3.96
8.0	9.99	9.99	9.99	9.99	7.53	6.38	5.40	4.58	3.88	3.29
8.1	8.26	8.26	8.26	8.26	6.22	5.27	4.47	3.78	3.21	2.72
8.2	6.81	6.81	6.81	6.81	5.13	4.34	3.68	3.12	2.64	2.24
8.3	5.60	5.60	5.60	5.60	4.22	3.58	3.03	2.57	2.18	1.84
8.4	4.61	4.61	4.61	4.61	3.48	2.95	2.50	2.11	1.79	1.52
8.5	3.81	3.81	3.81	3.81	2.87	2.43	2.06	1.74	1.48	1.25
8.6	3.15	3.15	3.15	3.15	2.37	2.01	1.70	1.44	1.22	1.04
8.7	2.62	2.62	2.62	2.62	1.97	1.67	1.42	1.20	1.02	0.862
8.8	2.19	2.19	2.19	2.19	1.65	1.40	1.19	1.00	0.851	0.721
8.9	1.85	1.85	1.85	1.85	1.39	1.18	1.00	0.847	0.718	0.608
9.0	1.57	1.57	1.57	1.57	1.19	1.00	0.851	0.721	0.611	0.517

Note: Native species of freshwater mussels are not known for Big Tujunga Wash or Haines Canyon Creek.
CMC – Criteria Maximum Concentration (ammonia)
Source: USEPA. 2009. Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater. EPA 822-D-09-001. Washington, D.C.

Table 10
Temperature and pH-Dependent Values of the CCC (Chronic Criterion) Mussels Absent and Early Fish Life Stages Present

CCC: Mussels Absent and Early Fish Life Stages Present, mg N/L										
pH	Temperature (° Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.36	6.36	6.36	6.36	6.36	6.11	5.37	4.72	4.15	3.65
6.6	6.26	6.26	6.26	6.26	6.26	6.02	5.29	4.65	4.09	3.60
6.7	6.15	6.15	6.15	6.15	6.15	5.91	5.19	4.57	4.01	3.53
6.8	6.00	6.00	6.00	6.00	6.00	5.77	5.08	4.46	3.92	3.45
6.9	5.84	5.84	5.84	5.84	5.84	5.61	4.93	4.34	3.81	3.35
7.0	5.64	5.64	5.64	5.64	5.64	5.42	4.76	4.19	3.68	3.24
7.1	5.41	5.41	5.41	5.41	5.41	5.20	4.57	4.02	3.53	3.10
7.2	5.14	5.14	5.14	5.14	5.14	4.94	4.35	3.82	3.36	2.95
7.3	4.84	4.84	4.84	4.84	4.84	4.66	4.09	3.60	3.16	2.78
7.4	4.52	4.52	4.52	4.52	4.52	4.34	3.82	3.36	2.95	2.59
7.5	4.16	4.16	4.16	4.16	4.16	4.00	3.52	3.09	2.72	2.39
7.6	3.79	3.79	3.79	3.79	3.79	3.65	3.21	2.82	2.48	2.18
7.7	3.41	3.41	3.41	3.41	3.41	3.28	2.89	2.54	2.23	1.96
7.8	3.04	3.04	3.04	3.04	3.04	2.92	2.57	2.26	1.98	1.74
7.9	2.67	2.67	2.67	2.67	2.67	2.57	2.26	1.98	1.74	1.53
8.0	2.32	2.32	2.32	2.32	2.32	2.23	1.96	1.72	1.52	1.33
8.1	2.00	2.00	2.00	2.00	2.00	1.92	1.69	1.49	1.31	1.15
8.2	1.71	1.71	1.71	1.71	1.71	1.64	1.45	1.27	1.12	0.982
8.3	1.45	1.45	1.45	1.45	1.45	1.40	1.23	1.08	0.949	0.835
8.4	1.23	1.23	1.23	1.23	1.23	1.18	1.04	0.914	0.804	0.706
8.5	1.04	1.04	1.04	1.04	1.04	0.999	0.878	0.772	0.679	0.597
8.6	0.878	0.878	0.878	0.878	0.878	0.844	0.742	0.652	0.573	0.504
8.7	0.742	0.742	0.742	0.742	0.742	0.714	0.628	0.552	0.485	0.426
8.8	0.631	0.631	0.631	0.631	0.631	0.606	0.533	0.469	0.412	0.362
8.9	0.539	0.539	0.539	0.539	0.539	0.518	0.455	0.400	0.352	0.309
9.0	0.464	0.464	0.464	0.464	0.464	0.446	0.392	0.345	0.303	0.266

Note: Native species of freshwater mussels are not known for Big Tujunga Wash or Haines Canyon Creek.
CCC – Criteria Continuous Concentration (ammonia)
Source: USEPA. 2009. Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater. EPA 822-D-09-001. Washington, D.C.

Table 11
30-Day Average Objective for Ammonia-N for Freshwaters Applicable to Waters Subject to the "Early Life Stage Present" Condition (mg N/L)

pH	Temperature (° Celsius)								
	14	16	18	20	22	24	26	28	30
6.5	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: California Regional Water Quality Control Board, Los Angeles Region. 2005. Amendments to the Water Quality Control Plan – Los Angeles Region with Respect to Early Life Stage Implementation Provisions of the Inland Surface Water Ammonia Objectives for Freshwaters. Taken from USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 12
One-Hour Average Objective for Ammonia-N for Freshwaters (mg N/L)

pH	Waters Designated COLD and/or MIGR	Waters Not Designated COLD and/or MIGR
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

Cold – Beneficial use designation of Cold Freshwater Habitat
MIGR – Beneficial use designation of Migration of Aquatic Organisms
Source: California Regional Water Quality Control Board, Los Angeles Region. 2002. Amendments to the Water Quality Control Plan – Los Angeles Region with Respect to Inland Surface Water Ammonia Objectives. Taken from USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. 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 2012 sampling are described by parameter in **Table 14**.

Table 14
Discussion of November 2012 Water Quality 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 5.0 mg/L in the inflow to the Tujunga Ponds to 10.3 in Haines Canyon Creek leaving the site. DO levels at all stations were at or above the recommended minimum (5.0 mg/L) for warmwater fish species. DO levels in the Tujunga Ponds were below the recommended mean (7.0 mg/L) for warmwater fish species.
pH	• Lowest pH was observed in the inflow to Tujunga Ponds (7.41), with highest pH observed in Big Tujunga Wash (9.14). On this date, pH readings in Haines Canyon Creek and the Tujunga Ponds were within the 6.5 to 8.5 range identified in the Basin Plan. The pH of Big Tujunga Wash was above the high end of the range.
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 four stations was <0.02 to 0.042 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 very low (1.1 NTU or less) at all stations.
Bacteria	• The fresh water bacteria standard for water contact recreation is for *E. coli* (126 MPN/100 ml geometric mean, 235 MPN/100 ml single sample limits). The observed fecal coliform level in Big Tujunga Wash was well below the standards. Fecal coliform levels in Haines Canyon Creek and the Big Tujunga Ponds ranged from 130 to 330 MPN/100 ml. Previously, the water contact standard was 200 MPN/100 ml fecal coliform. Sampling specifically for *E. coli* was not conducted. • Total coliform levels ranged from 79 MPN/100 ml in Big Tujunga Wash to 1,100 MPN/100 ml in Haines Canyon Creek inflow to Tujunga Ponds. [Note that recreation standards are for *E. coli*. Total coliform standards apply to waterbodies where shellfish can be harvested for human consumption.]

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 AREA
WATER QUALITY MONITORING PROGRAM

LABORATORY RESULTS
November 2012

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)

Laboratory Report

for

MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attention: Sarah Garber

Date of Issue
12/17/2012
EUROFINS EATON
ANALYTICAL

DST: David S Tripp

Project Manager

01114CA

Report: 416443
Project: BIG-TUJUNGA
Group: Water Quality Monitoring
PO#: PO#: 10501610.011601

Laboratory certifies that the test results meet all **TNI NELAP** 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.

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STATE CERTIFICATION LIST

State	Certification Number	State	Certification Number
Alabama	41060	**Mississippi**	Certified
Alaska	CA00006	**Montana**	Cert 0035
Arizona	AZ0778	**Nevada**	CA00006-2012-1
Arkansas	Certified	**New Hampshire**	2959-11
California – NELAP	01114CA	**New Jersey**	CA 008
California – ELAP	1422	**New Mexico**	Certified
Colorado	Certified	**New York**	11320
Connecticut	PH-0107	**North Carolina**	06701
Delaware	CA 006	**North Dakota**	R-009
Florida	E871024	**Oregon**	CA 200003-010
Georgia	947	**Pennsylvania**	68-565
Guam	11-004r	**Rhode Island**	01114CA
Hawaii	Certified	**South Carolina**	87016001
Idaho	Certified	**South Dakota**	Certified
Illinois	200033	**Tennessee**	TN02839
Indiana	C-CA-01	**Texas**	T104704230-11-2
Kansas	E-10268	**Utah**	Mont-1
Kentucky	90107	**Vermont**	VT0114
Louisiana	LA110022	**Virginia**	00210
Maine	CA0006	**Washington**	C383
Maryland	224	**West Virginia**	9943 C
Commonwealth of Northern Marianas Is.	MP0004	**Wisconsin**	998316660
Massachusetts	M-CA006	**Wyoming**	8TMS-L
Michigan	9906	**EPA Region 5**	Certified

750 Royal Oaks Dr., Ste 100, Monrovia, CA 91016 Tel (626) 386-1100 Fax (626) 386-1101 http://EatonAnalytical.com

Eurofins Eaton Analytical formerly MWH Laboratories

Acknowledgement of Samples Received

Addr:	**MWH Americas - Arcadia**	Client ID:	MWH-ECORP
	618 Michillinda Ave.	Folder #:	416443
	Suite 200	Project:	BIG-TUJUNGA
	Arcadia, CA 91007	Sample Group:	Water Quality Monitoring
Attn:	Sarah Garber	Project Manager:	David S Tripp
Phone:	626-568-6910	Phone:	(626) 386-1158
		PO #:	1012733.5620.011601

The following samples were received from you on **November 26, 2012**. 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 Eurofins Eaton Analytical.

Sample #	Sample ID	Sample Date
201211260029	BTW112612	11/26/2012 0930

@608_PEST	@8141EDD	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	Total phosphorus as PO4- Calc.
Turbidity		

Sample #	Sample ID	Sample Date
201211260035	TJPOUT112612	11/26/2012 1100

@608_PEST	@8141EDD	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	Total phosphorus as PO4- Calc.
Turbidity		

Sample #	Sample ID	Sample Date
201211260036	TJPIN112612	11/26/2012 1130

@608_PEST	@8141EDD	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	Total phosphorus as PO4- Calc.
Turbidity		

Sample #	Sample ID	Sample Date
201211260037	HCC112612	11/26/2012 1210

@608_PEST	@8141EDD	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	Total phosphorus as PO4- Calc.
Turbidity		

Test Description

@608_PEST -- Organochlorine Pesticides

@8141EDD -- Organophosphorous Pesticides (Sub)

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CHAIN OF CUSTODY RECORD

416443

750 Royal Oaks Drive, Suite 100
Monrovia, CA 91016-3629

Phone: 626 386 1100
Fax: 626 386 1101

800 566 LABS (800 566 5227)

Website: www.EatonAnalytical.com

EUROFINS EATON ANALYTICAL USE ONLY:

LOGIN COMMENTS: ______

SAMPLES CHECKED AGAINST COC BY: [initials]

SAMPLES LOGGED IN BY: [initials]

SAMPLES REC'D DAY OF COLLECTION? ☑ (check for yes)

SAMPLE TEMP RECEIVED AT:
☐ Colton / No. California / Arizona ______ ℃ (Compliance: 4 ± 2 ℃)
☑ Monrovia 15.2 ℃ (Compliance: 4 ± 2 ℃)

CONDITION OF BLUE ICE: Frozen ✓ Partially Frozen ______ Thawed ______ Wet Ice ______ No 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 Americas-Arcadia

PROJECT CODE: 1012 733.5620,011601

COMPLIANCE SAMPLES ☐ (check for yes) - Requires state forms ☐

NON-COMPLIANCE SAMPLES ☒ (check for yes)
REGULATION INVOLVED: ______

Type of samples (circle one): **ROUTINE SPECIAL CONFIRMATION** (eg. SDWA, Phase V, NPDES, FDA,...)

EEA CLIENT CODE: | **COC ID:** | **SAMPLE GROUP:**

SEE ATTACHED BOTTLE ORDER FOR ANALYSES ☒ (check for yes), **OR**
list ANALYSES REQUIRED (enter number of bottles sent for each test for each sample)

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	9221 B,C	SAMPLER COMMENTS
11/26	0930	BTW112612	1	RSW				
11/26	1100	TJPOUT112612	2	RSW				[initials] 11/26/12 1325
11/26	1130	TJPIN112612	3	RSW				
11/26	1210	HCC112612	4	RSW				

* **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
SAMPLED BY:	[signature]	SARAH GARBER	MWH	11/26/12	1210
RELINQUISHED BY:	[signature]	SARAH GARBER	MWH	11/26/12	1301
RECEIVED BY:	[signature]	[signature]	EEA	11/26/12	1302
RELINQUISHED BY:					
RECEIVED BY:					

PAGE 1 OF 1

2012

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750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
(626) 386-1100 FAX (626) 386-1101

Kit Order for MWH Americas - Arcadia

David S Tripp is your Eurofins Eaton Analytical Project Manager

Note: Sampler Please return this paper with your samples

Kit #: 59126
Created By: DST
Order Date: 11/26/2012
Ship By: 11/16/2012
STG: Bottle Orders

Client ID: MWH-ECORP
Project Code: BIG-TUJUNGA Bottle Orders
Group Name: Water Quality Monitoring
PO#/JOB#: 1012733.5620.011601

Ship Sample Kits to
MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Attn: Sarah Garber
Phone: 626-568-6910

Send Report to
MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Attn: Sarah Garber
Phone: 626-568-6910

Billing Address
MWH Americas Inc
PO Box 6610
Broomfield, CO 80021

Attn: Accounts Payable

# of Samples	Tests	Bottles - Qty for each sample, type & preservative if a	UN DOT #
4	@8081A	2 1L amber glass no preservative	
4	@8141EDD	2 1L amber glass 8141WRD_NO_PRESERVATIVE	
4	Ammonia Nitrogen, Total Kjeldahl Nitrogen, Total phosphorus as P	1 250ml poly 0.5ml H2SO4 (50%)	UN1830
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 label "BIG T WASH"
Client will pickup the sample kits on Friday 11/23 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: 416443

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Folder Comments

Analytical results for 8141 and 608 are submitted by Emax Laboratories, Inc. Torrance, CA, CA Certification No. 02116CA

The Comments Report may be blank if there are no comments for this report.

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Laboratory Hits
Report: 416443

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
11/26/2012

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL
	201211260029	**BTW112612**				
11/26/2012 14:04	Fecal Coliform Bacteria		11		MPN/100 mL	2
11/27/2012 15:53	Orthophosphate as P		0.013		mg/L	0.01
11/28/2012 09:53	Orthophosphate as PO4		0.040		mg/L	0.031
11/26/2012 14:04	Total Coliform Bacteria		79		MPN/100 mL	2
11/27/2012 10:04	Turbidity		0.37	5	NTU	0.05
	201211260035	**TJPOUT112612**				
11/26/2012 14:04	Fecal Coliform Bacteria		330		MPN/100 mL	2
11/26/2012 22:59	Nitrate as Nitrogen by IC		4.9	10	mg/L	0.2
11/26/2012 22:59	Nitrate as NO3 (calc)		22	45	mg/L	0.88
11/27/2012 15:54	Orthophosphate as P		0.023		mg/L	0.01
11/28/2012 09:53	Orthophosphate as PO4		0.070		mg/L	0.031
11/26/2012 14:04	Total Coliform Bacteria		790		MPN/100 mL	2
12/03/2012 14:05	Total phosphorus as P		0.024		mg/L	0.02
12/05/2012 11:22	Total phosphorus as PO4- Calc.		0.072		mg/L	0.031
11/27/2012 10:03	Turbidity		0.64	5	NTU	0.05
	201211260036	**TJPIN112612**				
11/26/2012 14:04	Fecal Coliform Bacteria		230		MPN/100 mL	2
11/26/2012 23:12	Nitrate as Nitrogen by IC		8.4	10	mg/L	0.2
11/26/2012 23:12	Nitrate as NO3 (calc)		37	45	mg/L	0.88
11/27/2012 15:55	Orthophosphate as P		0.034		mg/L	0.01
11/28/2012 09:53	Orthophosphate as PO4		0.10		mg/L	0.031
11/26/2012 14:04	Total Coliform Bacteria		1100		MPN/100 mL	2
12/03/2012 14:06	Total phosphorus as P		0.042		mg/L	0.02
12/05/2012 11:22	Total phosphorus as PO4- Calc.		0.13		mg/L	0.031
11/27/2012 10:01	Turbidity		1.1	5	NTU	0.05
	201211260037	**HCC112612**				
11/26/2012 14:04	Fecal Coliform Bacteria		130		MPN/100 mL	2
11/26/2012 23:25	Nitrate as Nitrogen by IC		4.6	10	mg/L	0.2
11/26/2012 23:25	Nitrate as NO3 (calc)		20	45	mg/L	0.88
11/27/2012 15:56	Orthophosphate as P		0.026		mg/L	0.01
11/28/2012 09:53	Orthophosphate as PO4		0.080		mg/L	0.031
11/26/2012 14:04	Total Coliform Bacteria		230		MPN/100 mL	2
12/03/2012 14:08	Total phosphorus as P		0.026		mg/L	0.02
12/05/2012 11:22	Total phosphorus as PO4- Calc.		0.080		mg/L	0.031

SUMMARY OF POSITIVE DATA ONLY

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Laboratory Hits
Report: 416443

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
11/26/2012

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL
11/27/2012 10:02	Turbidity		0.48	5	NTU	0.05

SUMMARY OF POSITIVE DATA ONLY

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Laboratory Data Report: 416443

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
11/26/2012

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
BTW112612 (201211260029)					**Sampled on 11/26/2012 0930**			
		EPA 8141A - Organophosphorous Pesticides (Sub)						
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Azinphos methyl	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Bolstar	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Chlorpyrifos	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Coumaphos	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Demeton	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Diazinon	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Dichlorvos	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Disulfoton	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Ethoprop	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Fensulfothion	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Fenthion	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Methyl Parathion	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Mevinphos	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Naled	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Phorate	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Ronnel	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Stirophos	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Tokuthion	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Trichloronate	ND	ug/L	1.1	1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Tributylphosphate	93	%		1
11/29/2012	12/03/2012	17:15	(EPA 8141A)	Triphenyl Phosphate	99	%		1
		EPA 608 - Organochlorine Pesticides						
11/29/2012	11/30/2012	16:02	(EPA 608)	4,4-DDD	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	4,4-DDE	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	4,4-DDT	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	Aldrin	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	alpha-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	alpha-Chlordane	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	beta-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	delta-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	Dieldrin	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	Endosulfan I (Alpha)	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	Endosulfan II (Beta)	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02	(EPA 608)	Endosulfan Sulfate	ND	ug/L	0.1	1

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory Data Report: 416443

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on: 11/26/2012

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
11/29/2012	11/30/2012	16:02		(EPA 608)	Endrin	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Endrin Aldehyde	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Endrin Ketone	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Gamma-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	gamma-Chlordane	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Heptachlor	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Heptachlor Epoxide	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Methoxychlor	ND	ug/L	1	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Toxaphene	ND	ug/L	2	1
11/29/2012	11/30/2012	16:02		(EPA 608)	Decachlorobiphenyl	105	%		1
11/29/2012	11/30/2012	16:02		(EPA 608)	Tetrachlorometaxylene	95	%		1
		SM 9221C - Fecal Coliform Bacteria							
	11/26/2012	14:04	683117	(SM 9221C)	Fecal Coliform Bacteria	11	MPN/100 mL	2	1
		SM 9221B - Total Coliform Bacteria							
	11/26/2012	14:04	683119	(SM 9221B)	Total Coliform Bacteria	79	MPN/100 mL	2	1
		S4500PE/ 365.1 - Total phosphorus as PO4- Calc.							
	12/05/2012	11:22		(S4500PE/ 365.1)	Total phosphorus as PO4- Calc.	ND	mg/L	0.031	1
		4500P-E/365.1 - Orthophosphate as PO4 (CAL)							
	11/28/2012	09:53		(4500P-E/365.1)	Orthophosphate as PO4	0.040	mg/L	0.031	1
		SM 4500-CL G - Total Chlorine Residual (H3=past HT not compliant)							
	11/26/2012	00:00	683231	(SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
		EPA 547 - Glyphosate							
	11/27/2012	16:46	682166	(EPA 547)	Glyphosate	ND	ug/L	6	1
		EPA 300.0 - Nitrate, Nitrite by EPA 300.0							
	11/26/2012	22:20	682587	(EPA 300.0)	Nitrate as Nitrogen by IC	ND	mg/L	0.2	2
	11/26/2012	22:20	682587	(EPA 300.0)	Nitrate as NO3 (calc)	ND	mg/L	0.88	2
	11/26/2012	22:20	682587	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
		SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)							
	12/03/2012	14:03	682756	(SM4500-PE/EPA 365.1)	Total phosphorus as P	ND	mg/L	0.02	1
		EPA 351.2 - Total Kjeldahl Nitrogen							
	12/04/2012	12:09	683470	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
		EPA 350.1 - Ammonia Nitrogen							
	11/29/2012	18:38	683187	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
		EPA 180.1 - Turbidity							
	11/27/2012	10:04	682272	(EPA 180.1)	Turbidity	0.37	NTU	0.05	1
		4500P-E/365.1 - Orthophosphate as P (OPO4)							
	11/27/2012	15:53	682348	(4500P-E/365.1)	Orthophosphate as P	0.013	mg/L	0.01	1

Rounding on totals after summation.
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Laboratory Data Report: 416443

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Samples Received on:
11/26/2012

TJPOUT112612 (201211260035) — **Sampled on 11/26/2012 1100**

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
		EPA 8141A - Organophosphorous Pesticides (Sub)						
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Azinphos methyl	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Bolstar	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Chlorpyrifos	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Coumaphos	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Demeton	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Diazinon	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Dichlorvos	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Disulfoton	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Ethoprop	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Fensulfothion	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Fenthion	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Methyl Parathion	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Mevinphos	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Naled	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Phorate	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Ronnel	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Stirophos	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Tokuthion	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Trichloronate	ND	ug/L	1	1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Tributylphosphate	90	%		1
11/29/2012	12/03/2012 17:49		(EPA 8141A)	Triphenyl Phosphate	100	%		1
		EPA 608 - Organochlorine Pesticides						
11/29/2012	11/30/2012 16:24		(EPA 608)	4,4-DDD	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	4,4-DDE	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	4,4-DDT	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	Aldrin	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	alpha-BHC	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	alpha-Chlordane	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	beta-BHC	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	delta-BHC	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	Dieldrin	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	Endosulfan I (Alpha)	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	Endosulfan II (Beta)	ND	ug/L	0.096	1
11/29/2012	11/30/2012 16:24		(EPA 608)	Endosulfan Sulfate	ND	ug/L	0.096	1

Rounding on totals after summation.
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Laboratory Data Report: 416443

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Samples Received on:
11/26/2012

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
11/29/2012	11/30/2012	16:24		(EPA 608)	Endrin	ND	ug/L	0.096	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Endrin Aldehyde	ND	ug/L	0.096	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Endrin Ketone	ND	ug/L	0.096	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Gamma-BHC	ND	ug/L	0.096	1
11/29/2012	11/30/2012	16:24		(EPA 608)	gamma-Chlordane	ND	ug/L	0.096	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Heptachlor	ND	ug/L	0.096	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Heptachlor Epoxide	ND	ug/L	0.096	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Methoxychlor	ND	ug/L	0.96	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Toxaphene	ND	ug/L	1.9	1
11/29/2012	11/30/2012	16:24		(EPA 608)	Decachlorobiphenyl	106	%		1
11/29/2012	11/30/2012	16:24		(EPA 608)	Tetrachlorometaxylene	94	%		1
		SM 9221C - Fecal Coliform Bacteria							
	11/26/2012	14:04	683117	(SM 9221C)	Fecal Coliform Bacteria	330	MPN/100 mL	2	1
		SM 9221B - Total Coliform Bacteria							
	11/26/2012	14:04	683119	(SM 9221B)	Total Coliform Bacteria	790	MPN/100 mL	2	1
		S4500PE/ 365.1 - Total phosphorus as PO4- Calc.							
	12/05/2012	11:22		(S4500PE/ 365.1)	Total phosphorus as PO4- Calc.	0.072	mg/L	0.031	1
		4500P-E/365.1 - Orthophosphate as PO4 (CAL)							
	11/28/2012	09:53		(4500P-E/365.1)	Orthophosphate as PO4	0.070	mg/L	0.031	1
		SM 4500-CL G - Total Chlorine Residual (H3=past HT not compliant)							
	11/26/2012	00:00	683231	(SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
		EPA 547 - Glyphosate							
	11/27/2012	16:58	682166	(EPA 547)	Glyphosate	ND	ug/L	6	1
		EPA 300.0 - Nitrate, Nitrite by EPA 300.0							
	11/26/2012	22:59	682587	(EPA 300.0)	Nitrate as Nitrogen by IC	4.9	mg/L	0.2	2
	11/26/2012	22:59	682587	(EPA 300.0)	Nitrate as NO3 (calc)	22	mg/L	0.88	2
	11/26/2012	22:59	682587	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
		SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)							
	12/03/2012	14:05	682756	(SM4500-PE/EPA 365.1)	Total phosphorus as P	0.024	mg/L	0.02	1
		EPA 351.2 - Total Kjeldahl Nitrogen							
	12/04/2012	12:11	683470	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
		EPA 350.1 - Ammonia Nitrogen							
	11/29/2012	18:39	683187	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
		EPA 180.1 - Turbidity							
	11/27/2012	10:03	682272	(EPA 180.1)	Turbidity	0.64	NTU	0.05	1
		4500P-E/365.1 - Orthophosphate as P (OPO4)							
	11/27/2012	15:54	682348	(4500P-E/365.1)	Orthophosphate as P	0.023	mg/L	0.01	1

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Laboratory Data Report: 416443

MWH Americas - Arcadia
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Samples Received on:
11/26/2012

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
TJPIN112612 (201211260036)						**Sampled on 11/26/2012 1130**		
		EPA 8141A - Organophosphorous Pesticides (Sub)						
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Azinphos methyl	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Bolstar	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Chlorpyrifos	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Coumaphos	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Demeton	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Diazinon	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Dichlorvos	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Disulfoton	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Ethoprop	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Fensulfothion	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Fenthion	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Methyl Parathion	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Mevinphos	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Naled	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Phorate	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Ronnel	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Stirophos	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Tokuthion	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Trichloronate	ND	ug/L	1	1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Tributylphosphate	87	%		1
11/29/2012	12/03/2012	18:23	(EPA 8141A)	Triphenyl Phosphate	99	%		1
		EPA 608 - Organochlorine Pesticides						
11/29/2012	11/30/2012	16:45	(EPA 608)	4,4-DDD	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	4,4-DDE	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	4,4-DDT	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	Aldrin	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	alpha-BHC	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	alpha-Chlordane	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	beta-BHC	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	delta-BHC	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	Dieldrin	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	Endosulfan I (Alpha)	ND	ug/L	0.1	1
11/29/2012	11/30/2012	16:45	(EPA 608)	Endosulfan II (Beta)	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45	(EPA 608)	Endosulfan Sulfate	ND	ug/L	0.092	1

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory Data
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Samples Received on:
11/26/2012

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
11/29/2012	11/30/2012	16:45		(EPA 608)	Endrin	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Endrin Aldehyde	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Endrin Ketone	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Gamma-BHC	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	gamma-Chlordane	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Heptachlor	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Heptachlor Epoxide	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Methoxychlor	ND	ug/L	0.92	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Toxaphene	ND	ug/L	0.092	1
11/29/2012	11/30/2012	16:45		(EPA 608)	Decachlorobiphenyl	108	%		1
11/29/2012	11/30/2012	16:45		(EPA 608)	Tetrachlorometaxylene	95	%		1
		SM 9221C - Fecal Coliform Bacteria							
	11/26/2012	14:04	683117	(SM 9221C)	Fecal Coliform Bacteria	230	MPN/100 mL	2	1
		SM 9221B - Total Coliform Bacteria							
	11/26/2012	14:04	683119	(SM 9221B)	Total Coliform Bacteria	1100	MPN/100 mL	2	1
		S4500PE/ 365.1 - Total phosphorus as PO4- Calc.							
	12/05/2012	11:22		(S4500PE/ 365.1)	Total phosphorus as PO4- Calc.	0.13	mg/L	0.031	1
		4500P-E/365.1 - Orthophosphate as PO4 (CAL)							
	11/28/2012	09:53		(4500P-E/365.1)	Orthophosphate as PO4	0.10	mg/L	0.031	1
		SM 4500-CL G - Total Chlorine Residual (H3=past HT not compliant)							
	11/26/2012	00:00	683231	(SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
		EPA 547 - Glyphosate							
	11/27/2012	17:09	682166	(EPA 547)	Glyphosate	ND	ug/L	6	1
		EPA 300.0 - Nitrate, Nitrite by EPA 300.0							
	11/26/2012	23:12	682587	(EPA 300.0)	Nitrate as Nitrogen by IC	8.4	mg/L	0.2	2
	11/26/2012	23:12	682587	(EPA 300.0)	Nitrate as NO3 (calc)	37	mg/L	0.88	2
	11/26/2012	23:12	682587	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
		SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)							
	12/03/2012	14:06	682756	(SM4500-PE/EPA 365.1)	Total phosphorus as P	0.042	mg/L	0.02	1
		EPA 351.2 - Total Kjeldahl Nitrogen							
	12/04/2012	12:12	683470	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
		EPA 350.1 - Ammonia Nitrogen							
	11/29/2012	18:50	683187	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
		EPA 180.1 - Turbidity							
	11/27/2012	10:01	682272	(EPA 180.1)	Turbidity	1.1	NTU	0.05	1
		4500P-E/365.1 - Orthophosphate as P (OPO4)							
	11/27/2012	15:55	682348	(4500P-E/365.1)	Orthophosphate as P	0.034	mg/L	0.01	1

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Laboratory Data Report: 416443

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Samples Received on:
11/26/2012

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
HCC112612 (201211260037)					**Sampled on 11/26/2012 1210**			
		EPA 8141A - Organophosphorous Pesticides (Sub)						
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Azinphos methyl	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Bolstar	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Chlorpyrifos	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Coumaphos	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Demeton	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Diazinon	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Dichlorvos	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Disulfoton	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Ethoprop	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Fensulfothion	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Fenthion	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Methyl Parathion	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Mevinphos	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Naled	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Phorate	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Ronnel	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Stirophos	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Tokuthion	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Trichloronate	ND	ug/L	0.99	1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Tributylphosphate	92	%		1
11/29/2012	12/03/2012	18:57	(EPA 8141A)	Triphenyl Phosphate	102	%		1
		EPA 608 - Organochlorine Pesticides						
11/29/2012	11/30/2012	17:06	(EPA 608)	4,4-DDD	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	4,4-DDE	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	4,4-DDT	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	Aldrin	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	alpha-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	alpha-Chlordane	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	beta-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	delta-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	Dieldrin	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	Endosulfan I (Alpha)	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	Endosulfan II (Beta)	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06	(EPA 608)	Endosulfan Sulfate	ND	ug/L	0.1	1

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory Data Report: 416443

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
11/26/2012

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
11/29/2012	11/30/2012	17:06		(EPA 608)	Endrin	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Endrin Aldehyde	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Endrin Ketone	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Gamma-BHC	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	gamma-Chlordane	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Heptachlor	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Heptachlor Epoxide	ND	ug/L	0.1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Methoxychlor	ND	ug/L	1	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Toxaphene	ND	ug/L	2	1
11/29/2012	11/30/2012	17:06		(EPA 608)	Decachlorobiphenyl	104	%		1
11/29/2012	11/30/2012	17:06		(EPA 608)	Tetrachlorometaxylene	96	%		1
		SM 9221C - Fecal Coliform Bacteria							
	11/26/2012	14:04	683117	(SM 9221C)	Fecal Coliform Bacteria	130	MPN/100 mL	2	1
		SM 9221B - Total Coliform Bacteria							
	11/26/2012	14:04	683119	(SM 9221B)	Total Coliform Bacteria	230	MPN/100 mL	2	1
		S4500PE/ 365.1 - Total phosphorus as PO4- Calc.							
	12/05/2012	11:22		(S4500PE/ 365.1)	Total phosphorus as PO4- Calc.	0.080	mg/L	0.031	1
		4500P-E/365.1 - Orthophosphate as PO4 (CAL)							
	11/28/2012	09:53		(4500P-E/365.1)	Orthophosphate as PO4	0.080	mg/L	0.031	1
		SM 4500-CL G - Total Chlorine Residual (H3=past HT not compliant)							
	11/26/2012	00:00	683231	(SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
		EPA 547 - Glyphosate							
	11/27/2012	17:21	682166	(EPA 547)	Glyphosate	ND	ug/L	6	1
		EPA 300.0 - Nitrate, Nitrite by EPA 300.0							
	11/26/2012	23:25	682587	(EPA 300.0)	Nitrate as Nitrogen by IC	4.6	mg/L	0.2	2
	11/26/2012	23:25	682587	(EPA 300.0)	Nitrate as NO3 (calc)	20	mg/L	0.88	2
	11/26/2012	23:25	682587	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
		SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)							
	12/03/2012	14:08	682756	(SM4500-PE/EPA 365.1)	Total phosphorus as P	0.026	mg/L	0.02	1
		EPA 351.2 - Total Kjeldahl Nitrogen							
	12/04/2012	12:13	683470	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
		EPA 350.1 - Ammonia Nitrogen							
	11/29/2012	18:54	683187	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
		EPA 180.1 - Turbidity							
	11/27/2012	10:02	682272	(EPA 180.1)	Turbidity	0.48	NTU	0.05	1
		4500P-E/365.1 - Orthophosphate as P (OPO4)							
	11/27/2012	15:56	682348	(4500P-E/365.1)	Orthophosphate as P	0.026	mg/L	0.01	1

Rounding on totals after summation.
(c) - indicates calculated results

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Laboratory Data
Report: 416443

MWH Americas - Arcadia
Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
11/26/2012

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution

Rounding on totals after summation.
(c) - indicates calculated results

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MWH Americas - Arcadia

QC Ref # 682166 - Glyphosate — **Analysis Date: 11/27/2012**

201211260029	BTW112612	Analyzed by: XWO
201211260035	TJPOUT112612	Analyzed by: XWO
201211260036	TJPIN112612	Analyzed by: XWO
201211260037	HCC112612	Analyzed by: XWO

QC Ref # 682272 - Turbidity — **Analysis Date: 11/27/2012**

201211260029	BTW112612	Analyzed by: LLL
201211260035	TJPOUT112612	Analyzed by: LLL
201211260036	TJPIN112612	Analyzed by: LLL
201211260037	HCC112612	Analyzed by: LLL

QC Ref # 682348 - Orthophosphate as P (OPO4) — **Analysis Date: 11/27/2012**

201211260029	BTW112612	Analyzed by: JMO
201211260035	TJPOUT112612	Analyzed by: JMO
201211260036	TJPIN112612	Analyzed by: JMO
201211260037	HCC112612	Analyzed by: JMO

QC Ref # 682587 - Nitrate, Nitrite by EPA 300.0 — **Analysis Date: 11/26/2012**

201211260029	BTW112612	Analyzed by: CYP
201211260035	TJPOUT112612	Analyzed by: CYP
201211260036	TJPIN112612	Analyzed by: CYP
201211260037	HCC112612	Analyzed by: CYP

QC Ref # 682756 - Total phosphorus as P (T-P) — **Analysis Date: 12/03/2012**

201211260029	BTW112612	Analyzed by: QMK
201211260035	TJPOUT112612	Analyzed by: QMK
201211260036	TJPIN112612	Analyzed by: QMK
201211260037	HCC112612	Analyzed by: QMK

QC Ref # 683117 - Fecal Coliform Bacteria — **Analysis Date: 11/26/2012**

201211260029	BTW112612	Analyzed by: JJN
201211260035	TJPOUT112612	Analyzed by: JJN
201211260036	TJPIN112612	Analyzed by: JJN
201211260037	HCC112612	Analyzed by: JJN

QC Ref # 683119 - Total Coliform Bacteria — **Analysis Date: 11/26/2012**

201211260029	BTW112612	Analyzed by: JJN
201211260035	TJPOUT112612	Analyzed by: JJN
201211260036	TJPIN112612	Analyzed by: JJN
201211260037	HCC112612	Analyzed by: JJN

QC Ref # 683187 - Ammonia Nitrogen — **Analysis Date: 11/29/2012**

201211260029	BTW112612	Analyzed by: QMK
201211260035	TJPOUT112612	Analyzed by: QMK
201211260036	TJPIN112612	Analyzed by: QMK
201211260037	HCC112612	Analyzed by: QMK

QC Ref # 683231 - Total Chlorine Residual (H3=past HT not complian — **Analysis Date: 11/26/2012**

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201211260029	BTW112612	Analyzed by: CCQ
201211260035	TJPOUT112612	Analyzed by: CCQ
201211260036	TJPIN112612	Analyzed by: CCQ
201211260037	HCC112612	Analyzed by: CCQ

QC Ref # 683470 - Total Kjeldahl Nitrogen **Analysis Date: 12/04/2012**

201211260029	BTW112612	Analyzed by: KXS
201211260035	TJPOUT112612	Analyzed by: KXS
201211260036	TJPIN112612	Analyzed by: KXS
201211260037	HCC112612	Analyzed by: KXS

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Laboratory QC Report: 416443

MWH Americas - Arcadia

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
QC Ref# 682166 - Glyphosate by EPA 547						**Analysis Date: 11/27/2012**			
CCCH	Glyphosate		25	20.8	ug/L	83	(80-120)		
CCCM	Glyphosate		10	9.34	ug/L	93	(80-120)		
LCS1	Glyphosate		10	11.5	ug/L	115	(70-130)		
MBLK	Glyphosate			<6	ug/L				
MRL_CHK	Glyphosate		6.0	4.34	ug/L	72	(50-150)		
MS_201211210166	Glyphosate	ND	10	9.19	ug/L	92	(70-130)		
MS2_201211190286	Glyphosate	ND	10	9.32	ug/L	93	(70-130)		
MSD_201211210166	Glyphosate	ND	10	9.43	ug/L	94	(70-130)	20	2.6
QC Ref# 682272 - Turbidity by EPA 180.1						**Analysis Date: 11/27/2012**			
DUP1_201211260305	Turbidity	0.12		0.112	NTU		(0-20)	20	8.5
DUP2_201211260186	Turbidity	0.11		0.114	NTU		(0-10)	10	2.7
LCS1	Turbidity		20	21.8	NTU	109	(90-110)		
LCS2	Turbidity		20	21.9	NTU	110	(90-110)	20	0.46
MBLK	Turbidity			<0.05	NTU				
MRL_CHK	Turbidity		0.05	0.0570	NTU	114	(50-150)		
QC Ref# 682348 - Orthophosphate as P (OPO4) by 4500P-E/365.1						**Analysis Date: 11/27/2012**			
LCS1	Orthophosphate as P		0.25	0.267	mg/L	107	(90-110)		
LCS2	Orthophosphate as P		0.25	0.263	mg/L	105	(90-110)	20	1.5
MBLK	Orthophosphate as P			<0.01	mg/L				
MRL_CHK	Orthophosphate as P		0.01	0.00900	mg/L	90	(50-150)		
MS_201211210166	Orthophosphate as P	0.092	0.5	0.602	mg/L	102	(90-110)		
MSD_201211210166	Orthophosphate as P	0.092	0.5	0.603	mg/L	102	(90-110)	20	0.17
QC Ref# 682587 - Nitrate, Nitrite by EPA 300.0 by EPA 300.0						**Analysis Date: 11/26/2012**			
LCS1	Nitrate as Nitrogen by IC		2.5	2.49	mg/L	100	(90-110)		
LCS2	Nitrate as Nitrogen by IC		2.5	2.55	mg/L	102	(90-110)	20	2.4
MBLK	Nitrate as Nitrogen by IC			<0.10	mg/L				
MRL_CHK	Nitrate as Nitrogen by IC		0.05	0.0520	mg/L	104	(50-150)		
MS_201211260121	Nitrate as Nitrogen by IC	3.5	1.3	6.18	mg/L	106	(80-120)		
MS_201211260029	Nitrate as Nitrogen by IC	ND	1.3	2.55	mg/L	102	(80-120)		
MSD_201211260029	Nitrate as Nitrogen by IC	ND	1.3	2.55	mg/L	102	(80-120)	20	0.0
MSD_201211260121	Nitrate as Nitrogen by IC	3.5	1.3	6.21	mg/L	107	(80-120)	20	0.32
LCS1	Nitrite Nitrogen by IC		1.0	0.970	mg/L	97	(90-110)		
LCS2	Nitrite Nitrogen by IC		1.0	0.976	mg/L	98	(90-110)	20	0.62
MBLK	Nitrite Nitrogen by IC			<0.10	mg/L				
MRL_CHK	Nitrite Nitrogen by IC		0.05	0.0501	mg/L	100	(50-150)		

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.
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).
(S) - Indicates surrogate compound.
(I) - Indicates internal standard compound.

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Laboratory QC
Report: 416443

MWH Americas - Arcadia

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
MS_201211260029	Nitrite Nitrogen by IC	ND	0.5	0.984	mg/L	98	(80-120)		
MS_201211260121	Nitrite Nitrogen by IC	ND	0.5	0.892	mg/L	89	(80-120)		
MSD_201211260029	Nitrite Nitrogen by IC	ND	0.5	0.990	mg/L	99	(80-120)	20	0.61
MSD_201211260121	Nitrite Nitrogen by IC	ND	0.5	0.896	mg/L	90	(80-120)	20	0.45

QC Ref# 682756 - Total phosphorus as P (T-P) by SM4500-PE/EPA 365.1 **Analysis Date: 12/03/2012**

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
LCS1	Total phosphorus as P		0.4	0.402	mg/L	100	(90-110)		
LCS2	Total phosphorus as P		0.4	0.403	mg/L	101	(90-110)	20	0.25
MBLK	Total phosphorus as P			<0.02	mg/L				
MRL_CHK	Total phosphorus as P		0.02	0.0193	mg/L	97	(50-150)		
MS_201211150155	Total phosphorus as P	0.19	0.4	0.626	mg/L	109	(90-110)		
MS_201211150316	Total phosphorus as P	0.030	0.4	0.389	mg/L	90	(90-110)		
MSD_201211150316	Total phosphorus as P	0.030	0.4	0.373	mg/L	86	(90-110)	20	4.2
MSD_201211150155	Total phosphorus as P	0.19	0.4	0.597	mg/L	102	(90-110)	20	4.7

QC Ref# 683187 - Ammonia Nitrogen by EPA 350.1 **Analysis Date: 11/29/2012**

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
LCS1	Ammonia Nitrogen		1.0	1.00	mg/L	100	(90-110)		
LCS2	Ammonia Nitrogen		1.0	0.995	mg/L	100	(90-110)	20	0.50
MBLK	Ammonia Nitrogen			<0.05	mg/L				
MRL_CHK	Ammonia Nitrogen		0.05	0.0469	mg/L	94	(50-112)		
MS_201211190044	Ammonia Nitrogen	0.41	1.0	1.34	mg/L	93	(90-110)		
MS_201211260036	Ammonia Nitrogen	ND	1.0	0.993	mg/L	97	(90-110)		
MSD_201211190044	Ammonia Nitrogen	0.41	1.0	1.35	mg/L	94	(90-110)	20	0.74
MSD_201211260036	Ammonia Nitrogen	ND	1.0	1.01	mg/L	99	(90-110)	20	1.7

QC Ref# 683470 - Total Kjeldahl Nitrogen by EPA 351.2 **Analysis Date: 12/04/2012**

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
LCS1	Kjeldahl Nitrogen		4.0	4.03	mg/L	101	(90-110)		
LCS2	Kjeldahl Nitrogen		4.0	3.82	mg/L	96	(90-110)	20	5.3
MBLK	Kjeldahl Nitrogen			<0.1	mg/L				
MRL_CHK	Kjeldahl Nitrogen		0.2	0.193	mg/L	97	(50-150)		
MS_201211200455	Kjeldahl Nitrogen	0.46	4.0	4.44	mg/L	100	(90-110)		
MS_201211240020	Kjeldahl Nitrogen	ND	4.0	2.57	mg/L	64	(90-110)		
MSD_201211200455	Kjeldahl Nitrogen	0.46	4.0	4.28	mg/L	96	(90-110)	20	3.7
MSD_201211240020	Kjeldahl Nitrogen	ND	4.0	2.71	mg/L	68	(90-110)	20	5.3

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.
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).
(S) - Indicates surrogate compound.
(I) - Indicates internal standard compound.

TABLE OF CONTENTS

CLIENT: **EUROFINS EATON ANALYTICAL**

PROJECT: **416443**

SDG: **12K232**

** - Not Requested

EMAX
LABORATORIES, INC.
1835 W. 205th Street
Torrance, CA 90501
Tel: (310) 618-8889
Fax: (310) 618-0818

Date: 12-07-2012
EMAX Batch No.: 12K232

Attn: Jackie Contreras

Eurofins Eaton Analytical
750 Royal Oaks Dr., Suite 100
Monrovia, CA 91016-3629

Subject: Laboratory Report
Project: 416443

Enclosed is the Laboratory report for samples received on 11/28/12.
The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
201211260029	K232-01	11/26/12	WATER	PESTICIDES ORGANOPHOSPHORUS PESTICIDES
201211260035	K232-02	11/26/12	WATER	PESTICIDES ORGANOPHOSPHORUS PESTICIDES
201211260036	K232-03	11/26/12	WATER	PESTICIDES ORGANOPHOSPHORUS PESTICIDES
201211260037	K232-04	11/26/12	WATER	PESTICIDES ORGANOPHOSPHORUS PESTICIDES

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 results included in this report meets all NELAC & DOD requirements unless noted in the Case Narrative.

NELAC Accredited Certificate Number 02116CA
L-A-B Accredited DoD ELAP and ISO/IEC 17025 Certificate Number L2278 Testing

eurofins | Eaton Analytical
formerly MWH Laboratories

Ship To:
1835 W. 205th St.
EMAX Laboratories, Inc.

Torrance, CA 90501 12K232

Phone: 310-618-8889 Fax: 310-618-0818

Folder #:	Report Due:	Sub PO #:
416443	12/11/2012	99-19823

Submittal Form & Purchase Order 99-19823

Date: 11/27/2012

*REPORTING REQUIRMENTS: *Do Not Combine Reports with any other samples submitted under different Folder Numbers!*
Report & Invoice must have the Folder # **416443** Sub PO# **99-19823** 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.

Reports: Jackie Contreras Sub-Contracting Administrator
EMAIL TO: us20_subcontract@eurofinsus.com
Eurofins Eaton Analytical 750 Royal Oaks Drive, Suite 100, Monrovia, CA 91016
Phone (626) 386-1165 Fax (626) 386-1122
Invoices to: Eurofins Eaton Analytical
Accounts Payable PO Box 12425, Lancaster, PA 17605

Provide in each Report the Specified State Certification # & Exp Date for requested tests + matrix.
Samples from: **CALIFORNIA**

JLS	Use Lab Order # for ID	Client Sample ID for reference only	Analysis Requested	Sample Date & Time	Matrix	PWS Systemcode	PWSID
	1 201211260029	BTW112612		11/26/12 0930	DW		
EPA 608	@608_PEST		Organochlorine Pesticides				
EPA 8141A	@8141EDD		Organophosphorous Pesticides (Sub)				
	2 201211260035	TJPOUT112612		11/26/12 1000	DW		
EPA 608	@608_PEST		Organochlorine Pesticides				
EPA 8141A	@8141EDD		Organophosphorous Pesticides (Sub)				
	3 201211260036	TJPIN112612		11/26/12 1130	DW		
EPA 608	@608_PEST		Organochlorine Pesticides				
EPA 8141A	@8141EDD		Organophosphorous Pesticides (Sub)				
	4 201211260037	HCC112612		11/26/12 1210	DW		
EPA 608	@608_PEST		Organochlorine Pesticides				
EPA 8141A	@8141EDD		Organophosphorous Pesticides (Sub)				

T= 2.2°C

Relinquished by: M. DEMESA Sample Control EEA Date 11-27-12 Time 1155
Received by: [signature] Date 11/28/12 Time 0930

NOTIFICATION REQUIRED IF RECEIVED OUTSIDE OF 0-6 CELSIUS
An Acknowledgement of Receipt is requested to attn: Jackie Contreras

EMAX LABORATORIES, INC.

SAMPLE RECEIPT FORM 1

Type of Delivery	Airbill / Tracking Number	
☑ Fedex ☐ UPS ☐ GSO ☐ Others ____	4294 2884 9897	ECN 12K232
☐ EMAX Courier ☐ Client Delivery		Recipient I PATEL
		Date 11/28/12 Time 0930

COC Inspection

☑ Client Name ☑ Client PM/FC JV ☑ Sampler Name ☑ Sampling Date/Time/Location ☑ Sample ID ☐ Matrix

☑ Address ☑ Tel # / Fax # ☐ Courier Signature ☑ Analysis Required ☐ Preservative (if any) ☑ TAT

Safety Issues (if any) ☐ 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) D ☑ Cooler 1 2.2 °C ☐ Cooler 2 ____ °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* *C - S/N 122091701* *D - S/N 122091758*

Comments: ☐ **Temperature is out of range. PM was informed IMMEDIATELY.**

Note: pH holding time requirement for water samples is 15 mins. Water samples for pH analysis are received beyond 15 minutes from sampling time.

DISCREPANCIES

LSID	LSCID	Description Code	Sample Label ID / Information	Corrective Action Code
2	3-4	D3	Time on label - 11:00	R2

☐ **Continue to next page.**

REVIEWS Sample Labeling [signature] Date 11/28/12 [signature] 11/28/12 SRF [signature] Date 11/28/12 PM RB Date 11/28/12

LEGEND:

Code	Description- Sample Management
A1	Analysis is not indicated in COC.
A2	Analysis is not indicated in label.
A3	Analysis is inconsistent in COC vis-à-vis label.
B1	Sample ID is not indicated in COC.
B2	Sample ID is not indicated in label.
B3	Sample ID is inconsistent in COC vis-à-vis label.
C1	Improper container
C2	Broken container
C3	Leaking container
D1	Date and/or time is not indicated in COC.
D2	Date and/or time is not indicated in label.
D3	Date and/or time is inconsistent in COC vis-à-vis label.
F1	Improper preservation
F2	Insufficient Sample
F3	Bubble is > 6mm. Use vial with smallest bubble first.
F4	Bubble is > 6mm in all vials.
F5	>20 % solid particle
F6	Out of Holding Time

Code	Description-Sample Management
G1	Sample indicated in COC is not received.
G2	MS/MSD is not indicated in COC.
G3	No identified trip blank, proceed as indicated in COC.
G4	Trip Blank is designated in SDG ____
G5	Trip Blank has no sampling date & time. Log-in with earliest sampling date and 0:00 time.
H1	____

Code	Description-Project Management
R1	Hold sample(s); wait for further instructions
R2	Proceed as indicated in COC and inform client.
R3	Refer to attached instruction
R4	Cancel the analysis
R5	Inform client.
R6	Proceed as indicated in COC

ORIGIN ID: WHPA (626) 386-1116
JEREMY HANSEN
EUROFINS EATON ANALYTICAL
750 ROYAL OAKS DR

MONROVIA, CA 91016
UNITED STATES US

SHIP DATE: 27NOV12
ACTWGT: 82.7 LB
CAD: 0031999/CAFE2605
DIMS: 28x15x16 IN

BILL SENDER

TO **SAMPLE RECEIVING**
EMAX LABORATORIES, INC.
1835 205TH STREET

TORRANCE CA 90501
(310) 618-8889 X 118 PO: MLD
DEPT: SAMPLE PREP. / SHIPPING

12K229 TO
12K232
11/28/12
0930

FedEx
Express

E

T=2.2C

WED - 28 NOV A

TRK# 0201 **4294 2884 9897**

STANDARD OVERNIGHT

92 HHRA

90501
CA-US **LAX**

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

EUROFINS EATON ANALYTICAL

416443

METHOD 608
PESTICIDES

SDG#: 12K232

CASE NARRATIVE

Client : EUROFINS EATON ANALYTICAL

Project : 416443

SDG : 12K232

METHOD 608
PESTICIDES

A total of four (4) water samples were received on 11/28/12 for Pesticides analysis, Method 608 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 of 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. Results were compliant to project requirement.

Lab Control Sample
A set of LCS/LCD was analyzed with the samples in this SDG. Percent recoveries for CPK028WL/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. Refer to sample result forms for details.

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 was 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 : EUROFINS EATON ANALYTICAL
Project : 416443

SDG NO. : 12K232
Instrument ID : GCE8

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1W	CPK028WB	1	NA	11/30/1214:58	11/29/1211:15	MK28087A	MK28083A	CPK028W	Method Blank
LCS1W	CPK028WL	1	NA	11/30/1215:20	11/29/1211:15	MK28088A	MK28083A	CPK028W	Lab Control Sample (LCS)
LCD1W	CPK028WC	1	NA	11/30/1215:41	11/29/1211:15	MK28089A	MK28083A	CPK028W	LCS Duplicate
201211260029	K232-01	1.01	NA	11/30/1216:02	11/29/1211:15	MK28090A	MK28083A	CPK028W	Field Sample
201211260035	K232-02	0.96	NA	11/30/1216:24	11/29/1211:15	MK28091A	MK28083A	CPK028W	Field Sample
201211260036	K232-03	0.92	NA	11/30/1216:45	11/29/1211:15	MK28092A	MK28083A	CPK028W	Field Sample
201211260037	K232-04	1	NA	11/30/1217:06	11/29/1211:15	MK28093A	MK28083A	CPK028W	Field Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD 608
PESTICIDES

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	11/26/12
Project	: 416443	Date Received:	11/28/12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	201211260029	Date Analyzed:	11/30/12 16:02
Lab Samp ID:	K232-01	Dilution Factor:	1.01
Lab File ID:	MK28090A	Matrix	: WATER
Ext Btch ID:	CPK028W	% Moisture	: NA
Calib. Ref.:	MK28083A	Instrument ID	: GCE8

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|0.016J	0.10	0.010|0.010
GAMMA-BHC (LINDANE)	0.015J|(ND)	0.10	0.010|0.010
BETA-BHC	(ND)|ND	0.10	0.010|0.010
HEPTACHLOR	(ND)|ND	0.10	0.010|0.010
DELTA-BHC	0.011J|(ND)	0.10	0.010|0.010
ALDRIN	(ND)|ND	0.10	0.010|0.010
HEPTACHLOR EPOXIDE	(ND)|ND	0.10	0.010|0.010
GAMMA-CHLORDANE	(ND)|ND	0.10	0.010|0.010
ALPHA-CHLORDANE	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN I	(ND)|ND	0.10	0.010|0.010
4,4'-DDE	(ND)|ND	0.10	0.010|0.010
DIELDRIN	(ND)|ND	0.10	0.010|0.010
ENDRIN	(ND)|ND	0.10	0.010|0.010
4,4'-DDD	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN II	(ND)|ND	0.10	0.010|0.010
4,4'-DDT	(ND)|ND	0.10	0.010|0.010
ENDRIN ALDEHYDE	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN SULFATE	(ND)|ND	0.10	0.010|0.010
ENDRIN KETONE	(ND)|ND	0.10	0.010|0.010
METHOXYCHLOR	(ND)|ND	1.0	0.10|0.10
TOXAPHENE	(ND)|ND	2.0	0.51|0.51

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.3540|(0.3818)	0.4040	87.6|(94.5)	30-140
DECACHLOROBIPHENYL	0.3989|(0.4238)	0.4040	98.7|(105)	60-130

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD 608
PESTICIDES

Client : EUROFINS EATON ANALYTICAL	Date Collected: 11/26/12
Project : 416443	Date Received: 11/28/12
Batch No. : 12K232	Date Extracted: 11/29/12 11:15
Sample ID: 201211260035	Date Analyzed: 11/30/12 16:24
Lab Samp ID: K232-02	*Dilution Factor:* 0.96
Lab File ID: MK28091A	Matrix : WATER
Ext Btch ID: CPK028W	% Moisture : NA
Calib. Ref.: MK28083A	Instrument ID : GCE8

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.096	0.0096|0.0096
GAMMA-BHC (LINDANE)	(ND)|ND	0.096	0.0096|0.0096
BETA-BHC	(ND)|ND	0.096	0.0096|0.0096
HEPTACHLOR	(ND)|ND	0.096	0.0096|0.0096
DELTA-BHC	(ND)|ND	0.096	0.0096|0.0096
ALDRIN	(ND)|ND	0.096	0.0096|0.0096
HEPTACHLOR EPOXIDE	*(ND)*|ND	0.096	0.0096|0.0096
GAMMA-CHLORDANE	(ND)|ND	0.096	0.0096|0.0096
ALPHA-CHLORDANE	(ND)|ND	0.096	0.0096|0.0096
ENDOSULFAN I	0.011J|(ND)	0.096	0.0096|0.0096
4,4'-DDE	(ND)|ND	0.096	0.0096|0.0096
DIELDRIN	(ND)|ND	0.096	0.0096|0.0096
ENDRIN	(ND)|ND	0.096	0.0096|0.0096
4,4'-DDD	(ND)|ND	0.096	0.0096|0.0096
ENDOSULFAN II	(ND)|ND	0.096	0.0096|0.0096
4,4'-DDT	(ND)|ND	0.096	0.0096|0.0096
ENDRIN ALDEHYDE	(ND)|ND	0.096	0.0096|0.0096
ENDOSULFAN SULFATE	(ND)|ND	0.096	0.0096|0.0096
ENDRIN KETONE	(ND)|ND	0.096	0.0096|0.0096
METHOXYCHLOR	(ND)|ND	0.96	0.096|0.096
TOXAPHENE	(ND)|ND	1.9	0.48|0.48

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.3478|(0.3610)	0.3840	90.6|(94.0)	30-140
DECACHLOROBIPHENYL	0.3773|(0.4055)	0.3840	98.3|(106)	60-130

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD 608
PESTICIDES

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	11/26/12
Project	: 416443	Date Received:	11/28/12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	201211260036	Date Analyzed:	11/30/12 16:45
Lab Samp ID:	K232-03	Dilution Factor:	0.92
Lab File ID:	MK28092A	Matrix	: WATER
Ext Btch ID:	CPK028W	% Moisture	: NA
Calib. Ref.:	MK28083A	Instrument ID	: GCE8

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.092	0.0092|0.0092
GAMMA-BHC (LINDANE)	(ND)|ND	0.092	0.0092|0.0092
BETA-BHC	(ND)|ND	0.092	0.0092|0.0092
HEPTACHLOR	(ND)|ND	0.092	0.0092|0.0092
DELTA-BHC	(ND)|ND	0.092	0.0092|0.0092
ALDRIN	(ND)|ND	0.092	0.0092|0.0092
HEPTACHLOR EPOXIDE	(ND)|ND	0.092	0.0092|0.0092
GAMMA-CHLORDANE	(ND)|ND	0.092	0.0092|0.0092
ALPHA-CHLORDANE	(ND)|ND	0.092	0.0092|0.0092
ENDOSULFAN I	(ND)|ND	0.092	0.0092|0.0092
4,4'-DDE	(ND)|ND	0.092	0.0092|0.0092
DIELDRIN	(ND)|ND	0.092	0.0092|0.0092
ENDRIN	(ND)|ND	0.092	0.0092|0.0092
4,4'-DDD	(ND)|ND	0.092	0.0092|0.0092
ENDOSULFAN II	(ND)|ND	0.092	0.0092|0.0092
4,4'-DDT	(ND)|ND	0.092	0.0092|0.0092
ENDRIN ALDEHYDE	(ND)|ND	0.092	0.0092|0.0092
ENDOSULFAN SULFATE	(ND)|ND	0.092	0.0092|0.0092
ENDRIN KETONE	(ND)|ND	0.092	0.0092|0.0092
METHOXYCHLOR	(ND)|ND	0.92	0.092|0.092
TOXAPHENE	(ND)|ND	1.8	0.46|0.46

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(0.3503)|0.3503	0.3680	(95.2)|95.2	30-140
DECACHLOROBIPHENYL	0.3706|(0.3971)	0.3680	101|(108)	60-130

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD 608
PESTICIDES

Client : EUROFINS EATON ANALYTICAL	Date Collected: 11/26/12
Project : 416443	Date Received: 11/28/12
Batch No. : 12K232	Date Extracted: 11/29/12 11:15
Sample ID: 201211260037	Date Analyzed: 11/30/12 17:06
Lab Samp ID: K232-04	Dilution Factor: 1
Lab File ID: MK28093A	Matrix : WATER
Ext Btch ID: CPK028W	% Moisture : NA
Calib. Ref.: MK28083A	Instrument ID : GCE8

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.10	0.010|0.010
GAMMA-BHC (LINDANE)	(ND)|ND	0.10	0.010|0.010
BETA-BHC	(ND)|ND	0.10	0.010|0.010
HEPTACHLOR	(ND)|ND	0.10	0.010|0.010
DELTA-BHC	(ND)|ND	0.10	0.010|0.010
ALDRIN	(ND)|ND	0.10	0.010|0.010
HEPTACHLOR EPOXIDE	(ND)|ND	0.10	0.010|0.010
GAMMA-CHLORDANE	(ND)|ND	0.10	0.010|0.010
ALPHA-CHLORDANE	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN I	(ND)|ND	0.10	0.010|0.010
4,4'-DDE	(ND)|ND	0.10	0.010|0.010
DIELDRIN	(ND)|ND	0.10	0.010|0.010
ENDRIN	(ND)|ND	0.10	0.010|0.010
4,4'-DDD	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN II	(ND)|ND	0.10	0.010|0.010
4,4'-DDT	(ND)|ND	0.10	0.010|0.010
ENDRIN ALDEHYDE	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN SULFATE	(ND)|ND	0.10	0.010|0.010
ENDRIN KETONE	(ND)|ND	0.10	0.010|0.010
METHOXYCHLOR	(ND)|ND	1.0	0.10|0.10
TOXAPHENE	(ND)|ND	2.0	0.50|0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.3723|(0.3844)	0.4000	93.1|(96.1)	30-140
DECACHLOROBIPHENYL	0.4015|(0.4150)	0.4000	100|(104)	60-130

RL : Reporting limit
Left of \| is related to first column ; Right of \| related to second column
Final result indicated by ( )

QC SUMMARIES

METHOD 608
PESTICIDES

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	NA
Project	: 416443	Date Received:	11/29/12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	MBLK1W	Date Analyzed:	11/30/12 14:58
Lab Samp ID:	CPK028WB	Dilution Factor:	1
Lab File ID:	MK28087A	Matrix	: WATER
Ext Btch ID:	CPK028W	% Moisture	: NA
Calib. Ref.:	MK28083A	Instrument ID	: GCE8

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	0.10	0.010|0.010
GAMMA-BHC (LINDANE)	(ND)|ND	0.10	0.010|0.010
BETA-BHC	(ND)|ND	0.10	0.010|0.010
HEPTACHLOR	(ND)|ND	0.10	0.010|0.010
DELTA-BHC	(ND)|ND	0.10	0.010|0.010
ALDRIN	(ND)|ND	0.10	0.010|0.010
HEPTACHLOR EPOXIDE	(ND)|ND	0.10	0.010|0.010
GAMMA-CHLORDANE	(ND)|ND	0.10	0.010|0.010
ALPHA-CHLORDANE	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN I	(ND)|ND	0.10	0.010|0.010
4,4'-DDE	(ND)|ND	0.10	0.010|0.010
DIELDRIN	(ND)|ND	0.10	0.010|0.010
ENDRIN	(ND)|ND	0.10	0.010|0.010
4,4'-DDD	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN II	(ND)|ND	0.10	0.010|0.010
4,4'-DDT	(ND)|ND	0.10	0.010|0.010
ENDRIN ALDEHYDE	(ND)|ND	0.10	0.010|0.010
ENDOSULFAN SULFATE	(ND)|ND	0.10	0.010|0.010
ENDRIN KETONE	(ND)|ND	0.10	0.010|0.010
METHOXYCHLOR	(ND)|ND	1.0	0.10|0.10
TOXAPHENE	(ND)|ND	2.0	0.50|0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(0.4102)|0.4024	0.4000	(103)|101	30-130
DECACHLOROBIPHENYL	(0.4183)|0.3829	0.4000	(105)|95.7	60-130

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:	EUROFINS EATON ANALYTICAL		
PROJECT:	416443		
BATCH NO.:	12K232		
METHOD:	METHOD 608		

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	CPK028WB	CPK028WL	CPK028WC		
LAB FILE ID:	MK28087A	MK28088A	MK28089A		
DATE EXTRACTED:	11/29/1211:15	11/29/1211:15	11/29/1211:15	DATE COLLECTED:	NA
DATE ANALYZED:	11/30/1214:58	11/30/1215:20	11/30/1215:41	DATE RECEIVED:	11/29/12
PREP. BATCH:	CPK028W	CPK028W	CPK028W		
CALIB. REF:	MK28083A	MK28083A	MK28083A		

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	0.200	0.217|(0.232)	108|(116)	0.200	0.202|(0.226)	101|(113)	7|(3)	70-130	30
Heptachlor	(ND)|ND	0.200	0.211|(0.221)	105|(110)	0.200	0.199|(0.213)	100|(106)	6|(4)	60-130	30
Aldrin	(ND)|ND	0.200	0.214|(0.222)	107|(111)	0.200	0.201|(0.213)	100|(106)	6|(4)	70-130	30
Dieldrin	(ND)|ND	0.200	0.206|(0.225)	103|(112)	0.200	0.193|(0.211)	96|(105)	7|(6)	70-140	30
Endrin	(ND)|ND	0.200	0.209|(0.233)	104|(116)	0.200	0.204|(0.224)	102|(112)	2|(4)	70-140	30
4,4'-DDT	(ND)|ND	0.200	0.230|(0.241)	115|(120)	0.200	0.217|(0.226)	108|(113)	6|(6)	70-140	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	0.4000	0.3645|(0.3728)	91.1|(93.2)	0.4000	0.3507|(0.3604)	87.7|(90.1)	30-130
Decachlorobiphenyl	0.4000	0.3996|(0.4247)	99.9|(106)	0.4000	0.4013|(0.4279)	100|(107)	60-130

LABORATORY REPORT FOR

EUROFINS EATON ANALYTICAL

416443

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

SDG#: 12K232

CASE NARRATIVE

Client : EUROFINS EATON ANALYTICAL

Project : 416443

SDG : 12K232

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

A total of four (4) water samples were received on 11/28/12 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. Refer to calibration summary forms of 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. Results were compliant to project requirement.

Lab Control Sample
A set of LCS/LCD was analyzed with the samples in this SDG. Percent recoveries for NPK001WL/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. Refer to sample result forms for details.

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 : EUROFINS EATON ANALYTICAL
Project : 416443

SDG NO. : 12K232
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	NPK001WB	1	NA	12/03/1215:33	11/29/1211:15	ZL03003A	ZL03002A	NPK001W	Method Blank
LCS1W	NPK001WL	1	NA	12/03/1216:07	11/29/1211:15	ZL03004A	ZL03002A	NPK001W	Lab Control Sample (LCS)
LCD1W	NPK001WC	1	NA	12/03/1216:41	11/29/1211:15	ZL03005A	ZL03002A	NPK001W	LCS Duplicate
201211260029	K232-01	1.09	NA	12/03/1217:15	11/29/1211:15	ZL03006A	ZL03002A	NPK001W	Field Sample
201211260035	K232-02	1	NA	12/03/1217:49	11/29/1211:15	ZL03007A	ZL03002A	NPK001W	Field Sample
201211260036	K232-03	1.01	NA	12/03/1218:23	11/29/1211:15	ZL03008A	ZL03002A	NPK001W	Field Sample
201211260037	K232-04	0.99	NA	12/03/1218:57	11/29/1211:15	ZL03009A	ZL03002A	NPK001W	Field Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	11/26/12
Project	: 416443	Date Received:	11/28/12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	201211260029	Date Analyzed:	12/03/12 17:15
Lab Samp ID:	K232-01	Dilution Factor:	1.09
Lab File ID:	ZL03006A	Matrix	: WATER
Ext Btch ID:	NPK001W	% Moisture	: NA
Calib. Ref.:	ZL03002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	(ND)|ND	1.1	0.55|0.55
MEVINPHOS	(ND)|ND	1.1	0.55|0.55
DEMETON	(ND)|ND	1.1	0.55|0.55
ETHOPROP	(ND)|ND	1.1	0.55|0.55
PHORATE	(ND)|ND	1.1	0.55|0.55
NALED	(ND)|ND	1.1	0.55|0.55
DIAZINON	(ND)|ND	1.1	0.55|0.55
DISULFOTON	(ND)|ND	1.1	0.55|0.55
RONNEL	(ND)|ND	1.1	0.55|0.55
CHLORPYRIFOS	(ND)|ND	1.1	0.55|0.55
FENTHION	(ND)|ND	1.1	0.55|0.55
TRICHLORONATE	(ND)|ND	1.1	0.55|0.55
METHYL PARATHION	(ND)|ND	1.1	0.55|0.55
TOKUTHION	(ND)|ND	1.1	0.55|0.55
STIROPHOS	(ND)|ND	1.1	0.55|0.55
BOLSTAR	(ND)|ND	1.1	0.55|0.55
FENSULFOTHION	(ND)|ND	1.1	0.55|0.55
AZINPHOS-METHYL	(ND)|ND	1.1	0.55|0.55
COUMAPHOS	(ND)|ND	1.1	0.55|0.55

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.351|(1.521)	1.635	82.6|(93.0)	30-130
TRIPHENYL PHOSPHATE	1.434|(1.610)	1.635	87.7|(98.5)	50-130

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	11/26/12
Project	: 416443	Date Received:	11/28/12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	201211260035	Date Analyzed:	12/03/12 17:49
Lab Samp ID:	K232-02	Dilution Factor:	1
Lab File ID:	ZL03007A	Matrix	: WATER
Ext Btch ID:	NPK001W	% Moisture	: NA
Calib. Ref.:	ZL03002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	(ND)|ND	1.0	0.50|0.50
MEVINPHOS	(ND)|ND	1.0	0.50|0.50
DEMETON	(ND)|ND	1.0	0.50|0.50
ETHOPROP	(ND)|ND	1.0	0.50|0.50
PHORATE	(ND)|ND	1.0	0.50|0.50
NALED	(ND)|ND	1.0	0.50|0.50
DIAZINON	(ND)|ND	1.0	0.50|0.50
DISULFOTON	(ND)|ND	1.0	0.50|0.50
RONNEL	(ND)|ND	1.0	0.50|0.50
CHLORPYRIFOS	(ND)|ND	1.0	0.50|0.50
FENTHION	(ND)|ND	1.0	0.50|0.50
TRICHLORONATE	(ND)|ND	1.0	0.50|0.50
METHYL PARATHION	(ND)|ND	1.0	0.50|0.50
TOKUTHION	(ND)|ND	1.0	0.50|0.50
STIROPHOS	(ND)|ND	1.0	0.50|0.50
BOLSTAR	(ND)|ND	1.0	0.50|0.50
FENSULFOTHION	(ND)|ND	1.0	0.50|0.50
AZINPHOS-METHYL	(ND)|ND	1.0	0.50|0.50
COUMAPHOS	(ND)|ND	1.0	0.50|0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.291|(1.346)	1.500	86.1|(89.7)	30-130
TRIPHENYL PHOSPHATE	1.305|(1.495)	1.500	87.0|(99.7)	50-130

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	11/26/12
Project	: 416443	Date Received:	11/28/12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	201211260036	Date Analyzed:	12/03/12 18:23
Lab Samp ID:	K232-03	Dilution Factor:	1.01
Lab File ID:	ZL03008A	Matrix	: WATER
Ext Btch ID:	NPK001W	% Moisture	: NA
Calib. Ref.:	ZL03002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	(ND)|ND	1.0	0.51|0.51
MEVINPHOS	(ND)|ND	1.0	0.51|0.51
DEMETON	(ND)|ND	1.0	0.51|0.51
ETHOPROP	(ND)|ND	1.0	0.51|0.51
PHORATE	(ND)|ND	1.0	0.51|0.51
NALED	(ND)|ND	1.0	0.51|0.51
DIAZINON	(ND)|ND	1.0	0.51|0.51
DISULFOTON	(ND)|ND	1.0	0.51|0.51
RONNEL	(ND)|ND	1.0	0.51|0.51
CHLORPYRIFOS	(ND)|ND	1.0	0.51|0.51
FENTHION	(ND)|ND	1.0	0.51|0.51
TRICHLORONATE	(ND)|ND	1.0	0.51|0.51
METHYL PARATHION	(ND)|ND	1.0	0.51|0.51
TOKUTHION	(ND)|ND	1.0	0.51|0.51
STIROPHOS	(ND)|ND	1.0	0.51|0.51
BOLSTAR	(ND)|ND	1.0	0.51|0.51
FENSULFOTHION	(ND)|ND	1.0	0.51|0.51
AZINPHOS-METHYL	(ND)|ND	1.0	0.51|0.51
COUMAPHOS	(ND)|ND	1.0	0.51|0.51

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.310|(1.312)	1.515	86.5|(86.6)	30-130
TRIPHENYL PHOSPHATE	1.356|(1.503)	1.515	89.5|(99.2)	50-130

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	11/26/12
Project	: 416443	Date Received:	11/28/12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	201211260037	Date Analyzed:	12/03/12 18:57
Lab Samp ID:	K232-04	Dilution Factor:	0.99
Lab File ID:	ZL03009A	Matrix	: WATER
Ext Btch ID:	NPK001W	% Moisture	: NA
Calib. Ref.:	ZL03002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	(ND)|ND	0.99	0.50|0.50
MEVINPHOS	(ND)|ND	0.99	0.50|0.50
DEMETON	(ND)|ND	0.99	0.50|0.50
ETHOPROP	(ND)|ND	0.99	0.50|0.50
PHORATE	(ND)|ND	0.99	0.50|0.50
NALED	(ND)|ND	0.99	0.50|0.50
DIAZINON	(ND)|ND	0.99	0.50|0.50
DISULFOTON	(ND)|ND	0.99	0.50|0.50
RONNEL	(ND)|ND	0.99	0.50|0.50
CHLORPYRIFOS	(ND)|ND	0.99	0.50|0.50
FENTHION	(ND)|ND	0.99	0.50|0.50
TRICHLORONATE	(ND)|ND	0.99	0.50|0.50
METHYL PARATHION	(ND)|ND	0.99	0.50|0.50
TOKUTHION	(ND)|ND	0.99	0.50|0.50
STIROPHOS	(ND)|ND	0.99	0.50|0.50
BOLSTAR	(ND)|ND	0.99	0.50|0.50
FENSULFOTHION	(ND)|ND	0.99	0.50|0.50
AZINPHOS-METHYL	(ND)|ND	0.99	0.50|0.50
COUMAPHOS	(ND)|ND	0.99	0.50|0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.363|(1.368)	1.485	91.8|(92.1)	30-130
TRIPHENYL PHOSPHATE	1.320|(1.515)	1.485	88.9|(102)	50-130

QC SUMMARIES

METHOD 3520C/8141A
ORGANOPHOSPHOROUS COMPOUNDS BY GC

Client	: EUROFINS EATON ANALYTICAL	Date Collected:	NA
Project	: 416443	Date Received:	11.29.12
Batch No.	: 12K232	Date Extracted:	11/29/12 11:15
Sample ID:	MBLK1W	Date Analyzed:	12/03/12 15:33
Lab Samp ID:	NPK001WB	Dilution Factor:	1
Lab File ID:	ZL03003A	Matrix	: WATER
Ext Btch ID:	NPK001W	% Moisture	: NA
Calib. Ref.:	ZL03002A	Instrument ID	: GCT012

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
DICHLORVOS	(ND)|ND	1.0	0.50|0.50
MEVINPHOS	(ND)|ND	1.0	0.50|0.50
DEMETON	(ND)|ND	1.0	0.50|0.50
ETHOPROP	(ND)|ND	1.0	0.50|0.50
PHORATE	(ND)|ND	1.0	0.50|0.50
NALED	(ND)|ND	1.0	0.50|0.50
DIAZINON	(ND)|ND	1.0	0.50|0.50
DISULFOTON	(ND)|ND	1.0	0.50|0.50
RONNEL	(ND)|ND	1.0	0.50|0.50
CHLORPYRIFOS	(ND)|ND	1.0	0.50|0.50
FENTHION	(ND)|ND	1.0	0.50|0.50
TRICHLORONATE	(ND)|ND	1.0	0.50|0.50
METHYL PARATHION	(ND)|ND	1.0	0.50|0.50
TOKUTHION	(ND)|ND	1.0	0.50|0.50
STIROPHOS	(ND)|ND	1.0	0.50|0.50
BOLSTAR	(ND)|ND	1.0	0.50|0.50
FENSULFOTHION	(ND)|ND	1.0	0.50|0.50
AZINPHOS-METHYL	(ND)|ND	1.0	0.50|0.50
COUMAPHOS	(ND)|ND	1.0	0.50|0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TRIBUTYL PHOSPHATE	1.186|(1.290)	1.500	79.1|(86.0)	30-130
TRIPHENYL PHOSPHATE	1.346|(1.605)	1.500	89.7|(107)	50-130

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT:	EUROFINS EATON ANALYTICAL		
PROJECT:	416443		
BATCH NO.:	12K232		
METHOD:	METHOD 3520C/8141A		

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	NPK001WB	NPK001WL	NPK001WC		
LAB FILE ID:	ZL03003A	ZL03004A	ZL03005A		
DATE EXTRACTED:	11/29/1211:15	11/29/1211:15	11/29/1211:15	DATE COLLECTED:	NA
DATE ANALYZED:	12/03/1215:33	12/03/1216:07	12/03/1216:41	DATE RECEIVED:	11.29.12
PREP. BATCH:	NPK001W	NPK001W	NPK001W		
CALIB. REF:	ZL03002A	ZL03002A	ZL03002A		

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)|ND	1.50	(1.37)|1.35	(91)|90	1.50	1.28|(1.36)	85|(91)	7|(1)	10-130	30
Ronnel	(ND)|ND	1.50	1.32|(1.47)	88|(98)	1.50	1.23|(1.41)	82|(94)	7|(4)	30-140	30
Chlorpyrifos	(ND)|ND	1.50	1.33|(1.45)	89|(97)	1.50	1.37|(1.46)	91|(97)	3|(1)	40-140	30
Tokuthion	(ND)|ND	1.50	1.43|(1.47)	95|(98)	1.50	1.43|(1.46)	95|(97)	0|(1)	40-130	30
Bolstar	(ND)|ND	1.50	1.39|(1.48)	93|(99)	1.50	1.35|(1.36)	90|(91)	3|(8)	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	1.500	(1.413)|1.393	(94.2)|92.9	1.500	1.261|(1.377)	84.1|(91.8)	30-130
Triphenyl Phosphate	1.500	1.469|(1.525)	97.9|(102)	1.500	1.364|(1.483)	90.9|(98.9)	50-130

APPENDIX N

Trails Maintenance and Monitoring Memos

April 3, 2012
(2010-116.006/E)

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

SUBJECT: Memorandum for the trails closure, cleaning, maintenance, and monitoring (February through April 2012) at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Grace Yu:

On April 2, 2012 a local resident contacted ECORP Consulting, Inc. (ECORP) regarding a trail and safety issue within the Big Tujunga Wash Mitigation Area. The area in question was described as a "sink hole" that had developed at one of the stream crossings. ECORP biologist, Phillip Wasz, visited the site to inspect and document the problem area.

The area of concern consisted of an eroded creek crossing located north of the Cottonwood Avenue upland area. The problem occurs on the side of the creek when the rider is heading south on the trail from the Big Tujunga Wash area into Haines Creek. The stream crossing is currently blocked with yellow caution tape and orange and white A-frame construction barricades that mark the trail closure (see photographs and maps in Figures 1 through 4). The stream crossing consists of a dramatic drop off from the stream bank into a fairly deep and sandy portion of the stream. The height of the bank at this location is approximately 1 foot above the water level in the stream. The depth of the water is approximately 3 feet so when the horse steps off of the bank into the water, it is a drastic and unexpected drop for both the horse and the rider. It appears that the recent heavy rains and associated heavy stream flows undermined the stream bank and caused the drop off. Although this area is currently closed off, travel on the trails is not restricted because there is an alternate creek crossing located approximately 25 meters to the west.

It is recommended that this portion of trail system be permanently closed and all future traffic directed to the alternate creek crossing to the west. The trails accessing the problem area could be blocked with large tree limbs and rocks in order to direct the public to the other creek crossing (see recommended locations in Figures 3 and 4). The trail closure will eliminate the safety hazard and will ultimately reduce streambed impact without affecting the functionality of the trails system.

I hereby certify that the statements furnished above present the data and information required for this biological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED:____________________ DATE: April 3, 2012

Phillip Wasz
Biologist

Figure 1. Trail closure at the creek crossing

Figure 2. Trail drop off at creek crossing

Figure 3. Trail Closure recommendations

Figure 4. Trail issue zoomed out with relation Cottonwood Avenue.

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

April 13, 2012
(2010-116.006/E/E1)

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

SUBJECT: Memorandum for the trails closure, cleaning, maintenance, and monitoring (April 2012) at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as an update to the trail closure, clearing, maintenance, and monitoring activities at the Big Tujunga Wash Mitigation Area during March and April 2012.

The activities conducted during this timeframe included a trail closure, clearing, and maintenance activities. In addition, the regularly scheduled trails maintenance monitoring was also conducted during this period.

ECORP was contacted by a local citizen about an eroded creek crossing located north of the Cottonwood Avenue upland area. The stream crossing that accesses the Big Tujunga wash to the north was blocked on April 2, 2012 because it was determined to be unsafe (Figure 1). The stream crossing consists of a dramatic drop off from the stream bank into a fairly deep and sandy portion of the stream. The height of the bank at this location is approximately 1 foot above the water level in the stream. The depth of the water is approximately 3 feet so when a horse steps off of the bank into the water, it is a drastic and unexpected drop for both the horse and the rider. The problem occurs on the side of the creek when the rider is heading south on the trail from the Big Tujunga Wash area into Haines Creek. It appears that the recent heavy rains and associated heavy stream flows undermined the stream bank and caused the drop off. Although this area is currently closed off, travel on the trails is not restricted because there is an alternate creek crossing located approximately 25 meters to the west.

It is recommended that this portion of the trail system be permanently closed and all future traffic directed to the alternate creek crossing to the west. The trails accessing the problem area could be blocked with large tree limbs and rocks in order to direct the public to the other creek crossing. The trail closure will eliminate the safety hazard and will ultimately reduce streambed impact without affecting the functionality of the trails system.

Normal trails maintenance was conducted on March 26 and 29, 2012 by a landscape contractor (Natures Image, Inc.) and supervised by an ECORP biologist (Figures 2 to 5). During this effort, the following activities were conducted throughout the entire trail system:

- Tree branches lying on the trails were cleared off of the trails;
- Overhanging tree branches, located at hiker and equestrian-height, were trimmed by machete;
- Overhanging trees, located at equestrian-height with no established trail around the tree, were removed using portable chain saws;
- Poison oak was trimmed away from established trails; and,
- Large dead trees with the potential to fall on the trail were removed using portable chain saws.

Garbage and non-organic debris were not observed during this trails maintenance session.

As a safety precaution to equestrian and hiker groups, ECORP's biologist notified the County of Los Angeles Department of Public Works that gas powered tools, such as string-trimmers and portable chainsaws, were going to be used along the entire trail system. LACDPW then notified the site users via an email notification.

I hereby certify that the statements furnished above present the data and information required for this biological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Krista A. Day DATE: 4/13/2012

Kristina A. Day
Biologist

Figure 1. Trail closure at creek crossing

Figure 2. Removal of overhanging branches


Figure 3. Tree removal – Before


Figure 4. Tree removal – After

Figure 5. Trail edges were cleared of overgrowth and exotic species.

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

April 16, 2012
(2010-116.006/G/G1)

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

SUBJECT: Memorandum for the Erosion Control and Barrier Maintenance Monitoring (January through March 2012) of the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This letter serves as an update to the erosion control and barrier maintenance monitoring activities at the Big Tujunga Wash Mitigation Area (Mitigation Area) during January through March 2012.

In an ongoing effort to enhance and protect the existing habitat at the Mitigation Area for native wildlife species, ECORP Consulting, Inc. (ECORP) has continued the erosion control and barrier maintenance monitoring efforts throughout the restoration site. ECORP biologist, Phillip Wasz, conducted a site visit on April 2, 2012 to address areas of concern within the Mitigation Area. Prior to this site visit, ECORP was contacted by a local citizen about an eroded creek crossing located north of the Cottonwood Avenue upland area. The stream crossing that accesses the Big Tujunga Wash to the north was closed on April 2, 2012 because it was determined to be unsafe (Figure 1). The stream crossing consists of a dramatic drop off from the stream bank into a fairly deep and sandy portion of the stream. ECORP's biologist verified that an appropriate barrier was put in place in order to limit access to the area. The biologist did not identify any other erosion issues within the trails system or in adjacent areas. In addition, the barriers and fences in the Mitigation Area were in the same condition as previously noted and showed no new signs of vandalism.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: Phillip Wasz DATE: April 16, 2012

Phillip Wasz, 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

Figure 1. Trail closure at creek crossing

December 12, 2012
(2010-116.007/10/10A)

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

SUBJECT: Memorandum for the Trails Maintenance and Monitoring Site Visit (August 2012) at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This memorandum serves as documentation for the trails maintenance and monitoring site visit conducted at the Big Tujunga Wash Mitigation Area (Mitigation Area) in August 2012.

All trails within the Mitigation Area were walked on August 1, 2012 by ECORP Consulting, Inc. (ECORP) biologists Phillip Wasz and Carley Lancaster to identify any problem areas along the trail system at the Mitigation Area. The biologists surveyed for areas of erosion, fallen trees, and potential safety hazards present on and adjacent to the trails. Biologists also identified potential trails that need to be closed to help maintain the ecological value of the Mitigation Area. The current condition of the trails and trail system was documented and representative site photographs were taken.

The trails within the Mitigation Area appeared to be in good condition and the biologists did not identify any safety concerns or areas of erosion. Trash and debris present within the Mitigation Area was minimal to non-existent and no trail closures appeared to be necessary at the time of the site visit.

The biologists visited one area during the site visit that was unofficially named the "sinkhole" by equestrians earlier in 2012. This area located within the riparian habitat of the trails system was a substantial safety concern for both equestrians and recreationists due to severe erosion from storm runoff. Equestrians reported that many horses tripped and fell into the water covering the hidden "sinkhole." In response to this safety concern, the trail leading to the "sinkhole" was successfully closed by the County of Los Angeles Department of Public Works (LACDPW) shortly after the problem was reported. During the site visit on August 1, 2012, the biologists visited this location and found that the closure continued to be successful at keeping pedestrian and equestrian traffic away from the "sinkhole." A photograph of the trail closure at the "sinkhole" is included as Figure 1.

During a recent bilingual outreach effort conducted on July 21, 2012, the bilingual biologist noticed several areas throughout the Mitigation Area that were flagged with orange survey flagging. The day after this flagging was observed, a mountain bike race was reported in the Mitigation Area. Mr. Terry Kaiser, a local resident, contacted LACDPW and ECORP after this bike race with information about a new mountain bike staging area in the vicinity of the Mitigation Area that may have been associated with the race. During the site visit on August 1, 2012, Mr. Kaiser met the biologists at the Mitigation Area and showed them the location of the new mountain bike staging area established by the Santa Monica Mountains Conservancy. The new mountain biking staging area was located north of the Mitigation Area at the intersection of Conover Street and Foothill Boulevard. Photographs of this staging area and access trail toward the Mitigation Area are included as Figures 2 and 3. The biologists also noted more orange survey flagging along the Mitigation Area trails during the site visit (Figure 4). After locations of the orange flagging were recorded, the biologists promptly removed the flagging and reported to LACDPW.

The next trails monitoring site visit is not yet scheduled; however, it is likely that a site visit will be conducted prior to the end of 2012.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: Phillip Wasz   DATE: December 12, 2012

Phillip Wasz
Biologist

Figure 1: Trail closure at the "sinkhole."

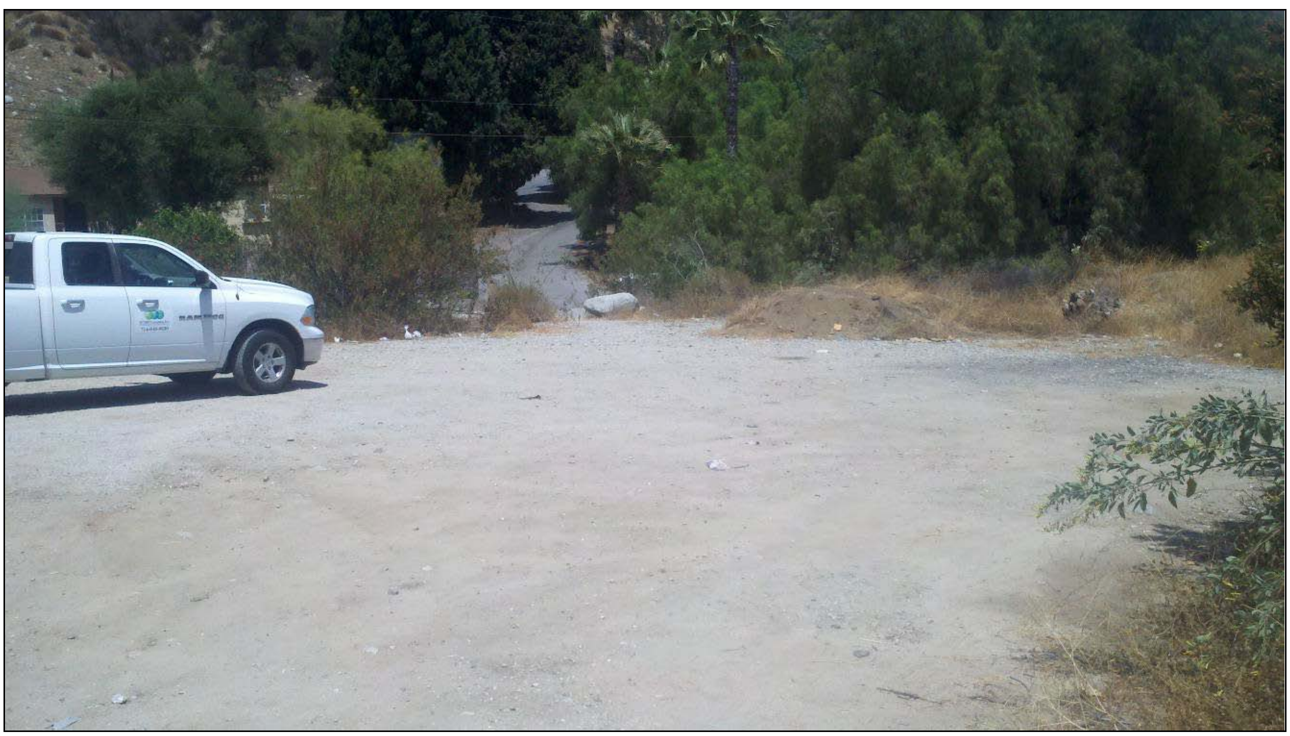

Figure 2: The new Santa Monica Mountains Conservancy mountain bike staging area.

Figure 3: Access trail towards the Mitigation Area from the Santa Monica Mountains Conservancy mountain bike staging area.

Figure 4. Orange survey flagging along Mitigation Area trails associated with prohibited mountain bike races. Flagging was removed promptly by biologists.

December 20, 2012
(2010-116.007/10/10A)

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

SUBJECT: Memorandum for the Trails Maintenance and Monitoring Site Visit (December 2012) at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

This memorandum serves as documentation for the trails maintenance and monitoring site visit conducted at the Big Tujunga Wash Mitigation Area (Mitigation Area) in December 2012.

All trails within the Mitigation Area were walked on December 10, 2012 by ECORP Consulting, Inc. (ECORP) biologists Carley Lancaster and Amy Trost to identify any problem areas along the trail system at the Mitigation Area. The biologists surveyed for areas of erosion, fallen trees, and potential safety hazards present on and adjacent to the trails. The biologists also identified potential trails that needed to be closed to help maintain the ecological value of the Mitigation Area. The current condition of the trails and trail system was documented and representative site photographs were taken.

The trails within the Mitigation Area appeared to be in good condition. The biologists identified only one area of minimal erosion in the trails system. The erosion issue was located at the start of the trail northwest of the Cottonwood Gate entrance (Figure 1). The erosion was present at the trailhead leading from the asphalt area down into the riparian area. This could be considered a minor safety concern for equestrians and recreationists and should be monitored and improved if conditions continue to deteriorate.

Trash and debris present within the Mitigation Area was minimal with the exception of one area identified to be a possible homeless encampment located just west of the South Wheatland entrance (Figure 2). Natures Image, ECORP's trail maintenance subcontractor, will remove the trash from this area on December 26, 2012. The biologists observed a total of five unauthorized trails within the Mitigation Area. Three new trails were observed near the Tujunga Ponds and seem to be associated with people trying to access previously inaccessible portions of the Tujunga Ponds (Figure 3). Upon inspection it was evident that hand tools were used to cut through thick portions of vegetation in order to provide access to the ponds. These areas were identified and natural vegetation was placed at the entrance to these trails to block access and deter future use.

The biologists also inspected the trail closure that was conducted in August 2012 following removal of the illegal structure located west of the Cottonwood Avenue entrance (Figure 4). The trail leading to the illegal structure site was successfully closed by the County of Los Angeles Department of Public Works (LACDPW) immediately after the removal of the structure and it appears that the trail closure continued to be successful. There was no evidence of pedestrian or equestrian activity observed in the trail closure area.

One additional issue was identified within the upland wash area during the site visit. The biologists noticed an increasing number of “horse circles” within the wash and other portions of the Mitigation Area (Figure 5). It is suspected that these circles are made when horseback riders are training their horses. During this process the horseback rider rides his horse in a small diameter circle approximately 10 to 15 feet wide. The horseback rider travels around in the same circle many times as the rider attempts to break the horse of any bad habits. This type of training is almost exclusive to Hispanic horse trainers. The training exercise creates fairly large areas of off trail disturbance and even potential damage to vegetation. Although this activity has been addressed at the Community Advisory Committee (CAC) meetings, it seems to have recently become more prevalent. Expanded outreach to the Spanish speaking horseback riders may be necessary in order to address these recent findings.

One maintenance and monitoring site visit is scheduled for December 26, 2012 to remove trash and debris from the trails. Details from this site visit will be summarized in the final exotic plant eradication memo. This is the last scheduled maintenance and monitoring site visit for 2012.

I hereby certify that the statements furnished above present the data and information required for this memorandum, and that the facts, statements, and information are true and correct to the best of my knowledge and belief.

SIGNED: ____________________ DATE: December 20, 2012

Phillip Wasz
Biologist

Figure 1. Trail Erosion Northeast of Cottonwood Gate.

Figure 2. Possible Homeless Encampment and Trash.

Figure 3. Unauthorized Trail on the South Side of the East Pond.

Figure 4. Trail Closure Leading to Illegal Structure Site.


Figure 5. Disturbance Caused by “Horse Circles” in Big Tujunga Wash.

APPENDIX O

Stakeholder Mailing List

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APPENDIX P

Newsletters

Big T Wash Line

April 2012

A Publication of the
County of Los Angeles
Department of Public Works
(LACDPW)

Announcements

•Share the Trails

Please remember to share the trails and be courteous to other trail users. For safety reasons, horses and their riders have the right-of-way. If you are hiking and encounter a horse and rider, please step to the side, stand very still, and talk to the rider while allowing the horse to pass.

•Focused Surveys

The focused surveys for two endangered songbirds (least Bell's vireo and southwestern willow flycatcher) and one toad (arroyo toad) will be conducted between April and July. So keep your eyes out for the biologists who will be wandering through Big T. They would love to answer any questions you may have.

•Brown-headed cowbird trapping

The annual brown-headed cowbird trapping program will be going on from April 1 through June 30. A biologist releases non-target birds on a daily basis so please do not disturb the traps. If you see anyone vandalizing the traps, please immediately contact Grace Yu with LACDPW, (626) 458-6139.

•View Past Newsletters

To view past Mitigation Area newsletters or annual reports, or just to find out more about the Mitigation Area, check out the Big T Website at: http://www.ladpw.org/wrd/facilities/

Water Lettuce Removal Update

In January 2012, LACDPW completed the huge job of removing the non-native water lettuce that was covering the surface of the Tujunga Ponds. Regular follow-up visits will be conducted to make sure this invasive plant does not take over the ponds again. The amazing result of the water lettuce removal is the return of many species of wildlife that have not been seen for a long time. Many species of ducks, coots, grebes, herons, egrets, and even kingfishers have been seen foraging and roosting in or near the ponds. Please remember, never release terrarium, aquarium, or other pets or plants into our native habitats.

Ring-necked Ducks in Tujunga Ponds

ABOUT THE BIG TUJUNGA WASH MITIGATION AREA

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 LACDPW in 1998 for the purpose of compensating for habitat loss for other LACDPW projects.

The LACDPW implementation of the Master Mitigation Plan for the Big Tujunga Wash Mitigation Area (Big T) has been under way since April 2000.

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 updates to ongoing programs and to explain upcoming enhancement measures that will be implemented on the site. Newsletters are published on a bi-annual basis (Spring and Fall).

More information can be found at

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

Don't Hurt the Yucca Plants!

Chaparral Yuccas (*Hesperoyucca whipplei*)

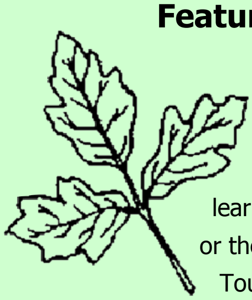
Recently, we noticed that flower stalks of the chaparral yuccas (*Hesperoyucca whipplei*) at Big T are being removed, which could endanger the species. Removal of the yucca flower stalks from Big T violates the ordinance that protects the native plants. The chaparral yucca takes five years to grow from seed to maturity. At maturity, the plant grows a tall, showy flower stalk and after flowering, the plant dies. If the flower stalks are removed, the yucca population will be in jeopardy because new seeds will not be deposited in the soil. The loss of yuccas could also impact wildlife species that depend upon them for protection and food.

Native Americans used the stalks to make baskets and sandals and the roots to make soap and detergent. They also ate the flowers and immature stalks. Dead and dried yucca stalks were used to fuel fires that hardened clay pottery. Currently, yucca stalks are used in some dietary supplements for joint pain and to promote healthy cartilage. Yucca extracts are used in beverages, such as root beer, to provide the "foamy head". And, yucca stalks are even used to make musical instruments like the didgeridoo, which is a wind instrument developed by the Australians about 1,500 years ago.

If you see anyone removing yucca flower stalks, contact the Sheriff's Department (1-800-834-0064).

Flower stalk of the chaparral yucca (*Hesperoyucca whipplei*)

Featured plant: Poison Oak



While hiking around Big T, watch out for Poison Oak (*Toxicodendron diversilobum*)!! Everyone should learn how to identify this plant by sight or they may end up with a nasty rash! Touching any parts of this plant at any time of the year can cause a rash that usually shows up about 24 hours after contact and it can get worse over the next few days. The rash may appear as a redness, swelling, or even blisters. So, what causes the reaction? A compound called Uroshiol Oil is the culprit! This compound is primarily found in the spaces between plant cells beneath the outer skin of the plant. If the plant tissue is damaged by the person or object that touches it, then Uroshiol Oil is released from the plant. The oil adheres to almost anything it comes in contact with, such as towels, gloves, blankets, clothing, and even your pets! Clothing or other materials that contact the plant and then, before being washed, contact the skin are the most common causes of exposure. The number of working hours lost as a result of exposure from poison oak makes this plant the most hazardous plant in the state of California.

So, how do you identify this pesky plant? Poison oak is a woody shrub or vine that loses its leaves in the winter but, in the early spring, the young leaves are green or sometimes a light red. It produces small, white-green flowers in the spring and then, in late summer, these form small, round whitish-green fruits. In late spring and summer, the foliage is glossy green and later turns attractive shades of orange and red. The most identifying characteristic is that the leaves are almost always in groups of three. Just remember the saying, **"If you see three, let it be!"**

Right: Poison Oak at base of tree. You can see the variation of colors here
Below: Poison Oak leaves

BE CAREFUL ON THE TRAILS!

Deep hole at creek crossing

LACDPW has an ongoing trails maintenance program designed to address problems or unsafe conditions on the trails. Recently, trail users notified LACDPW about three different problem areas. These include a deep hole at one of the creek crossings, trail erosion along the main Big T wash, and fallen trees that are blocking trails.

The deep hole, which is located northwest of the Cottonwood Avenue area, has resulted from the creek flows undermining the bank on one side of the pool at the crossing. The step down from the trail into the creek is deeper than expected for the horse and rider and should be avoided. Barriers are currently blocking this trail but it will be permanently closed with natural barriers in the near future. A safer crossing is located about 75 feet downstream of the hazardous crossing.

The trail with the erosion problem is located at the western edge of Big T, where the trail turns south from the haul road. Both sides of the terrace above Big T Wash are eroding away. The trails currently run along the edges of the terrace where the erosion is taking place. LACDPW is devising a plan to address the trail safety at this location. In the meantime, avoid using this area.

Large trees have fallen across the trails at several locations at Big T. When the trees are not too large, the maintenance crews can remove the portions blocking the trail. Otherwise, the trail will have to be directed around the fallen tree. If you have to go around a fallen tree, please stay on one trail around the tree and rejoin the existing trail in the shortest distance possible. Making new or multiple trails is damaging to the adjacent habitat.

Here are a few reminders when using the trails at Big T: traveling in single file minimizes impacts to the adjacent natural habitats and causes the least disturbance to wildlife species; paying attention to what is ahead of you on the trail will not only alert you to safety issues up ahead, but you may also be lucky enough to see wildlife on or adjacent to the trails; making new trails or widening trails destroys the habitat and allows for invasion by non-native species of plants. Please enjoy the wonderful outdoor experience that Big T has to offer but if you notice any trail issues, please contact Grace Yu at LACDPW (626) 458-6139.

Crews talk about how to remove fallen trees from trails

Featured Animal: Least Bell's Vireo

Least Bell's vireo (*Vireo bellii pusillus)*

The least Bell's vireo (*Vireo bellii pusillus*) is a small songbird that winters in South America and returns to California to nest and raise its young. This species is listed as endangered due to loss of habitat and parasitism by the brown-headed cowbird. This species lives in willow scrub habitat where it builds a nest low in the vegetation. Least Bell's vireos are only about 4.5 to 5 inches in length and their feathers are typically light gray on top and whitish on the bottom. Some distinguishing characteristics include a faint white ring around the eye and faint white wing bars. They lay 3 to 4 eggs that hatch in about 14 days and the young leave the nest 10 to 12 days after hatching. These small birds eat a variety of insects including caterpillars, moths, and grasshoppers. The habitat restoration and enhancement program at Big T is helping to preserve and enhance the habitat for this species.

Trails Maintenance Day November 2011

Big Tujunga Wash Mitigation Area's 7th Annual Trail Maintenance Day was held on November 5, 2011. The focus of the event was trash removal in the upland, riparian, and creek areas. Community volunteers, ECORP's biologists, and LACDPW staff all got together on this cold but sunny Saturday to clean up litter along the designated trails at Big T.

Adam Schroeder and Terrance Wroblewski, aquatic biologists from ECORP, put on waders and focused on removing trash from Haines Canyon Creek. They are both specialists with the Santa Ana Sucker so they were able to remove trash from the creek in a manner that would not harm this threatened species of fish. ECORP's biologists provided guidance and support during maintenance activities to ensure safety and protection for the sensitive species at Big T. The volunteers were successful in clearing out a lot of trash from along the trails. Other participants included: Valerie De La Cruz, Grace Yu, Mary Benson, Mari and Mickey Quillman, Maria Lastre, Elders Lambson and Mackay, Jim Wagner, and Randy Oglesby.

Thanks to all that participated in this important effort!

The next annual trail maintenance day will take place in the fall of 2012 to avoid impacts to nesting birds during the bird breeding season. We anticipate it will be sometime in October or November. Please look for the next Trail Maintenance Day event in our Fall 2012 newsletter or on our website: http://www.ladpw.org/wrd/facilities

Hope you can join us and bring your friends and family because everyone is welcome!

Report Unlawful Activities

Just a reminder, the English and Spanish signs listing unlawful activities are posted at the following entrances and throughout Big T:

- North and South Wheatland Avenue
- Mary Bell Avenue
- Gibson Ranch
- Tujunga Ponds Area

Paintball guns and air rifles are considered weapons or firearms so they should be reported. Also, please report unleashed or aggressive dogs at Big T.

If there is an **emergency, as always, please call 911**. If there is unlawful or suspicious activity occurring, please contact the Sheriff's Department (1-800-834-0064).

40x48, BIG T 2010S7

ÁREA DE MITIGACIÓN DE BIG TUJUNGA WASH

- NO SE PERMITE PERTURBAR LA PAZ DE OTROS (17.04.435 LACC)
- NO SE PERMITEN VEHÍCULOS MOTORIZADOS O CON LLANTAS (17.04.370, 17.04.1170, & 17.04.250 LACC)
- NO SE PERMITEN CAMPAMENTOS, FOGATAS Y FUEGOS DE CAMPAMENTO (17.04.390 & 17.04.590 LACC)
- NO SE PERMITE FUMAR (17.04.645 LACC)
- NO SE PERMITE TIRAR O DEJAR BASURA (17.04.500 LACC)
- NO SE PERMITEN ARMAS DE FUEGO Y OTRAS ARMAS (17.04.620 LACC)
- MANTÉNGASE EN LOS SENDEROS DESIGNADOS (17.04.250 LACC)
- NO SE PERMITE REMOVER O DAÑAR LA VEGETACIÓN O PROPIEDAD DEL PARQUE (17.04.340 LACC)
- R ATADOS CON CORREAS
- ALCÓHOLICAS, NARCÓTICOS, 7.04.440 LACC)
- CIÓN PUBLICA (17.04.450 LACC)
- O MATAR ANIMALES
- UE ANIMALES O MASCOTAS
- EN LAS AGUAS DEL PARQUE
- TRAVESAR, Y PARARSE EN (17.04.250 LACC)

AS LLAME AL: 911
ERIFF LLAME AL: 1-800-834-0064

40x48, BIG T 2010E5

BIG TUJUNGA WASH MITIGATION AREA

- NO DISTURBING THE PEACE OF OTHERS (17.04.435 LACC)
- NO MOTOR VEHICLES OR WHEELED VEHICLES (17.04.370, 17.04.1170, & 17.04.250 LACC)
- NO CAMPING-CAMPFIRES OR FIRES (17.04.390 & 17.04.590 LACC)
- NO SMOKING (17.04.645 LACC)
- NO LITTERING OR DUMPING (17.04.500 LACC)
- NO FIREARMS AND OTHER WEAPONS (17.04.620 LACC)
- STAY ON DESIGNATED PATHS (17.04.250 LACC)
- NO DAMAGING OR REMOVING OF PARK PROPERTY (17.04.340 LACC)
- DOGS MUST BE ON LEASHES (17.04.410 LACC)
- NO ALCOHOLIC BEVERAGES & NARCOTICS OR DANGEROUS DRUGS (17.04.440 LACC)
- NO PUBLIC INTOXICATION (17.04.450 LACC)
- NO INJURING OR KILLING OF ANIMALS (17.04.470 LACC)
- NO ABANDONING OR DUMPING OF ANY ANIMALS/PETS (17.04.250 LACC)
- NO FISHING IN PARK WATERS (17.04.560 LACC)
- NO SWIMMING, WADING, OR STANDING IN PARK WATERS (17.04.250 LACC)

FOR EMERGENCIES CALL: 911
FOR SHERIFF'S DEPT CALL: 1-800-834-0064

COAST HORNED LIZARD

The Coast Horned Lizard is a really cool lizard with a flat, wide body that is covered in horns! They are usually found in hot, dry environments and can avoid extreme heat by burrowing into loose sand and dirt. Their favorite food is ANTS!!!! Horned lizards have several methods of escaping predators that may get too close. They can stay very still and blend into their environment or they can quickly run away to escape a predator. When a predator picks up the horned lizard in its mouth, the horned lizard can either puff up really big or it can squirt blood from a gland near its eyes. When the predator gets squirted in the mouth, it spits out the horned lizard because of the bad taste! Some of the predators that will try to eat horned lizards include snakes, roadrunners, bobcats, and foxes. If you happen to see one of these amazing lizards in the wild, leave them be. They will be much happier left outdoors than taken home as a pet!

The Coast Horned Lizard has lots of horns on its body. The sharp and ridged horns can be found on its head and around its temples. When grabbed by a predator the coast horned lizard may shake its head from side to side in order to jab its predator with the horns.

Big Tujunga Word Search

Kid's Corner

We've hidden 22 vocabulary words from the stories in the newsletter. Read the stories and then find the words. **GOOD LUCK ON YOUR SEARCH!**

Word List

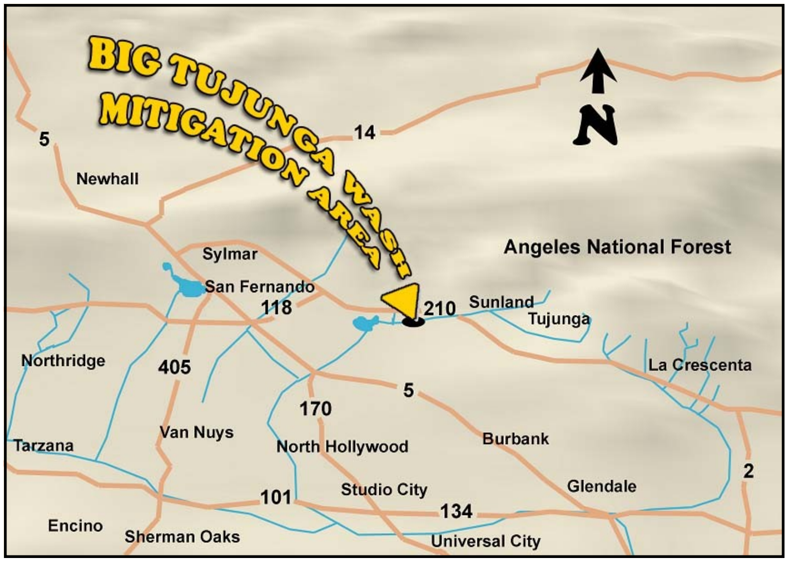
- Ants
- Barrier
- Creek
- Didgeridoo
- Endangered
- Erosion
- Flower stalk
- Habitat
- Horned lizard
- Moth
- Nest
- Poison oak
- Predator
- Prey
- Rash
- Safety
- Songbird
- Trails
- Uroshiol oil
- Vireo
- Willow
- Yucca

D	C	A	P	Y	I	L	B	O	K	F	B	Y	L	K	W	P	D	S	H
E	M	A	T	E	Y	Q	J	A	L	Q	A	R	T	O	J	M	L	L	O
R	Y	V	Q	R	T	X	O	O	F	Q	R	T	L	E	I	N	R	I	R
E	T	W	R	P	F	N	W	K	F	X	R	L	S	B	F	Q	S	A	N
G	E	A	I	X	O	E	B	N	C	I	I	U	G	E	C	A	V	R	E
N	F	V	I	S	R	E	R	H	Y	W	E	A	L	J	N	L	S	T	D
A	K	X	I	S	R	M	D	Q	X	W	R	B	W	C	U	F	Z	H	L
D	R	O	T	O	V	B	B	P	P	R	E	D	A	T	O	R	M	R	I
N	P	A	S	O	J	I	J	D	Z	S	Y	R	N	I	H	S	Y	I	Z
E	L	I	S	E	O	C	R	E	E	K	U	N	W	S	S	B	Z	K	A
K	O	P	N	O	M	D	O	E	B	X	C	F	A	Z	V	R	F	K	R
N	H	T	O	M	N	Q	I	G	O	K	C	R	Y	W	G	Q	G	K	D
O	D	O	I	M	O	G	A	R	B	J	A	B	G	M	A	Q	E	Q	Y
Y	E	H	H	Y	F	E	B	R	E	F	T	A	G	A	G	E	F	N	G
F	N	R	T	A	D	S	B	I	Z	G	Y	S	N	K	I	X	B	T	I
L	I	O	L	O	I	H	S	O	R	U	D	T	B	K	O	P	I	L	A
S	X	F	J	Y	T	N	O	K	F	D	S	I	N	G	K	J	Y	T	Y
X	A	O	P	T	A	T	I	B	A	H	Y	D	D	Y	P	P	J	X	E
D	O	D	Z	D	N	S	E	B	K	K	I	A	L	V	V	T	X	K	H
Z	J	V	S	U	B	U	F	M	O	R	O	P	W	W	S	E	O	C	O

Water Resources Division
County of Los Angeles
Department of Public Works
900 S. Fremont 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:
http://www.ladpw.org/wrd/facilities/



Emergencies? Incidents? Questions?

- **CALL 911 TO REPORT ANY EMERGENCY SUCH AS FIRE OR ACCIDENT**
- Please **DO NOT** use 911 to report minor incidents or regulation infractions. Contact the Sheriff's Department at 1-800-834-0064.
- 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 Sheriff's Department 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 5:00 p.m., Monday through Thursday), please contact:

Grace Yu or Cindy Rowlan
Water Resources Division
County of Los Angeles Department of Public Works
900 S. Fremont Avenue
Alhambra, CA 91803
Phone: (626) 458-6139 / (626) 458-6132
Fax: (626) 979-5436
Email: gyu@dpw.lacounty.gov or crowlan@dpw.lacounty.gov

Big T Wash Line

September 2012

A Publication of the
County of Los Angeles
Department of Public Works
(LACDPW)

Announcements

- **Report suspicious activities to the LA Sheriff's Department Dispatch.** Please report issues such as loose or aggressive dogs, weapons, vandalism, and anything else that seems suspicious. It is important to report these issues to law enforcement because each time something is reported a record is created, which in turn, brings more attention to the issue.

  LA Sheriff's Department Dispatch:
  1-800-834-0064

- **Award Nomination:** LACDPW has been nominated for an award presented by the National Association of Environmental Professionals (NAEP) for the excellent management of Big T. Great job! Thank you to all of the community members for your loyal support!!
- **Trails Maintenance Day:** Please join LACDPW and ECORP Consulting for the 8th Annual Trail Maintenance Day on October 20th, 2012. Come give a helping hand by cleaning up litter along Big T's beautiful trails. Meet us at the Cottonwood entrance (Wentworth St. and Cottonwood Ave.) at 8 am. Water, snacks and trash bags will be provided. Remember to wear comfortable clothes and closed-toed shoes, and bring your gloves, hat, sun block, and bug repellent.

  Event will be cancelled if rain is forecasted.

U.S Fish and Wildlife Service Biologist Visits Big T!

Santa Ana suckers are one of the native fish found in the streams at Big T. They are federally listed as threatened.

On June 12, 2012, Ms. Christine Medak, a biologist with the U.S. Fish and Wildlife Service (USFWS), visited Big T to discuss how to continue to improve the habitat for the federally threatened Santa Ana sucker. Haines Canyon Creek in Big T is the only creek left in the Los Angeles River Watershed that still supports this native fish species. USFWS is concerned about threats to this species from non-native species (bullfrogs, largemouth bass, and water lettuce) that have invaded the ponds and the creek.

Ms. Medak stated that "LACDPW's management efforts are contributing substantially to maintaining high quality aquatic and riparian habitats for sensitive native species." LACDPW would like to thank Ms. Medak for visiting the site and for her valuable input on future activities that may help to improve and protect the Santa Ana sucker habitat at Big T.

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

DON'T LET THE INVASIVES BE TOO PERSUASIVE

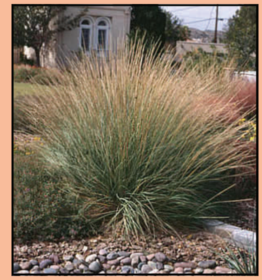
There are many invasive plant species that have snuck their way into Big T and are causing problems by displacing native vegetation and the wildlife that depend on them. Some of the plant species that are creating quite an uproar for Big T include African fountain grass, bigleaf periwinkle, tree of Heaven, and edible fig. These tricky species are commonly used in landscaping and can easily escape into unwanted territory when seeds are picked up by the wind or fall into streams and are carried elsewhere.

Out at Big T you may have noticed African fountain grass, which is a drought-tolerant herb that not only competes with native vegetation, but also increases the risk for wildfires. Three additional species, one shrub and two trees, have also become well-established problem species within Big T. Bigleaf periwinkle, a perennial herb that is native to southern Europe and northern Africa, is a sneaky plant that can thrive in full sun or shade and can easily become established anywhere. The tree of Heaven is an invasive tree that loves sunlight. This tree is native to China where its leaves, bark, and roots are commonly used for medicinal purposes. This tree can re-sprout easily after being cut, making it very difficult to remove. The edible fig tree has also snuck its way into Big T through seed dispersal. This species is native to the Middle East and was one of the first trees cultivated for their edible fruit.

How can you help in the fight against exotic plant invasion? By planting native trees and shrubs in your yard, of course! Native grasses, trees and bushes require much less water and attention because they are adapted to surviving in warm, dry climates like ours. They also attract native wildlife by providing the natural habitat these species have adapted to. Instead of planting African fountain grass, try planting native deer grass, which has flower stalks that can bring beauty to any garden. Deer grass also has deep roots that have been known to remove chemicals from agriculture runoff from the soil. Rather than bigleaf periwinkle, try planting California aster in your garden, a species that has white or purple flowers that bloom in summer and attract native butterflies such as monarchs and painted ladies. Black walnut trees are a good alternative to the tree of Heaven because they grow fast and provide lots of shade. Squirrels and other wildlife love to nibble on the walnuts that the trees produce too! Toyon is a great alternative to the edible fig tree. Toyon, which is visited frequently by many butterfly and bird species, produces beautiful, red berries in the winter that makes them look quite festive! If any of these native species find their way into Big T, we won't complain at all!

Instead of: | **Try this:**

African Fountain Grass



Deer Grass

Bigleaf Periwinkle

California Aster

Tree of Heaven

California Black Walnut

Edible Fig

Toyon

Check out these websites for more information on how to keep your garden beautiful with native plant and tree species!

http://www.cal-ipc.org/landscaping/dpp/planttypes.php?region=socal

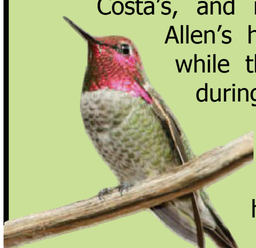
http://www.calipc.org/landscaping/dpp/plantpage.php?region=socal&type=Trees

The Birds Are Buzzing! ...What!?!

Chances are if you've spent much time outside lately you've come across that familiar buzzing and whirr of wings that indicate that a hummingbird is near! Or maybe you've seen a flash of bright yellow and black that announce the presence of an oriole. In either case, these are some beautiful nectar-drinking birds you don't want to miss!

Orioles are bright yellow birds with markings of glossy black on their head, wings, and tail. They mostly eat fruits, nectar, and insects, and will use their sharp beak to break through flowers to get the nectar at the flower's base. Look for orioles in areas with scattered trees and along streams within Big T. Find a bird guide (see below for suggestions) and see if you can identify the hooded, Scott's, and Bullock's orioles in your own neighborhood. All three of these species will be around during the summer breeding season. You can also look for a nest of woven plant fibers hanging from trees in your backyard and neighborhood that indicates oriole presence.

Did you know that, unlike most bird species, both male and female orioles will sing? In the case of the Bullock's oriole, males and females have slightly different songs. During the nesting season the female may actually sing *MORE* than the male Bullock's.



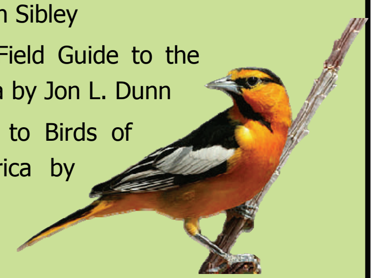
Keep your eyes open for the Anna's, Allen's, black-chinned, Costa's, and rufous hummingbirds. The Anna's and Allen's hummingbirds will stick around all year, while the other hummingbird species will visit during the breeding season only. Anna's are the most common hummingbird along the Pacific Coast and have bright green feathers with iridescent rose-colored heads and throats. Allen's are rust-colored with red throats and green shoulders and backs. Both Anna's and Allen's hummingbirds can be found in many types of habitats and in urban areas in and around Big T. Costa's and black-chinned hummingbirds only visit during the breeding season (spring and summer) and are only found in the alluvial scrub habitat in the northwestern portion of Big T. Rufous hummingbirds will only occasionally stop by Big T during their migration between Mexico and Canada.

Did you know that hummingbirds beat their wings 40 to 50 times per second during flight? The speed of their wing beats creates the "hum" that gives them their name. The unique way they beat their wings, a rapid figure eight pattern, allows them to hover in place while drinking nectar from flowers.

Want to attract these beautiful birds to your house? Hummingbirds and orioles are easily attracted to nectar feeders placed in your backyard. Hang one by a window and see how many different species you can identify! You can also attract orioles to the nectar feeders if you remove the little yellow "flowers" on the feeding tubes. Just make sure to keep your cats indoors when the bird feeder is out!

Want to know what birds you see regularly in your backyard? Check out one of these great bird field guides!

- The Sibley Field Guide to Birds of Western North America by David Allen Sibley
- National Geographic Field Guide to the Birds of North America by Jon L. Dunn
- Peterson Field Guide to Birds of Western North America by Roger Tory Peterson



Clockwise from top left: hooded oriole (male, adult), rufous hummingbird (male, adult), Bullock's oriole (male, adult), Anna's hummingbird (male, adult). Photographs by Tony Battiste.

Time to Trim Those Trees!

Do you have trees or shrubs in your yard that need to be trimmed? So do we! Fall is the time of year to do all your trimming and pruning. Why, you ask? To protect the birds and your trees!

Most people don't realize that trimming trees and shrubs during the spring and summer can be a problem because birds may be nesting in them. Almost all native North American birds are protected by the **Migratory Bird Treaty Act**, a federal law that was established in 1918 to protect the migratory birds that spend winters in other locations and return to their nesting areas in the spring to raise their young. In Southern California, the nesting season extends from February through August.

Here at Big T we need to keep those pesky exotic plant species at bay throughout the year to maintain the quality of the habitat. While we conduct exotic plant species removal efforts during all seasons, the activities we conduct during the spring and summer months are limited because of the nesting birds. In fact, all large removal efforts are performed in the fall or winter. If we do need to conduct minor removal efforts during the nesting season, a biologist is on site the entire time to protect any nests that may be present in the area.

Want another reason to trim trees during the fall or winter? Tree branches are dormant during this time and diseases and pests can't penetrate the newly cut branches, which greatly improves the health of your plants. So, break out those chainsaws and clippers to get all your trimming needs done now!

A bird's nest in a tree branch. Nests can be very delicate and sometimes hidden!

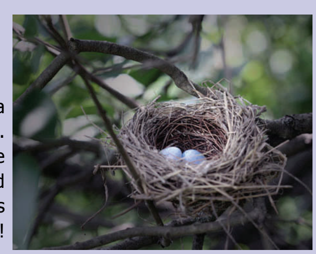


Photo: http://blog.duncraft.com/2011/01/11/prepare-to-help-birds-in-spring-in-the-middle-of-winter/

Leave the Swimming to the Fishes!

Big T is home to three sensitive native species of fish: Santa Ana sucker, Santa Ana speckled dace, and the arroyo chub. These fish are only found in a handful of places in Southern California. Particularly, the Santa Ana sucker is a federally listed threatened species, meaning that it is on the verge of extinction! The fast flowing water within the creek creates the perfect habitat for these native fishes. However, unauthorized man-made rock dams in the creek are becoming a common nuisance throughout the Mitigation Area. Unauthorized rock dams are built by people who are looking to beat the heat by taking dips in the pools built up behind these artificial dams. Not only is swimming not allowed in the mitigation area, but building rock dams to create swimming pools is a big NO-NO!

These swimming pools are not natural within the creek and are the perfect habitat for exotic species such as the American bullfrog and largemouth bass that feed on our native fish. The construction of rock dams also reduces the amount of water downstream, and can result in stranded fish! LACDPW is constantly working to preserve and protect the stream habitat by removing rock dams from the creek as soon as possible and by sending bilingual biologists to the site on weekends to educate the site users about the stream habitat and the sensitive fish found within it. What can you do to help? If you see a rock dam in the creek, please contact LACDPW so that they may remove it. You could save the lives of some very special fish!

Rock Dam Before Removal

Rock Dam After Removal

A Huge Thank You to Terry Kaiser!!!!!

LACDPW would like to extend a huge thank you to Terry Kaiser for his efforts in containing a fire from spreading at Big T. Terry was at Big T on the morning of May 30 to discuss trail issues with LACDPW and ECORP when he noticed smoke in an area that had burned a few days before. Smoldering ashes had reignited woody debris. In order to keep the fire from spreading, Terry pulled additional woody debris away from the burning area. LACDPW called 911 and within a few minutes, the fire department was there to put out the fire. Please remember, smoking and campfires are not allowed at Big T. If you see a fire please call 911. Thanks again to Terry for his heroic efforts!

Left: Terry Kaiser removes brush that could fuel the fire.

Bottom Left: Minutes later a fireman was able to put out the remainder of the fire.

Big Tujunga Crossword

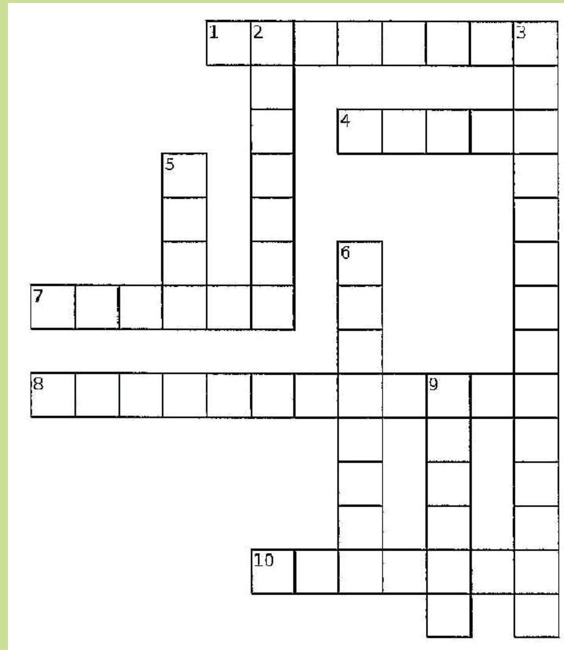
Use the hints below and the articles in the newsletter to fill out the crossword puzzle below.

Across

1) ____ ____ reduce the water levels in the creek and can leave fish stranded.
4) Plant _____ instead of edible fig in your yard.
7) ______ hummingbird can be found in the alluvial scrub at Big T during the spring and summer.
8) ______ ______ use much less water than exotic plants.
10) Some birds, like black-chinned hummingbirds, will spend the winter in one area and _______ to places like Big T for the spring and summer.

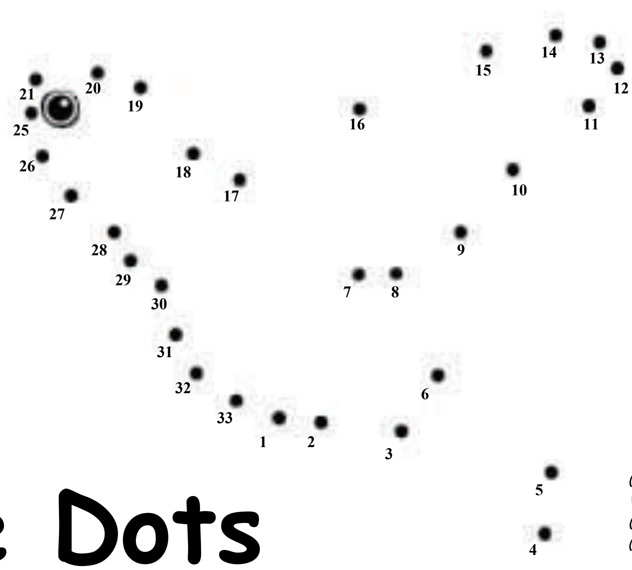
Down

2) Unlike many birds, both the male and female ______ will sing.
3) _____ ___ ______ is a threatened species of fish that lives at Big T.
5) ___ _ is home to three native fish species.
6) The ________ is an exotic species that eats the native fish at Big T.
9) Hummingbirds and orioles feed on ______.



We've hidden 10 hummingbirds like this one  throughout the newsletter, can you find them all? **GOOD LUCK ON YOUR SEARCH!**

Kid's Corner



Connect the Dots *Hummingbird*

Crossword answers–Across 1) *Rock dams* 4) *Toyon* 7) *Costas* 8) *Native plants* 10) *Migrate* **Down** 2) *Orioles* 3) *Santa Ana sucker* 5) *Big T* 6) *Bullfrog* 9) *Nectar*

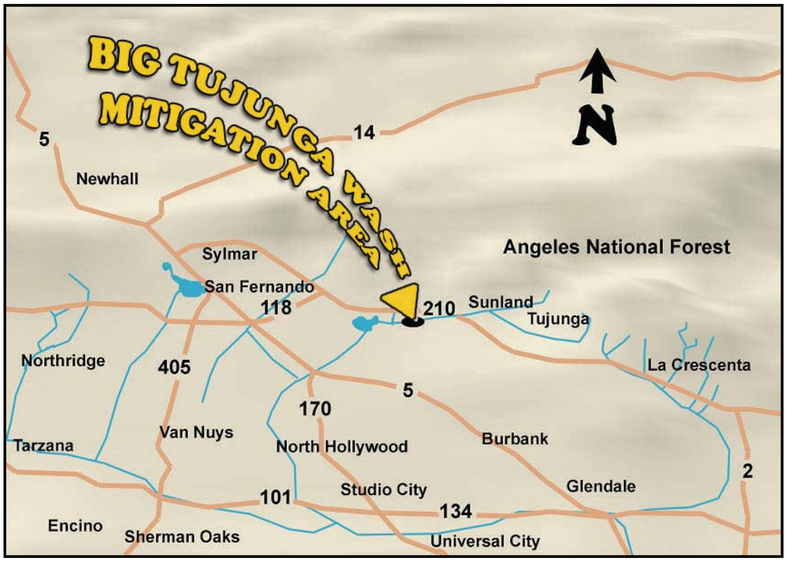
Connect the Dots

Can you identify this critter? Once you have connected the dots, try to color the critter in correctly, too!

Water Resources Division
County of Los Angeles
Department of Public Works
900 S. Fremont 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:
http://www.ladpw.org/wrd/facilities/



Emergencies? Incidents? Questions?

- **CALL 911 TO REPORT ANY EMERGENCY SUCH AS FIRE OR ACCIDENT**
- To report minor incidents or regulation infractions contact the Sheriff's Department at 1-800-834-0064. (Please **DO NOT** use 911.)
- Do not attempt to enforce regulations yourself; please allow law enforcement 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 5:00 p.m., Monday through Thursday), please contact:

Grace Yu or Cindy Rowlan
Water Resources Division
County of Los Angeles Department of Public Works
900 S. Fremont Avenue
Alhambra, CA 91803
Email: gyu@dpw.lacounty.gov or crowlan@dpw.lacounty.gov

APPENDIX Q

Community Advisory Committee Meeting Agendas and Reports

Big Tujunga Wash Mitigation Area

Community Advisory Committee Agenda

Date: Thursday, April 26, 2012

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. Exotic Wildlife Removal/Monitoring
3. Focused Surveys for Listed Wildlife Species
4. Water Quality Analysis
5. Trails Restoration/Maintenance

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 Meeting Minutes
From the Thursday, April 26, 2012 Meeting
At Hansen Yard

I. Welcome/Introduction

Meeting attendance sign-in sheet attached.

II. Review of Meeting Agenda

Grace Yu reviewed the meeting agenda.

III. Discussion of Action Items from the October 6, 2011 Meeting

Action items from the last meeting were reviewed. Each action item is listed followed by the discussion about each item. New action items generated from the discussions are listed in section VIII.

1. **ECORP may include an article about removal of Yucca flower stalks and other vegetation from the Mitigation Area in the spring 2012 Big T Wash Line Newsletter.** An article discussing the vegetation in the Mitigation Area was included in the spring 2012 newsletter. *This action item is now complete.*

2. **Grace Yu will continue providing 40 copies of the newsletters to Terry Kaiser and 30 copies to Chris Arlington. She will also continue sending an electronic version to Mary Benson.** Copies of the newsletters were provided to Terry Kaiser and Chris Arlington at the spring Community Advisory Committee meeting. An electronic version was sent to Mary Benson. LACDPW will continue to provide hard copies to Mr. Kaiser and Ms. Arlington each time a newsletter is produced. *This item is now a standard practice and will be removed from the action item list.*

3. **Grace Yu will send the Big Tujunga website link to Elektra Kruger and Terry Kaiser.** Cindy Rowlan (LACDPW) sent the website link to Ms. Kruger and Mr. Kaiser. CAC Members requested that the website link also be sent to Carlos George and Terri Ortiz. Grace Yu or Cindy Rowlan will send the link.

4. **ECORP will include the Big Tujunga website address in the announcements section of the upcoming Big Tujunga Wash Line newsletter.** The Big Tujunga website address was included on the front and back of the spring newsletter and will continue to be included on the front and back of future newsletters. *This action item is now complete.*

5. **ECORP will include an announcement in the spring 2012 Big Tujunga Wash Line newsletter that informs people that they can call Los Angeles County Sheriff's Dispatch if they see anyone in the Mitigation Area with paintball**

guns and/or air rifles. An announcement was included on page 4 of the spring newsletter. *This action item is now complete.*

6. **Grace Yu will coordinate a tour of the Mitigation Area for County and City Officials. Councilmember Krekorian would like 10 people from his office to attend. Grace Yu will schedule through Mary Benson once the water lettuce removal is finished.** The water lettuce removal has been completed and Mary Benson expressed that a site visit would still be a nice invitation for City officials. The Mitigation Area will be redistricted from District 2 to District 7 within the City of Los Angeles. This will likely occur sometime after July 1, 2012, which will result in a new District 7 representative for the Mitigation Area. A site visit would be a great transition to meet the new City officials involved and to introduce them to the Mitigation Area. Grace Yu will send Mary Benson a list of possible dates that would work best for a site visit, which Ms. Benson will then forward to Councilmember Krekorian and coordinate between contacts in District 2 and District 7.

7. **Ben Smith will provide Grace Yu with follow up photos of the problem trail at the north end of the Cottonwood area where equestrians are taking their horses down the steep hillside. Grace Yu will work with Flood Maintenance Division to determine a method to close that trail.** Photographs were provided to LACDPW and Flood Maintenance installed a barrier across the lower shortcut trail. However, the upper shortcut trail has not been blocked. This trail is a safety concern because there is metal debris sticking out of the side of the slope. Grace Yu will work with Flood Maintenance to determine a method to discourage riders from using the upper shortcut.

8. **Grace Yu will check on the correct phone number people should call for dog problems in the Mitigation Area.** Sergeant Caffrey from Los Angeles County Sheriff's Department stated that issues with loose dogs in the Mitigation Area should be reported to the Sheriff's Department dispatch [(800) 834-0064] and dispatch will coordinate with animal control to address the issue. *This action item is now complete.*

9. **Grace Yu will follow-up with Officer Larios by email to ask the officers who patrol on ATVs to shut off their vehicles when approaching equestrians on the trials. In addition, she will ask him to remind his officers to talk to the riders as they approach so the horses recognize them as people.** Officer Larios has been reassigned. LACDPW contacted Officer Larios's supervisor and the patrol team has been notified. Grace Yu also reminded the Los Angeles Police Department, the County Sheriff's Department, and County Animal Control that motorized vehicles are not allowed in the Mitigation Area, except in emergency situations. *This action item is now complete.*

10. **ECORP will notify Grace Yu about the date of the next maintenance event in the Mitigation Area. Grace Yu will send a notification to the community about when the crews will be on site.** A notification was sent out prior to site maintenance activities. *This action item is now complete.*

11. **Mari Quillman will email the article about why trees and vegetation should not be cut during the bird breeding season to Grace Yu. Valerie De La Cruz**

will review the article and then forward it to Chris Arlington for the SHPOA newsletter and an email blast to the SHPOA members. The article will also be provided to Terry Kaiser so he can send them it to the ETI members. The article was sent to Valerie De La Cruz in 2011. No action was taken by LACDPW at the time. ECORP will resend the article to Grace Yu in the fall of 2012.

12. **ECORP will prepare text for an email blast (in English and Spanish) to the SHPOA and ETI members about the importance of staying on the trails in the Mitigation Area. ECORP will provide the text to LACDPW for review and then Grace Yu will provide it to Chris Arlington and Terry Kaiser.** It was decided that ECORP will provide Chris Arlington and Terry Kaiser with electronic copies of the Spanish/English information brochure.

13. **Grace Yu will continue following up with Vector Control to find out additional information about the schedule for mosquito treatment within the Mitigation Area.** LACDPW contact at Vector Control has retired. Wesley Collins is the new contact for the Mitigation Area. A mosquito treatment in the Mitigation Area was conducted late last summer. Mr. Collins will email Cindy Rowlan prior to each mosquito/vector control treatment conducted at the Mitigation Area. People are encouraged to notify Grace Yu or Cindy Rowlan if they are noticing mosquito infestations in the Mitigation Area. Several CAC members did state that the mosquitoes are just now starting to be a problem so Cindy Rowlan will notify vector control to schedule a treatment in the Mitigation Area.

14. **Grace Yu will coordinate a meeting on site with Andrea Gutman or Terry Kaiser regarding graffiti abatement.** Cindy Rowlan provided information regarding the online Graffiti Hotline where people can report graffiti. Grace Yu stated that when reporting graffiti at the Mitigation Area on the online form, it is important that the "flood control" option be checked in order for LA County to address the request within the Mitigation Area. If "property" or "residence" is checked, then the online request will be denied, as those areas are serviced by the City's graffiti abatement team. *This action item is now complete.*

15. **ECORP will send the text of an email blast to Grace Yu that reminds the equestrians and other site users to report mosquito infestations and trail problems. In addition, the email blast will include the graffiti hotline number.** This action item was completed in 2011 but the CAC group decided it would be worthwhile to send another email blast out about reporting trails issues and downed trees. ECORP will send the text for a new email blast to Grace Yu for review and then Grace Yu or Cindy Rowlan will send the email out to the people on the email list.

16. **ECORP will follow-up with Terry Kaiser to see if he is still willing to provide GPS data for the minor trails through the Mitigation Area.** LACDPW will initiate a contract to survey all the trails within the Mitigation Area for an updated map. ETI has already begun tracking the minor trails within the Mitigation Area with GPS equipment and is able to send the data to LACDPW. LACDPW will provide the data to ECORP so the minor trails can be incorporated into the trails map for the Mitigation Area. Grace Yu will work with ECORP to have a biologist walk the minor trails in the Mitigation Area to assess them for biological resources.

17. **LACDPW will decide if they want to move forward with installing trails signs that indicate open and closed trails and directions. If requested, ECORP will provide LACDPW with information on where the Bureau of Land Management has their trails signs fabricated.** This item will be initiated once the official trails map has been updated with minor trails.

18. **Grace Yu and Cindy Rowlan will check into creating a certificate of community service for kids who help out with the trails cleanup day in the Mitigation Area. Grace Yu will send an email to Mary Benson and Elektra Kruger announcing the program and will include an indemnification form for parents to sign if kids are under the age of 18. Mary Benson and Elektra Kruger will forward the announcement to Sunland Tujunga Village Christian School, Sun Valley High School, and other applicable organizations.** This action item could not be completed prior to the 2011 Trails Maintenance Day but LACDPW may be able to do this prior to the 2012 Trails Maintenance Day. Mary Benson will get an example certificate from Heal the Bay and send it to Grace Yu. Grace Yu will follow-up internally in LACDPW.

IV. New Discussion Items

1. Site Security Issues

Sergeant Caffrey from the Los Angeles County Sheriff's Department was present at the meeting and discussed the current safety issues at the Mitigation Area. Sergeant Caffrey reported the following facts to the CAC group:

- The Sheriff's Department has 10,000 sworn deputies throughout 26 stations serving LA County, including one office at Whittier Narrows, one station in Castaic, and one in South LA;
- They recently took over Los Angeles County Office of Public Safety (OPS);
- They have unlimited resources to address emergencies; however, due to the remote nature of the Mitigation Area, it may take time for deputies to show up at the site;
- The Sheriff's Department patrols all County Parks throughout Los Angeles County but they do not patrol the City Parks (only portions of Hanson Dam area are under the authority of the Sheriff's Department);
- Call the phone number for the Sheriff's Department dispatch on the back of the newsletter to report any problems (1-800-834-0064). When you are on the phone with dispatch, explain your location with reference to the Tujunga Ponds because that is the only point of reference the Sheriff's Department has for the Mitigation Area. If it is a minor issue, they will send a deputy over if there is already one in the area;
- The only address that the Sheriff's Department dispatch has for the Mitigation Area is I-210 and Wentworth;
- The Sheriff's Department does not work very closely with the Los Angeles Police Department (LAPD);
- The Sheriff's Department does have a mounted patrol that they can dispatch, if needed;

- If there is a special event planned in the Mitigation Area, notify Sergeant Caffrey and he will be able to send deputies there to patrol, either mounted or on foot; and,
- There is a newly-formed off-road enforcement team that will also be able to respond to calls within the Mitigation Area.

Chris Arlington reported some issues she ran into while trying to report safety issues at the Mitigation Area (people with paintball guns, teenagers using weapons, and etc.) and asked for clarification on who patrols certain areas in and around the Mitigation Area. Cindy Rowlan stated that there was a plan in place (with regard to who patrols what portions of the Mitigation Area), but now it seems like we are back at square one, with questions as to who patrols the Mitigation Area. Sergeant Caffrey stated that the Mitigation Area is still a "gray area" in terms of the Sheriff's Department's jurisdiction, however, they will definitely be responding if there is a severe emergency. Ms. Rowlan requested a contact at the Sheriff's Department that the CAC can direct questions to. Also, LACDPW would like to give the Sheriff's Department maps of the Mitigation Area to aid dispatch in telling the deputies where the issue is happening. Sergeant Caffrey said it is also important for whoever calls dispatch to leave their cell phone number when reporting something so the deputy responding to the call can contact the person directly to ask for the person's exact location.

The Sheriff's Department has Cat 30 keys to access the Mitigation Area. It was requested that the road into the Mitigation Area at the North Wheatland entrance be smoothed out to allow easier access for patrol vehicles. If there is an emergency, the newly formed off-road enforcement team can use off-road vehicles to access areas within the Mitigation Area. The off-road vehicles, however, will not be used for regular patrols to be consistent with the rules and regulations of the Mitigation Area.

Chris Arlington, who is now a member of the Foothill Mounted Patrol Association will email their patrol reports to Sergeant Caffrey and he will forward them on to his mounted patrols.

The Sheriff's Department would like to know about all events occurring in and around the Mitigation Area. They may not be able to send deputies to patrol, but they would like to know anyway. Grace Yu mentioned that when a permit is requested for an organized event occurring in and/or around the Mitigation Area, then LACDPW will forward the information to the Sheriff's Department for notification.

2. Gate at South Wheatland Entrance

Terry Kaiser is continuing to investigate the construction of a new one-way gate at the South Wheatland entrance to the Mitigation Area for horse and rider safety purposes. Mr. Kaiser was able to get $5,000 approved by the neighborhood council. His original design is more expensive than the funds that he has so he is in the process of redesigning the project and getting 2 bids for the construction. While looking for a way to construct the gate in place, Mr. Kaiser found that there is a 20- to 30-foot drop off just north and inside of the South Wheatland entrance that is covered by vegetation. This drop off could be very dangerous if a horse or person stepped through the bushes at this location. Mr. Kaiser suggested that the existing fence be replaced or repaired to prevent horses or people from venturing into the area where the drop off is located.

LACDPW and ECORP will look into this issue. If a more stable fence is erected at that location, then Mr. Kaiser's design for the one-way gate can incorporate the fence in the design and this would lower the costs associated with constructing the one-way gate.

3. **Mitigation Area Permits for Organized Events**

The need for permits to authorize organized events within the Mitigation Area was discussed. LACDPW needs to be aware of all events in and around the Mitigation Area to maintain the site's function for mitigation purposes. LACDPW views the permits as having three functions; 1) to protect the site and its purpose as a mitigation area, 2) to protect users of the site, and 3) to notify LACDPW about events occurring in the Mitigation Area. LACDPW is most concerned about the recreational users that are unaware of the site's purpose as a mitigation area. Once LACDPW receives the permit application, they will then forward the event information to the Sheriff's Department so they are aware of the event(s). A question was raised about the number of riders that would constitute the need for a permit; oftentimes, groups of riders will run into each other on the trails and ride together, but it was never intended on being an organized riding event. LACDPW said these types of occurrences do not need a permit. Additionally, individual riders riding through the Mitigation Area to attend an organized event outside of the Mitigation Area boundaries do not need a permit either. Only the event organizers need to apply for the permit. LACDPW will also look into a rider threshold number that would warrant the need for a permit.

The Mayor's Good Food Day was a success this year; a permit was requested from LACDPW prior to the event. Chris Arlington mentioned that monthly Charro events are held at the Hansen Dam Equestrian Center. She will forward the information on these events to Mari Quillman. LACDPW will decide whether or not to have a Spanish-speaking biologist at some of these events to educate the Spanish-speaking riders about the purpose of the Mitigation Area.

V. Current Status of Programs

Exotic Plant Removal

A large exotic plant removal effort was conducted a few weeks ago. Due to breeding bird issues in the upland area, removal activities were not conducted in certain areas. These areas will be addressed during the next major exotic plant removal effort. Additionally, due to high rainfall amounts experienced recently, an increasing number of exotic plants have been observed. Natures Image will be out at the site again to conduct a removal effort prior to the vegetation monitoring studies this spring.

Exotic Aquatic Wildlife Species Removal

An exotic aquatic wildlife species removal effort will be conducted in the Mitigation Area within the next couple weeks.

Sensitive Species Surveys

The first of five arroyo toad surveys was conducted on Monday, April 23, 2012. Arroyo toads were not observed or detected. The first of eight least Bell's vireo surveys will be conducted on Monday, April 30, 2012. Southwestern willow flycatcher surveys will begin in May.

Water Quality Monitoring

Water quality monitoring was conducted in March 2012. Results were the same as in previous years; no changes in water quality at the Mitigation Area were documented. Results of the water quality monitoring were included in the 2011 Annual Report for the Mitigation Area.

Trails

The eroded trail adjacent to Big Tujunga Wash at the western edge of the Mitigation Area has been repaired and is now safe for users. It is unclear as to who performed the maintenance; possibly LA County Department of Parks and Recreation.

There was concern with a severely undermined trail near where the haul road goes under the 210 freeway. Due to safety concerns, this trail needs to be investigated and modified as soon as possible. LACDPW and ECORP will assess the problem and determine a method to either repair or close the trail in question. It appears that this trail might be within the Caltrans District 7 right-of-way. Grace Yu will check on whether or not this trail is located within an easement that LACDPW has in the area near the 210 freeway.

Other trails issues were also discussed, including the "sink hole" area at one of the creek crossings. Flood Maintenance Division blocked the trail to the "sink hole." ECORP's Biologists will conduct a site visit to check out the trail closure at the crossing.

Community Outreach

The CAC members stated that they thought the community outreach program utilizing the Spanish-speaking biologist has been very successful. Trash has been greatly reduced within the Mitigation Area. LACDPW will continue this program during the summer of 2012.

VI. Discuss and Schedule for the Next Trail Maintenance Day

The next Trail Maintenance Day is scheduled on September 29, 2012 from 8:00 am to 12:00 pm. The event will be cancelled if rain is forecasted. An alternate day of October 13 or 20, 2012 may be utilized if the event is cancelled. LACDPW will provide trash bags, gloves, water, and snacks.

VII. Schedule Next CAC Meeting

The next CAC meeting is scheduled for Thursday, September 27, 2012, from 6:30 pm to 8:30 pm at Hansen Yard, 10179 Glen Oaks Boulevard, Sun Valley, California, 91352.

VIII. Action Items

1. Grace Yu (LACDPW) will send the Mitigation Area website link to Carlos George and Terri Ortiz.

2. Grace Yu will send Mary Benson a list of possible dates for a tour of the Mitigation Area for County and City Officials and Mary Benson will forward it on to Councilmember Krekorian's office. Mary Benson will also coordinate between District 2 and District 7.

3. Grace Yu will work with Flood Control to determine a method for blocking the steep upper shortcut trail at the end of the Cottonwood Avenue area where the metal debris is sticking out of the side of the slope.

4. Mari Quillman (ECORP) will resend the article about trimming trees in the fall as opposed to other seasons to Grace Yu. Grace Yu will review it and then send it to Chris Arlington for the SHPOA newsletter and an email blast to SHPOA members. In addition, Grace Yu will also provide the article to Terry Kaiser so he can send it to ETI members.

5. Mari Quillman will provide Chris Arlington and Terry Kaiser with electronic copies of the English/Spanish Information Brochure.

6. Cindy Rowlan (LACDPW) will notify Vector Control to schedule a treatment for mosquitoes at the Mitigation Area.

7. Mari Quillman will send Grace Yu the text for a follow-up email blast that alerts site users about staying on the trails and reporting problems like downed trees on the trails. Grace Yu or Cindy Rowlan will review it and then send it out to the recipients on the email list.

8. Grace Yu will assess the need for open and closed trails signs once the new trails map is completed. If the signs are deemed necessary, then ECORP will provide Grace Yu with the information on where the Bureau of Land Management has their trails signs fabricated.

9. Mary Benson will provide Grace Yu with a community service certificate from Heal the Bay to use as potential template for a community service certificate that can be utilized for student volunteers at the Trails Maintenance Day. Grace Yu will follow up internally with LACDPW.

10. Grace Yu or Cindy Rowlan will provide the Sheriff's Department Dispatch with maps of the Mitigation Area to aid deputies when responding to calls in the Mitigation Area.

11. Grace Yu will coordinate with Flood Maintenance Division about blading or smoothing the access road in from the North Wheatland entrance in order to provide easier access into the Mitigation Area for the Sheriff's Department and LAPD.

12. Grace Yu and Mari Quillman will meet with Flood Maintenance Division and Terry Kaiser at the south Wheatland entrance to look at the location where the fence needs to be replaced or repaired.

13. Chris Arlington will send Mari Quillman info about the Charro get-togethers. LACDPW will decide whether or not to send a bilingual biologist to these events as an outreach activity.

14. Grace Yu will coordinate with Flood Maintenance Division about the problem trail near where the haul road goes under the 210 freeway. Grace Yu will also determine whether this trail issue is within the Caltrans right-of-way or if it is within a LACDPW easement. The trail is a safety issue that needs to be taken care of soon. An alternative solution was offered by Terry Kaiser. Terry Kaiser will report back to Grace Yu and/or Mari Quillman on the status of the trail problem.

15. Grace Yu or Cindy Rowlan will update the Mitigation Area website with the new water quality monitoring results from most recent monitoring study.

Big Tujunga Wash Mitigation Area

Community Advisory Committee Agenda

Date: Thursday, September 27, 2012

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. Exotic Wildlife Removal/Monitoring
3. Focused Surveys for Listed Wildlife Species
4. Water Quality Analysis
5. Trails Restoration/Maintenance

V. Schedule Next CAC Meeting

VI. Comments, Questions, and Answers

Big Tujunga Wash Mitigation Area Project
Community Advisory Committee
2012 Fall Meeting Minutes
September 27, 2012

I. Welcome/Introduction

Meeting attendance sign-in sheet attached.

II. Review of Meeting Agenda

Grace Yu reviewed the meeting agenda.

III. Discussion of Action Items from the April 26, 2012 Meeting

Action items from the last meeting were reviewed. Each action item is listed followed by the discussion about each item. New action items generated from the discussions are listed in Section VII.

1. **Grace Yu (LACDPW) will send the Mitigation Area website link to Carlos George and Terri Ortiz.** *This action item is now complete.*

2. **Grace Yu will send Mary Benson (City of Los Angeles District 7; City) a list of possible dates for a tour of the Mitigation Area for County and City Officials, and Mary Benson will forward it on to Councilmember Krekorian's office. Mary Benson will also coordinate between District 2 and District 7.** Mary Benson left Council District 2 and is now with Council District 7. Grace Yu and Mary will contact the following people for the tour: Council District 7 staff members, Sunland Tujunga staff members, and Gerald Rubicon (new City planning representative). Mary will let Chris Stone (LACDPW) know who will be attending. Grace will give Mary some times that would work best for a site visit, preferably during a morning. Mary will contact Chris Arlington (SHOPA) to let her know if Foothill Mounted Patrol should be present.

3. **Grace Yu will work with Flood Maintenance Division to determine a method for blocking the steep upper shortcut trail at the end of the Cottonwood Avenue area where the metal debris is sticking out of the side of the slope.** Boulders were placed at the top of the slope at the end of Cottonwood Avenue in the summer to prevent future use of the shortcut. There have been no complaints from the equestrian community regarding this trail closure. *This action item is now complete.*

4. **Mari Quillman (ECORP) will resend LACDPW the article about trimming trees in the fall as opposed to other seasons. Grace Yu will review the article and then send it to Chris Arlington for the SHPOA newsletter and an email blast to SHPOA members. In addition, Grace will also provide the article to Terry Kaiser (ETI) so he can send it to ETI members.** The

article was placed on page 3 of the Fall 2012 newsletter. *This action item is now complete.*

5. **Mari Quillman will provide Chris Arlington and Terry Kaiser with electronic copies of the English/Spanish Information Brochure.** *This action item is now complete.*

6. **Cindy Rowlan (LACDPW) will notify Vector Control to schedule a treatment for mosquitoes at the Mitigation Area.** Cindy Rowlan has been in contact with Vector Control. Applications have been done in the summer every three to four weeks. Mosquitoes do not appear to be a problem in the Mitigation Area right now; however, mosquitoes could become a problem due to dropping water levels, reduction of water flows in the creek, and an increase in stagnant water (due to rock dams and lack of rain during this time of year). If you see mosquitoes, let LACDPW know so that Cindy can schedule Vector Control. *This will be ongoing, and therefore, this action item is now complete.*

7. **Mari Quillman will send Grace Yu the text for a follow-up email blast that alerts site users about staying on the trails and reporting problems like downed trees on the trails. Grace or Cindy Rowlan will review it and then send it out to the recipients on the email list.** An email blast was sent on September 27, 2012. *This action item is now complete.*

8. **Grace Yu will assess the need for open and closed trails signs once the new trails map is completed. If the signs are deemed necessary, then ECORP will provide Grace Yu with the information on where the Bureau of Land Management has their trails signs fabricated.** LACDPW will regroup internally and determine a new plan for signage throughout the entire Mitigation Area. It may be necessary to close some trails and re-route them around problem areas; however, there is no need to update the official trails map at this point. *This action item has been temporarily tabled.*

9. **Mary Benson will provide Grace Yu with a community service certificate from Heal the Bay to use as potential template for a community service certificate that can be utilized for student volunteers at the Trail Cleanup Day. Grace will follow up internally with LACDPW.** There may be difficulty with issuing certificates because of current County protocol regarding volunteers. Chris Stone and Grace Yu will look into the current requirements for volunteers. In the meantime, Mary Benson will arrange for student volunteers to get their hours verified through another organization or group for work done in the Mitigation Area. *This action item is now complete.*

10. **Grace Yu or Cindy Rowlan will provide the Los Angeles County Sheriff's Department (LASD) Dispatch with maps of the Mitigation Area to aid deputies when responding to calls in the Mitigation Area.** LACDPW provided copies of Mitigation Area maps to LASD. It was announced during the meeting that City of Los Angeles Police Department (LAPD) would like copies of Mitigation Area maps again because all the copies they had have gone missing. Additionally, a new officer will be assigned to the Mitigation Area beginning

October 7, 2012. Mary Benson will provide information to the CAC about the new officer, including the name and contact information.

11. **Grace Yu will coordinate with Flood Maintenance Division about blading or smoothing the access road from the North Wheatland entrance in order to provide easier access into the Mitigation Area for LASD and LAPD.** Grace Yu will follow up with Flood Maintenance Division.

12. **Grace Yu and Mari Quillman will meet with Flood Maintenance Division and Terry Kaiser at the south Wheatland entrance to look at the location where the fence needs to be replaced or repaired.** The fence has been replaced. Terry Kaiser is waiting for a check in the mail for the gate construction. *This action item is now complete.*

13. **Chris Arlington will send Mari Quillman information about the Charro get-togethers. LACDPW will decide whether or not to send a bilingual biologist to these events as an outreach activity.** Chris Arlington did not hear of any Charro events since the last CAC meeting. There are problems on the trails where the Charro riders race the horses at the end of the day, where some riders will ride all the way from Hansen Dam Equestrian Center to the Tujunga Ponds. Contact information for the Charro promoter will be sent to Grace Yu so she can contact them about their schedule of events and activities. LA County Department of Parks and Recreation permitting office will have the information pertaining to events and activities scheduled. Grace will send information to ECORP should bilingual outreach at these events be warranted. *This will be ongoing, and therefore, this action item is now complete.*

14. **Grace Yu will coordinate with Flood Maintenance Division about the problem trail near where the haul road goes under the I-210 freeway. Grace will also determine whether this trail issue is within the Caltrans right-of-way or if it is within a LACDPW easement. The trail is a safety issue that needs to be taken care of soon. An alternative solution was offered by Terry Kaiser. Terry will report back to Grace and/or Mari Quillman on the status of the trail problem.** The subject property is under the jurisdiction of Caltrans, LACDPW does not have jurisdiction over this area. Caltrans never deeded the property back to the City after the construction of I-210 and the City (Council District 7) is negotiating with Caltrans for an encroachment permit for this area. Caltrans is still responsible for the areas 50 feet on either side of the I-210 freeway. *This item no longer pertains to the Mitigation Area and will be removed from the agenda.*

15. **Grace Yu or Cindy Rowlan will update the Mitigation Area website with the new water quality monitoring results from most recent monitoring study.** The most recent water quality data has been posted to the website and LACDPW is still working on adding the last 10 years' worth of water quality data to the website. *This action item is now complete.*

IV. Ongoing and New Discussion Items

1. Upcoming Events

- Hansen Dam Trail Riders will be having a cleanup day on November 4. Chris Stone recommended that they get a permit for all cleanup activities occurring in the Mitigation Area. When working in or adjacent to the Mitigation Area, volunteers should be trained on authorized and prohibited activities within the Mitigation Area.

- There is a major event occurring at the Hansen Dam Equestrian Center (HDEC) on September 30, 2012, the El Salvador Festival. Approximately 10,000 people are expected to attend. The Foothill Mounted Patrol will be there from 11:00 a.m. to 5:00 p.m. to patrol the event.

- The phone number for the Hansen Dam Recreation Center events coordinator (Katie O'Kelly) was distributed so LACDPW would be able to contact her for upcoming events adjacent to the Mitigation Area.

2. Mitigation Area Permits for Organized Events

A permit protocol for the Mitigation Area is currently in the works. This protocol will describe the types of activities that need permits and types that don't. The protocol should be in draft form by the next CAC meeting. Until the permit protocol is in place, Grace Yu will work with groups on a case-by-case basis to issue permits and waivers. To allow processing time, permit applications should be submitted at a minimum one month prior to the event.

3. Site Security Issues

- Several locations along the Wentworth Avenue fence between Wheatland and Cottonwood are down due to traffic accidents.

- There is a new LAPD team in the Hansen Dam area patrolling Sundays from 11:00 a.m. to 5:00 p.m. for the next six weeks. Councilmember Alarcon would like to arrange a mutual agreement between LAPD and LASD. It was suggested the area be actively patrolled by LASD or LAPD at the beginning of spring to help reduce the occurrences of prohibited activities later on in the spring and summer. Mary Benson and Chris Stone will discuss this further. Grace Yu will work with LAPD and LASD.

- It was announced that a Santa Monica Mountains Conservancy (SMMC) Ranger is on patrol each day for at least three hours on the north side of Big Tujunga Wash (east of Interstate 210 to Oro Vista Ave). The SMMC is now managing 300 acres adjacent to the Mitigation Area. The head ranger is Fernando Gomez.

- The CAC was encouraged to contact LASD Dispatch or Grace Yu if homeless encampments and structures have been identified within the Mitigation Area.

4. Parking near South Wheatland Entrance

Parking on the pavement along Wentworth Avenue at the South Wheatland Entrance is not allowed because all lanes are active traffic lanes. There is no way to obtain a permit from the City to park within the active traffic lanes; however, City and County personnel (and their subcontractors) are allowed to park vehicles off the road on the dirt trail between the curb and the fence at the South Wheatland Entrance. There is also a dirt lot across the street from the South Wheatland Entrance where City and County vehicles are allowed to park.

5. **Equestrian Crossing at Wheatland South Entrance**
Councilmember Alarcon is planning on conducting a feasibility study for putting in an equestrian crossing at Wheatland and Mary Bell. The crossing would look like a pedestrian crosswalk with solar-powered flashing yellow lights on either end of the crossing. The "walk" button would be located at horse height.

6. **Formalize CAC Meeting Membership list**
LACDPW would like to formalize the CAC membership list. Grace Yu sent around a list of organizations to the CAC and asked members to assign two representatives to each organization to streamline communication methods. The purpose of this formalized list is to have a single contact list for all organizations associated with the Mitigation Area so it is easier for LACDPW to disseminate information regarding the Mitigation Area. CAC meetings will still be open to the public. Members were also asked to add other organizations to the existing list if any were overlooked.

7. **Locks on Fences/Gates**
Grace Yu has noticed a large number of locks on the Mitigation Area gates and fences, most of which have unidentified owners. LACDPW would like to identify the owners and remove any unnecessary locks to maintain Mitigation Area site security. The gate at Foothill Avenue on the north side of the site is not owned by LACDPW, so LACDPW will not remove any locks from that gate. Terry Kaiser will check the locks on all the LACDPW-owned Mitigation Area gates and record the locks he can identify.

8. **Trail Cleanup Day**
It was announced that the annual Trail Maintenance Day had an official name change. The official name of the event is now the Trail Cleanup Day (TCD). The next TCD will be held on Saturday, October 20, 2012. Volunteers will meet at 8:00 a.m. at the Cottonwood entrance to the Mitigation Area and will help pick up trash and debris along the trails until 12:00 p.m. If there is a national weather forecast for rain, the event will be cancelled and an email blast will be sent out to community members. Contact Grace Yu if you would like to be added to the email blast list.

9. **Big Tujunga Dam Sediment Removal**
Terry Kaiser inquired about LACDPW work upstream of the Mitigation Area near the Big Tujunga Dam and how future work will impact the Mitigation Area. Due to the completion of the Big Tujunga Dam Seismic Rehabilitation Project and the future initiation of the Big Tujunga Reservoir Sediment Removal Project, the County anticipates that the flow release regime from the dam will change in the upcoming years which could impact habitat downstream. The County is currently working with regulators on an adaptive management plan to allow for regular dam releases and hopes to

have a plan in place by 2014. Currently, no drastic changes have been made to the dam operations. The dam is currently releasing water frequently, but in low quantities.

Mary Benson inquired about whether the North Big Tujunga Wash has been surveyed in the past and ECORP replied that it has been surveyed during exotic aquatic species removal efforts and during the focused arroyo toad surveys. If large amounts of water are regularly released from the Big Tujunga Dam, habitat for arroyo toad and sensitive fish species (Santa Ana sucker, Santa Ana speckled dace, and arroyo chub) will improve. Mari Quillman stated that if willows began to grow along the North Big Tujunga Wash, habitat quality for native fish and arroyo toads will be increased in this area due to the additional vegetation cover. Terry Kaiser asked if the varying water levels would affect sensitive fish in the wash. Mari stated that the Santa Ana sucker, which has been observed in this portion of the wash, is adapted to the varying water levels and drought/flood conditions characteristic to southern California and shouldn't be affected in a substantial way as long as there is always water present in the wash.

10. Vulcan Materials Company Lot

A 4-acre lot off Wentworth Avenue and Foothill Avenue, across from the Angeles National Golf Club, belongs to Vulcan Materials Company. Vulcan is interested in giving the area to an entity so the lot could be made into a parking lot and access area to the Big Tujunga Wash for recreation. There would be room to park horse trailers. It would require developing some trail routes from this area. Vulcan would like to partner with a willing agency or organization in a grant/restoration project which would serve as mitigation for a quarry down the street. Mike Linton and Chris DiMaggio are the contacts for Vulcan. Mari Quillman will contact Mike Linton to obtain information and possibly a boundary map of these areas from Vulcan.

V. Current Status of Programs

Community Outreach

The bilingual biologists were able to reach out to 100 people over 8 weekends this summer. The rock dam issue got worse over the summer but people have been receptive to the bilingual outreach. A plan to address the rock dams may be needed for next year.

Exotic Plant Removal

A large exotic plant removal effort was conducted in July and August. The next removal will take place in the fall, around November or December. LACDPW will distribute an e-mail blast to notify the community prior to the effort.

Exotic Aquatic Wildlife Species Removal

Two efforts have been completed to date, one in May and one in early September. One more will be conducted in November/December when temperatures are cooler, hopefully after a rain event. A large number of exotics have already been removed this year. Species include crayfish, largemouth bass, bluegill, green sunfish, fathead minnow, black bullhead, goldfish, carp, and American bullfrogs. The biologists found one bullfrog that had eaten a two-striped garter snake (a California Department of Fish and Game [CDFG] Species of Special Concern [SSC]) when a gut analysis was performed. No native species have been observed in the ponds, however, the biologists have been regularly seeing Santa Ana sucker (federally listed threatened), Santa Ana speckled dace (CDFG SSC), and arroyo chub (CDFG SSC) in Haines Canyon Creek. The biologists have reported that there appears to be higher densities of exotic aquatic wildlife species (primarily bullfrog, crayfish, and largemouth bass) in the creek since the water lettuce infestation last year. This is probably because the water lettuce infestation removed habitat for these species in the ponds, thus forcing these animals into Haines Canyon Creek. The biologists are using a new removal method in the ponds, in addition to their traditional methods, that is increasing the success of capturing largemouth bass and other sportfishes.

Brown-headed Cowbird Trapping

Brown-headed cowbird trapping was conducted in and adjacent to the Mitigation Area in the spring. Trapping concluded in June and a total of 137 cowbirds were captured and removed from the Mitigation Area (68 male, 68 female, one juvenile). A total of 211 cowbirds were removed from traps in same locations in 2011 (103 males, 99 females, nine juveniles). The fact that fewer cowbirds were trapped in 2012 is a good sign because it shows that trapping has been successful at removing cowbirds and that fewer native bird nests are being parasitized by cowbirds.

Sensitive Species Surveys

Arroyo toad, southwestern willow flycatcher, and least Bell's vireo surveys were conducted in the Mitigation Area in 2012. A native fishes survey may be conducted soon. A summary of each survey is found below:

- A <u>native fishes survey</u> is planned for October, which is outside the spawning season, when young fish are large enough to be captured, and consistent with the surveyor's permits.

- <u>Arroyo toad surveys</u> were completed in mid-July and no arroyo toads were observed or detected. The following species were detected: Santa Ana sucker (federally listed threatened), Santa Ana speckled dace (CDFG SSC), arroyo chub (CDFG SSC), two-striped garter snake (CDFG SSC), two species of native tree frogs, and western toad.

- <u>Southwestern willow flycatcher/Least Bell's vireo surveys</u> were completed by mid-July. Two adult willow flycatchers were observed in the riparian habitat in the central portion of the site. This species is state listed as endangered but the individuals observed were only migrants utilizing the site as a stopover during their spring migration. The two birds were only observed during the first survey conducted on May 21, 2012. No southwestern willow flycatchers, breeding willow flycatchers, or least bell's vireo were detected. However, approximately 50 species of native birds were observed, including the olive-sided flycatcher (CDFG SSC) and the yellow warbler (CDFG SSC). The yellow warbler usually co-occurs with least Bell's vireo. Currently, least Bell's vireos are not found in the Mitigation Area because of the density and structure of the riparian areas (no mid-story vegetation).

However, there is hope that the Least Bell's vireo will eventually move into the site from downstream areas where it is known to occur.

Water Quality Analysis
A water quality analysis will be conducted in November by MWH Global, Inc., the same company that has conducted the analysis in the past.

Trails Restoration/Maintenance
LACDPW and ECORP have been responding to trails issues that have been reported, and the trails appear clean and generally unobstructed. CAC members were encouraged to contact LACDPW or ECORP if they observe any issues with the trails system.

VI. Schedule Next CAC Meeting

The next CAC meeting is scheduled for Thursday, April 25, 2013, from 6:30 p.m. to 8:30 p.m. at Hansen Yard, 10179 Glen Oaks Boulevard, Sun Valley, California 91352.

VII. New Action Items

1. Grace Yu and Mary Benson will contact the following people for a City/County tour of the Mitigation Area: Council District 7 staff members, Sunland Tujunga staff members, and Gerald Rubicon. Mary will let Chris Stone know who will be attending the tour of the Mitigation Area. Grace will give Mary some times that would work best for a site visit, preferably during a morning. Mary will contact Chris Arlington to let her know if Foothill Mounted Patrol should be there during the site visit.

2. Mary Benson will provide the name and contact information of the new officer assigned to patrol the Mitigation Area to the CAC.

3. Grace Yu will follow up with Flood Maintenance Division about blading or smoothing the access road from the North Wheatland entrance in order to provide easier access into the Mitigation Area for the LASD and LAPD.

4. ECORP will draft a Mitigation Area permit protocol.

5. Mary Benson and Chris Stone will advocate scheduling more LAPD and/or LASD patrols of the Mitigation Area. Grace Yu will work with LAPD and LASD.

6. Grace Yu will formalize the CAC Meeting Membership list.

7. Terry Kaiser will check the locks on all the LACDPW-owned Mitigation Area gates and record the locks he can identify to help LACDPW.

8. Mari Quillman will contact Mike Linton at Vulcan Materials Company for information and possibly to obtain a boundary map of the Vulcan Materials Company properties along Foothill Boulevard.

APPENDIX R

Public Outreach Memos

August 13, 2012
(2010-116.007/012)

Grace Yu
Water Resources Division
County of Los Angeles, Department of Public Works
900 S. Fremont Avenue
Alhambra, CA 91803-1331

SUBJECT: Public Outreach on August 11, 2012 for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

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.

ECORP biologist Israel Marquez conducted a bilingual outreach effort on August 11, 2012 between the hours of 2:00 pm and 6:00 pm. Details on the outreach effort will be included in the final public outreach memo that will be prepared upon completion of this task. However, this memorandum details an encounter the biologist had with a recreationist that has admitted to consistently building rock dams within and adjacent to the Mitigation Area.

Mr. Marquez encountered a Caucasian female and male in their early 30's around 5:50 p.m. on August 11, 2012 at the popular swimming area near the South Wheatland entrance. Both were carrying towels and smoking cigarettes. Mr. Marquez approached the pair and notified them that smoking was prohibited in the Mitigation Area and began discussing the appropriate recreational uses of the Mitigation Area. After Mr. Marquez explained that rock dams and swimming were also prohibited activities, the woman, who identified herself as 'Kris', notified Mr. Marquez that she was responsible for building many of the dams throughout the Mitigation Area. Kris stated that she had been building rock dams in this area for awhile and proceeded to give Mr. Marquez a tour of a couple of the rock dams and swimming areas she has created. Kris also showed Mr. Marquez a rock bridge she constructed for the purpose of crossing Big Tujunga Wash on the northwest side of the Mitigation Area. At this rock bridge location, there was plenty of space between rocks and the crossing did not seem to affect the water flow at all or the stream habitat in any major way.

After showing the biologist the rock bridge crossing Big Tujunga Wash, Kris mentioned that the biggest swimming pool in the area resulting from rock dams is located west of the power lines (outside of the Mitigation Area), and that she doesn't even like to go there because it seems dangerous. Kris began smoking another cigarette and Mr. Marquez explained to her again why smoking was not allowed in the Mitigation Area, not only because it is a prohibited activity but also because of the hot weather and the current fire season. Kris did not listen to Mr. Marquez and said that she was fine because she takes all the cigarette butts with her.

Kris then proceeded to show Mr. Marquez an area she called her “secret swimming hole.” The “secret swimming hole” was located approximately 300 feet west of the South Wheatland entrance and approximately 200 feet east of the popular swimming area. The water in the “secret swimming hole” was approximately 4 feet and 10 inches deep and is pooled due to sturdy rock dam she built with large boulders. A small amount of water flows through the rock dam, but water levels downstream of the rock dam are extremely low. No fish were observed in the swimming hole. The area surrounding the swimming hole is relatively clean and free of trash and debris; Kris mentioned that she tries to keep the area as clean as possible.

Kris said that she lives near the Mitigation Area (approximately 10 minutes walking distance) and that she owns a boarding facility for horses, next to the U.S. Army Corps of Engineers property. She had red hair, was approximately five and a half feet in height, and had a tattoo on her back that said “Valerie” (her daughter’s name). She did not give Mr. Marquez her last name but did mention that she was in the newspaper recently due to her husband’s death (apparently he was murdered). Mr. Marquez was under the impression that she may have been under the influence of a drug or stimulant at the time of his encounter with her, as she was very hyper active and quite frenetic. However, she did not appear dangerous to Mr. Marquez. She was very familiar with the Mitigation Area and visits the site regularly to build dams and go swimming.

When Mr. Marquez walked back towards the South Wheatland entrance with Kris, Kris’s male friend and another male individual were already moving rocks, possibly to build a new rock dam. Mr. Marquez left the site approximately at 6:10 p.m.

If you have any questions regarding the content of this memorandum, or would like maps of the approximate locations of the dams and trail mentioned above, please don’t hesitate to contact Kristen Mobraaten at (714) 648-0630.

I hereby certify that the statements furnished above present the data and information required for this memo, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Sincerely,

SIGNED: ______________________ DATE: August 13, 2012

Israel Marquez
Assistant Biologist

October 9, 2012
(2010-116.007/012/12)

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

SUBJECT: Public Outreach for July through September 2012 for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

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 ECORP biologists Jesus "Freddie" Olmos, Alfredo Aguirre, and Israel Marquez on eight different occasions. Outreach efforts took place on July 21 and 28, August 4, 11, and 19, and September 1, 2, and 3, 2012. All outreach efforts took place during the peak hours of 10:00 AM to 3:00 PM.

During all outreach visits both equestrian and non-equestrian visitors received an educational brochure outlining the County of Los Angeles Department of Public Works (LACDPW) conservation goals for the Mitigation Area. The educational brochure also contained the Mitigation Area's rules and regulations. During each outreach event, ECORP biologists spoke about why specific activities are prohibited in the Mitigation Area. Most outreach events included informal interviews, and short question and answer sessions. Visitor's questions for the biologist ranged from natural history topics to questions about the purpose of the Mitigation Area's rules and regulations.

Outreach took place throughout the Mitigation Area. ECORP biologists walked the established trails system and popular swimming/wading locations in the Haines Canyon Creek or Tujunga Ponds and spoke with visitors within the Mitigation Area. Visitors that were interviewed fell into one of two groups: non-equestrian family groups or equestrian user groups.

Non-Equestrian Family Groups

Over 100 non-equestrian individuals were encountered during the eight outreach visits. Most of the people were situated along the Haines Canyon Creek and the Tujunga Ponds. The family groups were there to have picnics and swim in the water features. All site users were given an informational brochure about the site, informed about activities that are prohibited in the Mitigation Area, and asked if they had any questions. Some of the issues observed included smoking, alcohol consumption, rock dams in the river, littering, fire pits, and vegetation removal (Figure 1).

Some of the groups that were interviewed were receptive while others were not as receptive. Many of the people on the site agreed to not use grills, start fires, smoke cigarettes, or litter, but many continued to swim and wade in the creek even after being told that swimming was not permitted.

Most of the family groups that were interviewed during the site visits were of Latino heritage with some users being monolingual (Spanish only) and others being bilingual Spanish-English speakers.

Effects on Sensitive Habitat by Non-Equestrian Family Groups

The largest impacts on sensitive habitat by non-equestrian family groups are caused by swimming and dam creation within Haines Canyon Creek. There are a few unauthorized swimming holes that have become popular spots for non-equestrian family groups to congregate, picnic, and swim. The most popular location for picnickers and swimmers is the unauthorized swimming pool situated approximately 1,000 feet west of the South Wheatland Ave entrance. During the outreach visits, children and adults were observed swimming and wading in this pool. One of the most detrimental activities associated with the popular swimming hole is the creation of rock dams designed to make the swimming areas deeper. The creation of rock dams has persisted despite the outreach efforts and constant removal of these rock dams. The dams consisted of large dead branches, boulders, debris, trash, and plastic placed across a narrow portion of the creek that reduced the natural flow (Figures 2 and 3). The changes to the natural flow of the creek can be detrimental to the sensitive species of fish within the creek. The rock dams reduce the flow of the creek and create large pools of water that are favorable habitat for the exotic, invasive aquatic species, such as the red swamp crayfish (*Procambarus clarkii*) and American bullfrog (*Lithobates catesbeianus*), that prey on native species such as the federally listed (threatened) Santa Ana Sucker (*Catostomus santaanae*). These pools reduce suitable breeding habitat for sensitive fish species as well.

In an effort to reduce these effects, non-equestrian family groups were approached and educated during the outreach site visits. All documented rock dams were removed promptly (Figures 4 and 5).

Additional adverse effects of non-equestrian family groups include increased littering with the popular picnic areas, vegetation removal, and unauthorized fire pits and campfires.

Equestrian User Groups

Equestrians were approached and interviewed along the established trails or in the upland areas of the Mitigation Area. Equestrians were provided with the bilingual brochure and informed about many of the unique aspects of the Mitigation Area. Outreach events with equestrians were usually brief but most of the equestrian site visitors were receptive to the outreach efforts. Most questions to ECORP biologist were about the conservation efforts taking place at the Mitigation Area. Several riders stated that they were planning to post the education brochure at their stable to get the word out to fellow riders.

Riders were reminded to cross the creek single file to minimize erosion along the banks, and to stay on the established trails.

Effects on Sensitive Habitat by Equestrian Site Visitors

Equestrian site visitors can affect sensitive habitat by traveling off of the established trail system; however, evidence of this was not observed during the outreach visits conducted in 2012. This type of activity typically occurs when a portion of the trail is impassible due to fallen trees and branches or if the trail is extremely muddy or flooded from recent rains. The making of new trails and traveling off of the established trails can be avoided with continued trail maintenance and equestrian site visitor education. Through these efforts, the frequency of users traveling off of the established trails system can be reduced.

I hereby certify that the statements furnished above present the data and information required for this memo, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Phillip Wasz DATE: October 9, 2012

Phillip Wasz
Biologist

Figure 1: Non-equestrian family group picnicking at the popular swimming area near the South Wheatland entrance on September 2, 2012 (Labor Day Weekend).

Figure 2. An extreme example of an elaborate rock dam built at the popular swimming area near the South Wheatland entrance on September 2, 2012. The recreational users removed this dam before they left the Mitigation Area.

Figure 3. Rock and debris dam blocking the natural flow of Haines Canyon Creek on July 21, 2012. The bilingual biologist removed this dam during the outreach effort on that same day.

Figure 4: Rock dam in Haines Canyon Creek before removal on September 1, 2012.

Figure 5. Rock dam location in Haines Canyon Creek after removal on September 1, 2012.

APPENDIX S

Illegal Structure Monitoring and Removal Memo

July 18, 2012
(2010-116.006)

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

SUBJECT: Site Visit and Documentation of the Illegal Structure in the Big Tujunga Wash Mitigation Area

Dear Ms. Yu:

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 a site visit to document the effects of an illegally built structure and homeless encampment located within the Mitigation Area.

A site visit was conducted on July 17, 2012 by ECORP biologists Kristen Mobraaten, Carley Lancaster, and Tania Asef. Photographs and detailed survey notes were documented during the site visit to aid the County of Los Angeles Department of Public Works (LACDPW) in planning removal and clean-up activities to remove the structure from the Mitigation Area.

The illegally constructed structure was located northwest of the Cottonwood gate entrance in the Mitigation Area (Figure 1). A small trail, approximately three feet wide, led to the structure that had been constructed under the canopy of a large, mature acacia tree (*Acacia* sp., non-native species) in an area that had been previously documented as cottonwood-willow riparian habitat. Underneath and adjacent to the structure, a patio area consisting of a non-cemented cobblestone pathway had been constructed using rocks from the surrounding area. The area of disturbance where the structure had been built, including the cobblestone patio area, was approximately 30 feet wide and 40 feet long. The main structure and many of the surrounding objects were either painted or covered in camouflage coloration. Dead branches had been removed from surrounding vegetation to conceal the structure from view. Only small amounts of vegetation appeared to be trimmed or removed during construction of the structure.

Approximately 75 feet northwest of the main structure, a large pit (approximately 4 feet wide, 3 feet long, and 5 feet deep) had been dug out by hand using shovels (Figures 2 and 3). The pit, presumably dug in preparation for construction of a latrine, was located under the canopy of an oak tree (*Quercus* sp.). Human waste was discovered behind the oak tree just beyond the pit to the north/northeast. The latrine pit was not located on a slope or hiking trail, and was not located in close proximity to any waterway.

Five non-native California pepper trees (*Shinus molle*) were found planted adjacent the trail leading to the main structure (Figure 4). It is believed that these trees were planted within the last year to increase vegetative cover and further conceal the unauthorized structure.

Lastly, trash and debris, including paper waste, glass bottles, and aluminum cans, were found in the vicinity of the structure and latrine pit (Figures 5 and 6).

Recommendations

LACDPW is planning on removing the structure, filling in the pit, and disposing of associated trash and debris within the next two weeks. The following measures are recommended to reduce and/or eliminate impacts to sensitive biological resources within the Mitigation Area.

The primary issue of concern during the structure clean-up activities would be impacts to nesting birds in the immediate area of the structure and latrine pit. Due to the dense structure of the vegetation surrounding the area, and because the clean-up activities would be conducted during nesting bird season (March 1 through September 1, according to the California Department of Fish and Game Streambed Alteration Agreement [SAA] for the Mitigation Area), a pre-construction breeding bird survey would need to be conducted to identify any birds potentially nesting in the area and to be consistent with requirements listed in the SAA. The pre-construction breeding bird survey should be conducted one to three days prior to the commencement of clean-up activities. A biological monitor should be present during clean-up operations to ensure no impacts to breeding birds and nests (if identified) will occur.

In order to further reduce impacts to the surrounding area, it is recommended that the majority of the structure be removed by hand to minimize impacts to the surrounding vegetation. If equipment and machinery are required for clean-up activities, it is recommended that the smallest types of equipment be used to reduce impacts to surrounding native vegetation (e.g., a Bobcat). Where possible, vegetation be trimmed or crushed rather than removed to make space for any equipment or machinery.

The cobblestone patio area should be broken up and removed to maintain continuity of the disturbed structure area with the natural surroundings.

The five California pepper trees should be removed during clean-up operations, as they are a fast-growing, non-native species that would affect the native plant species surrounding the trees.

The latrine pit is located directly underneath the canopy of a mature oak tree, a tree that is protected under the Oak Tree Ordinance in the Los Angeles County General Plan. In order to reduce impacts to the oak tree during filling of the latrine pit, it is recommended that fill-in of the pit be conducted entirely by hand (without the use of machinery or equipment). It was determined during the site visit that additional permits or consultation with regulatory agencies regarding potential impacts to waterways would not be required for this type of fill activity because the latrine pit is located far away from any waterway within the Mitigation Area. Because the latrine pit is located near the edge of a slope, care should be taken during the fill-in process to not push rocks and soils over the edge of the slope and into the vegetation below.

During the latrine pit fill activity, the human waste located on the north/northeast side of the oak tree should be buried in the pit as it is filled. Additionally, the rocks that comprise the cobblestone pathway may be used to help fill the latrine pit.

After the completion of clean-up and removal activities, it is recommended that the trail leading to the structure site be closed to prevent further use by recreational users. The trail leading to the structure does not connect with the main trail system within the Mitigation Area; it comes to a dead end at the latrine pit. Additionally, the clean-up operations will likely create an obvious path to the structure, which may appear to be an official trail to recreational users. Placement of large boulders, vegetation debris, and/or fallen branches and logs at the trail entrance will deter further use by recreationists.

Lastly, the non-native acacia tree at the site of the structure should be girdled, treated with herbicide, and left in place during the next restoration maintenance site visit.

If you have any questions about the content in this memorandum, please feel free to contact me at (714) 721-3793.

I hereby certify that the statements furnished above present the data and information required for this biological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Kristen Mobraaten　　　　DATE: July 20, 2012

Kristen Mobraaten
Wildlife Biologist

Figure 1: Illegally constructed structure

Figure 2: Trail leading from structure to latrine pit

Figure 3: Latrine pit

Figure 4: Non-native Pepper trees planted at trail entrance to structure

Figure 5: Garbage and debris on trail leading to structure

Figure 6: Additional debris associated with the structure

December 20, 2012
(2010-116.008/019/19)

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

SUBJECT: Biological Monitoring Report for the Illegal Structure Removal at the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Yu:

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) worked with the County of Los Angeles Department of Public Works (LACDPW) to remove an illegal structure from the Mitigation Area.

On July 16, 2012, an illegally constructed structure was discovered in the Mitigation Area. LACDPW project personnel and ECORP biologists conducted an initial site visit on July 17, 2012. Photographs and detailed survey notes were documented during the initial site visit to identify any biological impacts resulting from the illegal structure construction and any potential biological constraints that may affect clean-up and removal activities. Following this site visit, a memo was prepared to assist LACDPW in planning the removal and clean-up activities to remove the structure from the Mitigation Area.

The illegally constructed structure was located northwest of the Cottonwood gate entrance in the Mitigation Area. A small cobblestone patio was constructed around the entrance of the structure. Approximately 75 feet northwest of the structure a large pit had been dug out using shovels, presumably dug in preparation for construction of a latrine. Five non-native California pepper trees (*Shinus molle*) were found planted adjacent to the trail leading to the main structure and trash and debris associated with the structure were found in the vicinity of both the structure and latrine pit.

Removal and clean-up activities began on July 30, 2012. Prior to the commencement of structure removal activities, ECORP biologists Kristen Mobraaten and Carley Lancaster conducted a pre-construction survey of the work area to search for active bird nests and any other sensitive biological resources present. There were no active bird nests or other sensitive biological resources identified in and around the work area. Following the pre-construction survey, the biologists held a biological resources briefing for the workers to explain the sensitive biological resources at the Mitigation Area and their significance to the Mitigation Area. Specific emphasis was placed on breeding birds and active nests because the removal activities occurred during the breeding season.

The crew began the removal and clean-up activities on July 30 by tearing down the main structure. Several branches of the non-native acacia tree (*Acacia* sp.) that the structure had been built under were trimmed with a chainsaw to allow workers easier access to the structure. The five non-native California pepper trees planted along the access path were also removed using a chainsaw. A backhoe was utilized to begin transporting trash and debris from the work area to a dumpster located in the staging area near the Cottonwood gate. An access route of approximately six feet in width along the existing access trail was created as a result of the backhoe traveling down the trail. Instead of completely removing vegetation to allow backhoe access to the work area, the existing vegetation was simply crushed so that the plants would be able to recover faster. Sensitive plant species were not affected by backhoe access along the existing trail. By the end of the day, the entire structure had been dismantled and most of the cobblestone patio area was broken apart and left in place.

On July 31, clean-up and removal activities continued in the work area. Work was mostly focused on removing the trash and debris resulting from the structure dismantling process. The crew removed the structure foundation, finished breaking up the cobblestone patio, filled in the latrine pit, and covered the associated human waste with dirt. Both the latrine pit and the area where the waste was covered were both compacted by hand to prevent further erosion during future storm events.

Boulders were placed at the head of the trail leading to the structure site on August 1 to deter recreationists and site visitors from entering the structure site. All clean-up and removal activities were complete as of August 1, 2012.

The biological monitor took detailed notes regarding structure removal activities during all removal activities conducted within the Mitigation Area. A photograph log of the removal activities was also prepared and is attached to this memo.

Impacts to breeding birds and sensitive biological resources did not occur during structure removal and clean-up activities.

I hereby certify that the statements furnished above present the data and information required for this biological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

SIGNED: Kristen Mobraaten DATE: December 20, 2012

Kristen Mobraaten
Wildlife Biologist

Illegal Structure Removal Photograph Log

Figure 1: Illegal structure before removal activities.

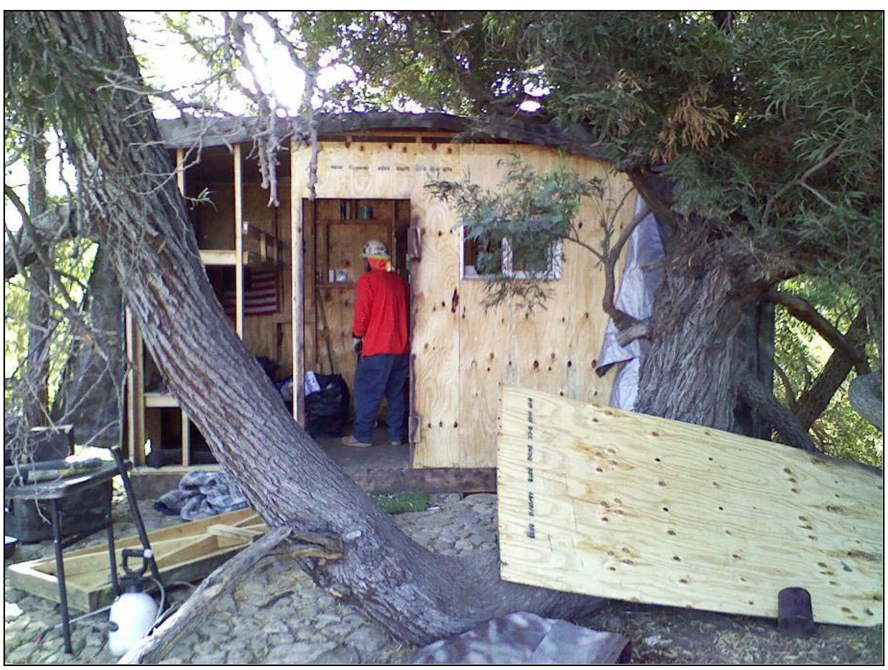


Figure 2: Crew removing structure.

Figure 3: Structure site after removal (foundation was removed separately).

Figure 4: Access trail before removal activities.

Figure 5: California pepper trees planted along the access trail.

Figure 6: Backhoe using access trail to remove trash and debris.

Figure 7: Removal of California pepper trees using the backhoe.

Figure 8: Access trail at completion of removal activities.

Figure 9: Cobblestone patio before removal.

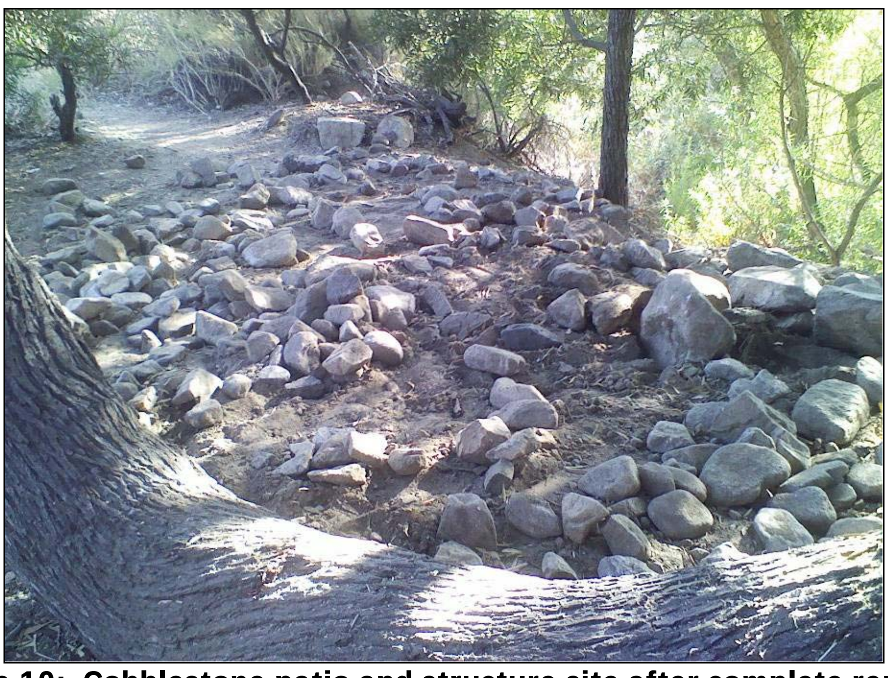


Figure 10: Cobblestone patio and structure site after complete removal (rocks were left in place).

Figure 11: Latrine pit before being filled in.

Figure 12: Latrine pit after being filled in.

Figure 13: Trash and debris before removal.

Figure 14: Trash Removal on Trail Complete.

Figure 15: Potted plants and other trash were removed.

Figure 16: Boulders were placed at trail entrance to close off trail.